UNIVERSITY OF SEVILLE

Faculty of Tourism and Finance

Interuniversity Doctorate in Tourism

Doctoral Thesis

Circular Economy in the Portuguese Hotel Industry

Berta José Fernandes Costa

Seville, Noviembre 2022

UNIVERSITY OF SEVILLE

FACULTY OF TOURISM AND FINANCE

PhD in Tourism: Innovation in Tourism Businesses

Doctoral Thesis

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Seville, Noviembre 2022

Adoramos a perfeição, porque a não podemos ter; repugná-la-íamos se a tivéssemos.

O perfeito é o desumano porque o humano é imperfeito.

Fernando Pessoa

ACKNOWLEDGEMENTS

In the course of this research project, I have received a great deal of support, assistance, and encouragement.

I would like to acknowledge my co-supervisor Professor Susana Rodrigues, and my supervisor Professor Maria Pilar Moreno for their valuable collaboration, guidance, and support which allowed my work to be taken to another level. I am also very grateful for their confidence, and for believing in the project since the very beginning. Their knowledge and plentiful experience have encouraged me throughout this journey.

Some special words of gratitude go to Professor Carina Silva for her contributions and technical support.

I would also like to express my gratitude to my friend Filipe Pinto, and to my dearest cousin Eugénio Neves for their assistance in collecting the key data to accomplish this study.

To all the Portuguese hotel managers who took part in the exploratory study and to those who responded the questionnaire in such a complex and demanding period, my deepest gratitude.

To the University of Seville and to School of Tourism and Maritime Technology – Polytechnic of Leiria for the opportunity, and particularly to Professor Paulo Almeida, my recognition.

A very special word to my friends ‘Zimbora’ just for being there for me!

And last, but not the least, to the love of my life, my family! For the strength and motivation in achieving my goals. This thesis is dedicated to you!

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Costa, B., Rodrigues, S., Moreno, P. (2020). *Circular Economy and the Tourism Industry.* Journal of Global Business and Technology. Volume 16, Number 1. (SCOPUS Indexed)

Costa, B., Rodrigues, S., Silva, C., Moreno, P. (2022). *Circular Economy and the Portuguese Hotel Industry – awareness, attitude and impact on the organisational performance.* Journal of Global Business and Technology. Volume 18, Number 2, (in press – SCOPUS Indexed)

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DOI: 10.4018/978-1-5225-9885-5.
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ISBN13: 9781522598855.

ABSTRACT

There is a substantial amount of literature on Circular Economy (CE), particularly at the industry level. Nevertheless, limited attention has been devoted to the implementation of Circular Economy in the Portuguese travel and tourism sector in general, and by the Portuguese hotel industry in particular.

This thesis investigates Circular Economy and its implementation by the Portuguese hotel industry. Its main objective is: To examine the adoption of Circular Economy by the Portuguese hotel industry. The specific objectives delineated are the following: 1. to examine if there is awareness within the hotel industry of the Circular Economy concept; 2. to determine if this industry is implementing Circular Economy; 3. to identify the challenges that the hotel industry tackles to implement Circular Economy; 4. to perceive the benefits of implementing a Circular Economy approach in the hotel industry; 5. to identify which initiatives would encourage hoteliers to implement Circular Economy; 6. to determine if the organisational performance distribution is homogeneous considering the CE hotels profile; 7. to examine if there is a relationship between the implementation of Circular Economy and the organisational performance of hotels.

In order to address the purpose of this thesis, the research was conducted in two phases. During the first phase a literature review on Circular Economy, CE R-Principles, linear economy, sustainability, CE dimensions (awareness, attitude, benefits, enablers, challenges and the organisational performance), CE and the tourism industry, as well as CE and the hotel industry was accomplished. These provide an understanding and a definition of the Circular Economy concept and allow to draw a distinction from those related concepts, so that the similarities and differences between these constructs could be highlighted. The Portuguese tourism sector in general and the Portuguese hotel industry in particular were also considered, so that the context in which this study takes place is contextualised. Some features regarding the Portuguese hotel industry that may provide

this specific sector the potential so as to encourage the transition to a Circular Economy model were also considered.

Throughout the second phase a quantitative approach were carried out by means of a questionnaire survey instrument conducted within the Portuguese hotel industry, with 78 valid responses obtained.

The results of this study demonstrate that there is awareness among the group of participants regarding the Circular Economy concept and its R-Principles in general, and that some CE practices are already being implemented. The positive predictive impacts of the implementation of a CE model on the organisational performance of hotels were also recognised, as well as that implementing Circular Economy in these companies stands out as a challenging task with various obstacles that need to be overcome. Growing awareness regarding firms' commitment to environmental issues and customers' increasing consciousness and demand for sustainable products and services were also identified, and evidenced as a strategy to have access to new markets and consumers, which will ultimately enhance companies performance and profitability.

The findings also indicate that an economic approach based on circularity is considered by hoteliers as extremely beneficial as it will allow companies to establish themselves as brands that are making progress towards sustainability, which will grant saving costs in the future, stimulate companies' innovation, and finally enable job creation. Additionally, the enablers to a CE implementation were identified, with hoteliers ranking the following: a stronger support from supply agents in the transition and implementation phases, specialised consultancy at disposal, the establishing of a national awareness strategy regarding CE dissemination and its R-Principles, tax reduction to assist accompanies on the transition, training provided by governmental entities, and financial support. The main challenges considered by the participants were the lack of investment in CE implementation strategies, in policies that mainly focus on waste processing instead of concentrating on waste management and R-Principles oriented, and the lack of incentives

to design circular products. At the organisational performance level, hoteliers reckoned that implementing CE in their companies would enable companies to acquire new competencies, reduce CO2 emissions, promote access to new markets and customers, increase customer satisfaction and the companies' overall performance.

The current research also revealed that hotels with higher star categorisation (four and five-star hotels), that are part of international hotel chains in the regions of Lisbon and Alentejo consider that a Circular Economy implementation would allow organisational performance of their companies to be strengthened.

This thesis aims to contribute not only to the Circular Economy literature in general but also to the CE and the Portuguese hotel industry literature, which has been vaguely studied so far, and provide hoteliers meaningful insights on this subject.

Keywords: Circular Economy, R-Principles, linear economy, sustainability, Portuguese hotel industry, CE awareness, CE benefits, CE challenges, CE enablers, CE attitude, organisational performance.

RESUMEN

Existe una cantidad sustancial de investigación académica sobre Economía Circular (EC), particularmente a nivel de industria. Sin embargo, se ha dedicado una atención limitada a la implementación de la Economía Circular en el sector de los viajes y el turismo portugués en general, y en el caso de la industria hotelera portuguesa en particular.

El principal objetivo de este proyecto de investigación es: examinar la adopción de la Economía Circular por parte de la industria hotelera portuguesa. Para ello se han definido los objetivos siguientes objectivos específicos: 1. examinar si existe conciencia dentro de la industria hotelera del concepto de Economía Circular; 2. determinar si esta industria está implementando la Economía Circular; 3. identificar los desafíos que enfrenta la industria hotelera para implementar la Economía Circular; 4. percibir los beneficios de implementar un enfoque de Economía Circular en la industria hotelera; 5. identificar qué iniciativas alentarían a los hoteleros a implementar la Economía Circular; 6. determinar si la distribución del desempeño organizacional es homogénea considerando el perfil de los hoteles de CE; 7. examinar si existe una relación entre la implementación de la Economía Circular y el desempeño organizacional de los hoteles.

Con el fin de abordar el propósito de esta tesis, la investigación se llevó a cabo en dos fases. Durante la primera fase, se realizó una revisión de la literatura sobre Economía Circular, Principios de R-CE, economía lineal, sostenibilidad, dimensiones de CE (conciencia, actitud, beneficios, facilitadores, desafíos y desempeño organizacional), CE y la industria del turismo, así como CE y la industria hotelera. Esta labor de revision ha proporcionado una comprensión y una definición del concepto de Economía Circular y há permitido establecer una distinción de los conceptos relacionados, de modo que se puedan resaltar las similitudes y diferencias entre estos constructos. También se consideró el sector turístico portugués en general y la industria hotelera portuguesa en particular, de manera que se contextualiza el contexto en el que se desarrolla este estudio. También se consideraron algunas características de la industria hotelera portuguesa que pueden

proporcionar a este sector específico el potencial para fomentar la transición hacia un modelo de Economía Circular.

En la segunda fase se há analizado empiricamente la implementación de la Economia Circular por parte de la industria hotelera portuguesa. Para ello, se opto por un enfoque cuantitativo mediante un cuestionario semiestruturado realizado entre los hoteles portugueses, al objeto de validar las hipóteses previamente definidas, con 78 respuestas válidas obtenidas.

Los resultados de este análisis demuestran que, en términos generales, existe conciencia entre el grupo de participantes sobre el concepto de Economía Circular y sus R-Principios, y que em la actualidad se están implementando algunas prácticas de EC. También se confirmaron los impactos predictivos positivos de la implementación de un modelo de EC en el desempeño organizacional de los hoteles, así como que la implementación de la Economía Circular en estas empresas constituye un desafio que debe hacer frente a diversos obstáculos. También se identificó una creciente concienciación sobre el compromiso de las empresas hoteleras con los problemas ambientales, al tiempo que una mayor concienciación y demanda de productos y servicios sostenibles por parte de los clientes. De este modo, se evidenció como una estrategia para tener acceso a nuevos mercados y consumidores, lo que en última instancia mejorará el desempeño y la rentabilidad de las empresas hoteleras.

Los hallazgos también indican que los hoteleros consideran que un enfoque económico basado en la circularidad es extremadamente beneficioso, ya que permitirá a las empresas consolidarse como marcas que avanzan hacia la sostenibilidad, lo que permitirá ahorrar costos en el futuro, estimular la innovación de las empresas y finalmente habilitar la creación de empleo. Adicionalmente, se identificaron los facilitadores para la implementación de CE, siendo los hoteleros los que califican como los siguientes: un mayor apoyo de los agentes proveedores en las fases de transición e implementación, poner a disposición de los hoteles servicios de consultoria especializada, el establecimiento de una

estrategia nacional de concienciación sobre la difusión de CE y su R-Principios, una possible reducción de impuestos para ayudar a las empresas en la transición hacia la Economia Circular, capacitación brindada por entidades gubernamentales y un mayor apoyo financiero. Por su parte los principales desafíos considerados por los participantes fueron la falta de inversión en estrategias de implementación de EC, la existência de políticas que se centran principalmente en el tratamiento de residuos en lugar de enfocarse la gestión de residuos y orientadas a los R-Principios, y la falta de incentivos para diseñar productos circulares. A nivel de desempeño organizacional, los hoteleros consideraron que implementar EC en sus empresas les permitiría adquirir nuevas competencias, reducir las emisiones de CO2, promover el acceso a nuevos mercados y clientes, aumentar la satisfacción del cliente y mejorar el desempeño global de las empresas.

La presente investigación también reveló que los hoteles de mayor categoria (hoteles de cuatro y cinco estrellas), que forman parte de cadenas hoteleras internacionales en las regiones de Lisboa y Alentejo, consideran que la implementación de una Economía Circular les permitiría fortalecer el desempeño organizacional de sus empresas.

Esta tesis tiene como objetivo contribuir no solo a la literatura sobre economía circular en general, sino a la literatura de la industria hotelera portuguesa y de la EC, que ha sido vagamente estudiada hasta ahora, y proporcionar a los hoteleros conocimientos significativos sobre este tema.

Palabras clave: economía circular, R-principios, economía lineal, sostenibilidad, industria hotelera portuguesa, concienciación de CE, beneficios de CE, desafíos de CE, habilitadores de CE, actitud de CE, desempeño organizacional.

Table of Contents

List of Figures

List of Tables

List of Abbreviations

AEV – Average Extracted Variance

AIIC – Average Inter-Item Correlation

AHP – Associação da Hotelaria de Portugal (Portuguese Association of Hotels)

AMI – Assistência Médica Internacional (International Medical Aid)

CE – Circular Economy

CEOs – Chief Executive Officers

CR – Composite Reliability

EC – European Commission

EEA – European Environmental Agency

EMF – Ellen MacArthur Foundation

EMS – Environmental Systems

EU – European Union

GDP – Gross Domestic Product

GE – Green Economy

GVA – Gross Value Added

IE – Industrial Ecology

IM – Industrial Metabolism

INE – Instituto Nacional de Estatística

IS – Industrial Symbiosis

IUCN – Union for the Conservation of Nature

NGOs – Non-Governmental Organisations

NUTS – Nomenclature of Territorial Units for Statistical purposes

OECD – Organisation for Economic Co-operation and Development

TSA – Tourism Satellite Account

UN – United Nations

UNCED – United Nations Conference on Environment and Development

UNEP – United Nations Environment Programme

UNSGDS – United Nations Sustainable Development Goals

UNWCED – United Nations World Commission for Environment Development

UNWTO – United Nations World Tourism Organization

USA – United States of America

WBCSD – World Business Council for Development

WBSD – World Business for Sustainable Development

WC – World Conservation

WCED – World Commission on Environment and Development

WEF – World Economic Forum

WRAP – Waste Resources Action Programme

WSCSD – World Student Community for Sustainable Development),

WWF – World Wild Fund

Chapter 1 - Introduction

1.0. Introduction

The purpose of this research is to provide a comprehensive insight into the concept of Circular Economy by understanding the Portuguese hotel industry's awareness on the aforementioned concept, as well as the attitude of this industry towards CE. It also attempts to examine the benefits of such an implementation, the enablers as well as the challenges and their impact on the organisational performance of Portuguese hotels. The overall aim is to develop a deeper understanding in the Portuguese context but amid that broad aim a number of more research questions and one hypothesis were formulated. These include examining awareness relatively to the concept of Circular Economy among the Portuguese hotel industry; exploring the attitude of this industry with respect to CE (in particular to explore the CE strategies and initiatives that are already being implemented within this context); examining the benefits, enablers, and challenges that the implementation of the aforementioned concept poses. Furthermore, another objective of this research is to investigate the predictive impact of Circular Economy on the organisational performance of hotels.

The purpose of this chapter is to present these goals and to contextualise this research study. Considering that this research has been performed relatively to Circular Economy and hotel industry subject area, its purpose is to develop insights based on theory, conceptual frameworks and data analysis that will contribute to the literature not only on Circular Economy but also on the hotel industry based on empirical evidence from the Portuguese hotel industry, which has so far been vaguely investigated.

This chapter is divided into six sections. The first section outlines the background to research, by identifying the context in which the research was performed. The second section addresses the previous research in the area under study by identifying the theoretical gaps in the literature, which points out to the necessity of further investigation relatively to Circular Economy and the hotel industry, particularly in Portugal, where it is

scarce. The third section identifies the purpose of the research, which is based on the previous section, i.e. the identification of the literature gap, and addresses the research questions as well as the research hypothesis, which were identified throughout the literature analysis. The fourth section develops the research methodology. The fifth section illustrates the originality of the study and provides its theoretical and managerial contributions, and the sixth section describes the thesis structure.

1.1. Background to research

According to the European Commission (EC) (2021) climate change is the most important challenge of modern times, along with global demand for resources and scarcity, environmental degradation coupled with biodiversity loss, pollution (air, soil and air) and land management. These difficulties are threatening planet Earth life-support systems (Meadows et al., 2004; Rockström et al., 2009; Jackson, 2009; World Wild Fund [WWF], 2014; Geissdoerfer, 2017) and are presumably to impose greater challenges to welfare and wellbeing and, from a business perspective, to competitiveness, and revenues.

Therefore, there is a compelling demand of transitioning to more sustainable social and economic systems (Meadows et al., 2004; World Business Council for Sustainable Development [WBCSD], 2010; Seiffert, 2005; Markard, 2012; Geissdoerfer, 2017), which do not exceed the environmental boundaries of planet Earth. Within this context, and regarding the constrains of the existing linear economic paradigm based on the 'take-make-dispose' paradigm (Ness, 2008), supported by inputs of low cost and accessible resources that have allowed to generate growth and stability (Circularity Gap Report, 2019), the predominant economic model's effectiveness has now been questioned.

Consumers dispose of the products that are no longer desirable, largely due to the fact that those are broken, obsolete, and no longer necessary. However, a large number of these products still keep substantial value and if maintained and improved through repair,

upgrade or even remanufacture, they can be preserved and be economically valuable for extended periods of time. This reorganisation would mean that companies would no longer just sell products, but they would be keeping them at their highest value for longer periods of time. This would also imply that customers would shift their focus from transactions to relationships, making adjustments or alterations according to specific requirements (Lacy and Rutqvist, 2015).

The tourism industry and subsequently the hotel sector stand out as some of the few industries that have experienced a monumental economic growth in the last decades, in which nature, biodiversity, culture and heritage play key roles. According to the United Nations World Tourism Organization (UNWTO) (2021), it was possible to determine that in 2019 around 1.5 billion foreign tourists arrivals were documented worldwide. This means a 4% increase relatively to 2018 and the same figures were projected to 2020, validating that the tourism sector distinguishes itself as a very significant and strong economic sector (UNWTO, 2021). Nevertheless, the UNWTO World Tourism Barometer indicates that the impact of the Covid-19 pandemic on tourism reduced global exports by 4%, and the cumulative loss in export revenues from international tourism comes down to almost US$1.1 trillion. In 2020, the tourism revenues dropped 64% in real terms, which corresponds to a collapse of over US$900 billion, reducing the global exports value by 4% (UNWTO, 2021). The tourism sector was placed in number three after chemicals and fuels industries and in front of vehicle production and food (UNWTO, 2017), projecting itself as the leading export category in some countries. As shown, this industry generates vast economic benefits impacting positively on the economy of destinations and on small businesses.

The hotel industry is one of the most important segments of the tourism sector that has experienced a tremendous growth over the last decades until it was profoundly affected by the Covid-19 pandemic in 2020. According to the figures published by the platform *Eurostat – Statistics Explained* of the European Union (2021), in March 2020, it was

observed a marked decrease in overnight stays in European Union hotels by 61% in contrast with 2019. Such circumstance was mainly related to the lockdown in most EU countries and also due to travel restrictions imposed by the outbreak of Covid-19.

In April 2020, a month of full lockdown in the majority of the countries the decline reached as astonishing 95% when compared to the same period in 2019. In the following months the progressive softening of restrictions allowed a slow recovery of the sector, and in September 2020, there were 42% fewer overnight stays in comparison to the same period in 2019. Furthermore, comparing the early months of 2021 (January to March) with the corresponding period of 2020, the figures show that the number of overnight stays dropped from 344 million during 2020 to 92 million in 2021, a decrease of 73%. Nevertheless, once the tourism industry and consequently the hotel sector is relaunched, and taking into account, the comfortable condition and the figures presented relatively to a pre-pandemic period, the numbers presented above will certainly improve (*Eurostat – Statistics Explained*, 2021).

Until the Covid-19 pandemic affected the entire world, the Portuguese travel and tourism industry barely stopped expanding, with the country reaching top positions in this market. Throughout 2019 and 2020, the number of visitors almost doubled. Only in 2019 it attracted around 27,1 million guests, which originated 70,2 million overnight stays. These figures indicate that not only the direct and indirect but also the induced impact of tourism makes up 19,8% to the gross domestic product (GDP) (Costa, 2021). Further information regarding the Portuguese hotel industry will be provided in Chapter 3.

Despite this sector's global social and economic relevance, it also poses constrains on the environment, as a large number of tourism related activities depend on nature to be performed. Along with tourism growth the metabolism of tourism sites are compromised, in consequence of waste generation, overexploitation of local resources, and of the considerable infrastructures necessary to accommodate tourists and satisfy their needs.

Although there is acknowledgement of the growing environmental, social, and cultural impact of tourism, sustainability is just a trend, a matter of opinion, a moral decision, and above all a question of branding, and there is little scientific evidence that tourism stakeholders are truly engaged in pursuing a more sustainable future (Jones et al., 2016).

Taking all the above into consideration, embracing a circular transformation towards sustainability appears to be the desirable path concerning the decoupling of economic growth from unviable resource use (Lacy et al., 2020). Thus, the momentum to transition to a Circular Economy model has come. There is increasing global acknowledgement among academia, governments, stakeholders that the sustainable viability of planet Earth relies on this shift, which will be the opportunity to restructure production and consumption models and obtain economic and social revenues as well as opportunities to keep resources in effective use in the economy for the longest period of time possible (Lacy et al., 2020).

The contemporary economic model is based on a linear model: resources are extracted, products are manufactured and afterwards consumed or used, and finally thrown away, creating enormous amounts of waste. Transitioning to a 'circular' approach would give businesses the possibility of finding solutions to transform waste into wealth, without feeling compelled to resort to natural resources (Lacy and Rutqvist, 2015), and to close material loops in order to preserve products, its parts and materials.

Implementing Circular Economy constitutes the fundamental transformation that the predominant economic model imperatively needs and desires. Relatively to the hotel industry, its implementation can assist the transition from this industry's linear economic model to one based on circularity.

This thesis aims to contribute to the travel and tourism literature by examining Circular Economy in hotels supported by empirical evidence from the Portuguese hotel industry, which has only been vaguely studied thus far.

1.2. Identification of the theoretical gap in the literature

The concept of Circular Economy has been gaining importance in the last decades among stakeholders, academia, and policymakers and prioritized in an increasing number of countries. It stands out as an alternative economic model to the prevailing one, the linear economic model. Transitioning to a circular model would withdraw the pressure on scarce natural resources and would allow to mitigate the impact of the amount of waste generated by the current model of production and consumption, and would simultaneously enable the reuse of resources and products.

In spite of all the growing attention this concept has been receiving over recent years, the literature and research on this construct focus predominantly on the manufacturing sector with few references to the tourism sector and even fewer regarding the hotel industry. When considering this industry in Portugal, the target country of this study, few references were found, though this is a sector that vastly relies on the extensive use of energy and water, and generates food waste, and considerable CO_2 emissions.

The travel and tourism sector in general and the hotel industry in particular is one of the sectors that mostly contributes to job creation, promote entrepreneurship, develop local economies, and assists the gross domestic product in various countries and regions, with export revenues from international tourism also representing a significant source of external income both for developed and developing countries. In small emerging countries it constitutes the main source of foreign exchange income, representing a total of 90% of the overall amount of exports (UNWTO, 2020).

During the past few decades, this sector has been experimenting continuous growth and diversification and positions itself as one of the biggest and with the most significant growth in the world. In spite of its recognised benefits, it poses numerous constrains on the environment and the cause is the predominant linear economy.

Naydenov (2018) considers that the tourism sector has still not received the necessary interest as an area where Circular Economy initiatives could be implemented. Vargas-Sánchez (2018) also states that this is a field that ought to be considered at an international level by academia, stakeholders, and policymakers in the future.

Considering the literature on this subject, it was not possible to identify any particular guidelines or a specific framework that would enable the transition of the tourism sector, and consequently the hotel industry, towards a circular economic model, as it is observable in other sectors such as the manufacturing and industrial ones. Furthermore, there is an intersection between the tourism sector and all the other sectors when it comes to resource availability and deployment, which strengthens the demand to perform this transition.

Korhonen et al. (2018) go further into this question and consider that the CE concept has been carried out mainly by practitioners, policymakers, and business related stakeholders (Ellen MacArthur Foundation [EMF], 2013; European Commission, 2014). These authors also declare that the scientific research conducted on CE so far is broadly unexplored, having as the most productive source of theoretical support and guidance the ecological economics field.

Even though the curiosity and enthusiasm regarding CE and its implementation in the travel and tourism industry in general has been expanding during the past few decades, and some research has already been carried out (van Rheede, 2015; Girard and Nocca, 2017; Manniche et al., 2018; Pamfilie et al., 2018; Jones and Wynn, 2019; Rodríguez-Antón et al., 2019; Sørensen and Bærenholdt, 2020; Khan et al., 2021; Rodríguez et al., 2020; Einarsson and Sorin, 2020; Costa et al., 2020), investigation regarding the Circular Economy implementation in the Portuguese hotel industry is still limited (Bica et al., 2019).

Research regarding Circular Economy focus mainly on the manufacture and industry (Rajput and Sing, 2019; Rosa et al., 2020; Tavera Romero et al, 2021; Dantas et al., 2021; Cwiklicki and Wojnarowska, 2020; Walker et al., 2021; Chauhan et al., 2021; Awan et al.,

2021), hydric resources (Brandoni and Bošnjakovic, 2018; Sgroi et al., 2018; Gracia-de-Renteria et al, 2019; Guerra-Rodriguez et al., 2020; Kakwani and Kalbar, 2020; Nika et al., 2020; Brears, 2020), energy (Malinauskaite et al., 2017; Osmani, 2017; Olabi, 2019; Mignacca et al., 2020; Borghi et al., 2020), civil construction (Mahpour, 2018; Benachio et al., 2020; Costa et al., 2020; Ginga et al., 2020; Anastasiades et al., 2020; Hossain et al., 2020; Eberhardt et al., 2022; Christensen, 2021), textile industry (Franco, 2017; Fischer and Pascucci, 2017; Jacometti, 2019; Saha and Dey, 2020; Jia, 2020; Shirvanimoghaddam et al., 2020; Chen et al., 2021), and the food and beverage sector (Mathews et al., 2020; Wilts, 2020; Paris, 2021; Lopes et al., 2021; Miemczyk et al., 2022), and often at the master thesis level research (Mentik, 2014; Martins, 2021).

Fewer results were found relatively to research on CE and the tourism sector (Costa et al., 2020; Pego, 2020) or CE and the Portuguese hotel industry (Julião et al., 2018; Julião et al., 2020; Bica et al., 2020).

In accordance with the literature review on Circular Economy in the hotel sector, it has been acknowledged that further empirical research concerning CE is necessary as it is a very promising concept, which is raising the sectors' awareness. In addition, the scarcity of research concerning CE implementation in Portuguese hotels assisted the author of the current study to identify a singular opportunity to contribute to the contemporary literature and research questions structuring. For this reason, the CE implementation topic based on the Portuguese hotel industry was proposed.

In Portugal a significant need for further research in the domain of CE implementation is necessary, and when it comes to the Portuguese travel and tourism industry overall and in more specific subsectors of travel and tourism, namely the hotel sector, is even more mandatory. Relatively to research in the Portuguese context, focus primarily and largely on industry (Oliveira and Soares, 2017; Fonseca et al., 2018; Ferreira and Fuso-Nerini, 2019; Ferreira et al., 2019; Ferreira and Ramos, 2019; Barbas et al., 2020; Droege et al., 2021;

Henriques et al., 2022; Ramos et al., 2022; Sousa and Correia, 2022). It also focus on the textile industry (Marques et al., 2017; Maia et al., 2019; Marques et al., 1019; Paixão et al., 2020; Carvalho et al., 2020; Marques et al., 2020; Bagnato, 2021) and waste (Berardi et al., 2019; Pires e Martinho, 2019; Prata et al., 2022; Bruna and Broega, 2022; Barros et al., 2022; Moreira and Marques, 2022).

1.3. The purpose of the research

The main purpose/goal of this study is to analyse the Portuguese hotel industry awareness, attitude towards the implementation of a Circular Economy paradigm. The specific aims propose to investigate the enablers, benefits of such an implementation as well as the companies' organisational performance when undergoing such a process.

Based on the review of the literature relevant features regarding Circular Economy were identified (awareness to the concept, enablers, implementation benefits, challenges, and the organizational performance of the companies that implement this approach), resulting in the following general objective:

General objective: To examine the adoption of Circular Economy by the Portuguese hotel industry.

From this general objective, several other specific objectives were delineated. They are:

Research objective 1: to examine if there is awareness within the Portuguese hotel industry of the Circular Economy concept.

Research objective 2: to determine if this industry is implementing Circular Economy.

Research objective 3: to identify the challenges that the Portuguese hotel industry tackles to implement Circular Economy.

Research objective 4: to perceive the benefits of implementing a Circular Economy approach in the Portuguese hotel industry.

Research objective 5: to identify which initiatives would enable Portuguese hoteliers to implement Circular Economy.

Research objective 6: to determine if the organisational performance distribution is homogeneous considering the CE hotels profile.

Research objective 7: to examine if there is a relationship between the implementation of Circular Economy and the organizational performance of hotels.

Furthermore, the research also suggested that when implementing a Circular Economy approach in the hotel industry various challenges need to be considered. So, another objective of this study is to examine what those challenges would be. The transition is not straightforward, and it is a phase that brings a lot of challenges throughout the decoupling process from the old linear economy model.

The final goal is to explore the relationship between all the dimensions considered (companies' profile, awareness, attitude, benefits, enablers, and challenges) relatively to the organisational performance of hotels if a Circular Economy approach is implemented. Such framework allows to broaden the knowledge on the contemporary situation of CE in the hotel industry, with the purpose of providing beneficial information for promoting the CE transition and implementation.

Considering the aforementioned general and specific objectives, the research questions proposed are as follows:

RQ1 - Is the Portuguese hotel industry aware of Circular Economy?

RQ2 - Is the Portuguese hotel industry implementing circular economy?

RQ3 - What are the challenges that the hotel industry addresses to implement Circular Economy?

RQ4 - What are the benefits of a Circular Economy implementation?

RQ5 - Which initiatives would enable Circular Economy implementation?

RQ6 – Is there a homogeneous organisational performance distribution of the CE hotels profile?

As this study also intends to examine if there is a relationship between CE implementation and the organisation performance of companies, and so one hypothesis was proposed:

Hypothesis 1. There is a relationship between the implementation of CE and the organizational performance of hotels (overall performance).

From the literature review a comprehensive overview on the subject under analysis was brought forward, which adds further research and data to the field of tourism and specifically to the hotel industry regarding the implementation of Circular Economy.

Figure 1 displays the research general objective and the specific objectives considered in this study.

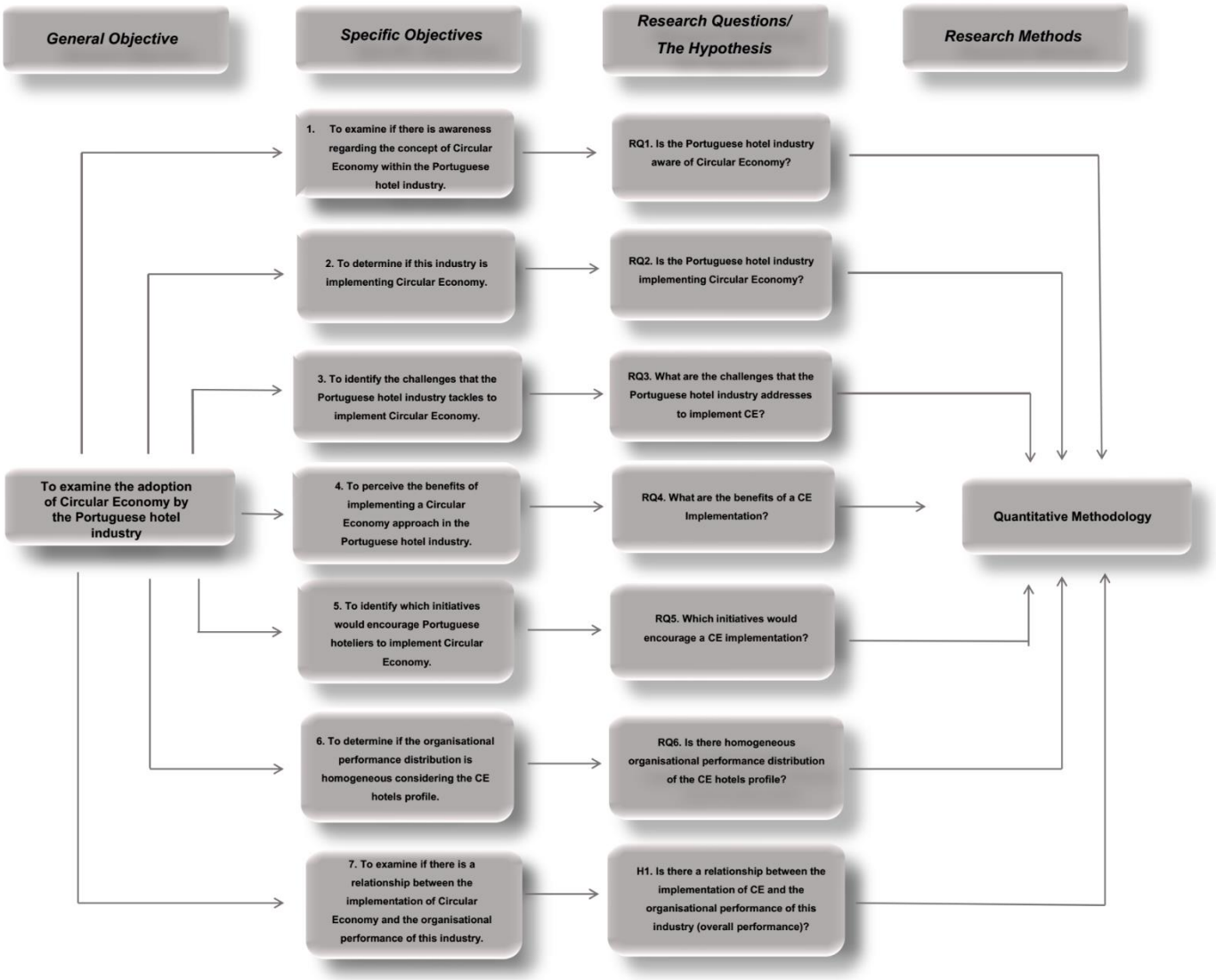


FIGURE 1. OBJECTIVES AND RESEARCH QUESTIONS.

The framework developed above allowed the development of several research questions and hypotheses to be examined. These will be described in the following section.

1.4. The research methodology

Prior to the investigation theme was defined and the problem conceptualised, a literature review of the constructs was performed so that the research objectives, general and specific, were outlined. These were on the basis of the research questions and the research hypothesis formulation. So as to examine the aforementioned research objectives

that allowed the formulation of the research questions and hypothesis, this study has used a survey, cross-sectional research strategy. The research strategy was carried out in two different stages. Throughout the first stage had an exploratory purpose by resorting to a secondary data collection, the second stage was quantitative, descriptive, and explanatory by making use of a survey method. Throughout the first stage a critical review of the literature on Circular Economy and related topics was performed in order to identify the evolution of this concept and its R-Principles, as well as to examine CE awareness, CE attitude, CE benefits, CE enablers and challenges, all this also in correlation with their impact on the organisational performance of companies. A questionnaire was applied and the secondary data collection was performed to support the design of the questionnaire and as a result guarantee its reliability and validity of the research results. The aforementioned data collection analysis give rise to the data interpretation, discussion, and results analysis, and finally the conclusions were drawn in the light of the literature review performed initially. Figure 2 outlines the research methodology design.

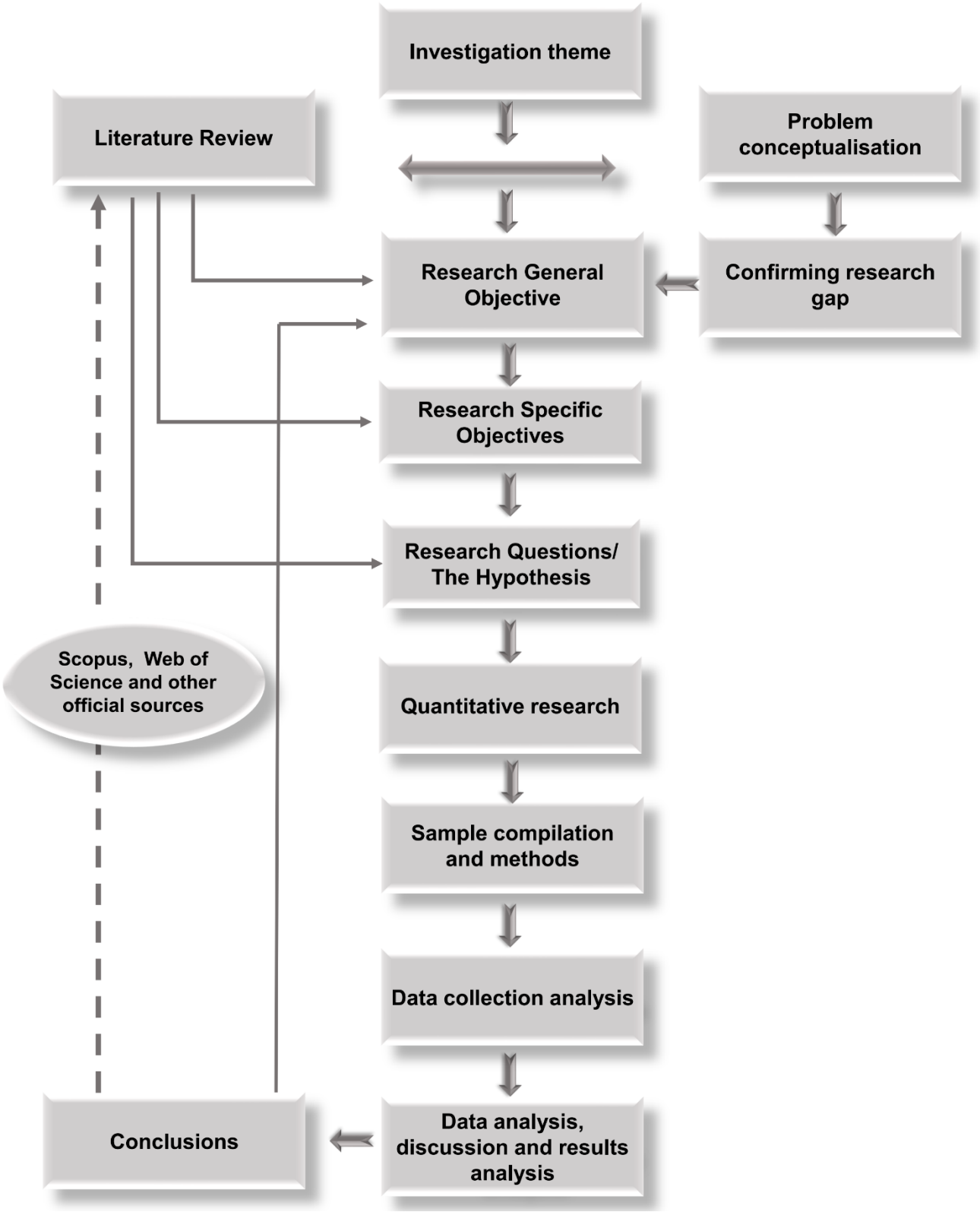


FIGURE 2. RESEARCH METHODOLOGY DESIGN.

Figure 3 displays the data analysis of the current research. It was based on a quantitative method, specifically on descriptive statistics. It outlines a succinct overview of the data analysis performed. From the 16th of April to the 7th of July 2021, a questionnaire was distributed to the Portuguese hotel industry, resulting in 78 valid questionnaires. IBM SPSS (Statistical Package for the Social Sciences) version 26 was used in the results analysis process, with the aim of providing the appropriate understanding relatively to the hotel sample considered in this research. In addition, a correlation analysis was performed so that the relationships between the various dimensions would be studied.

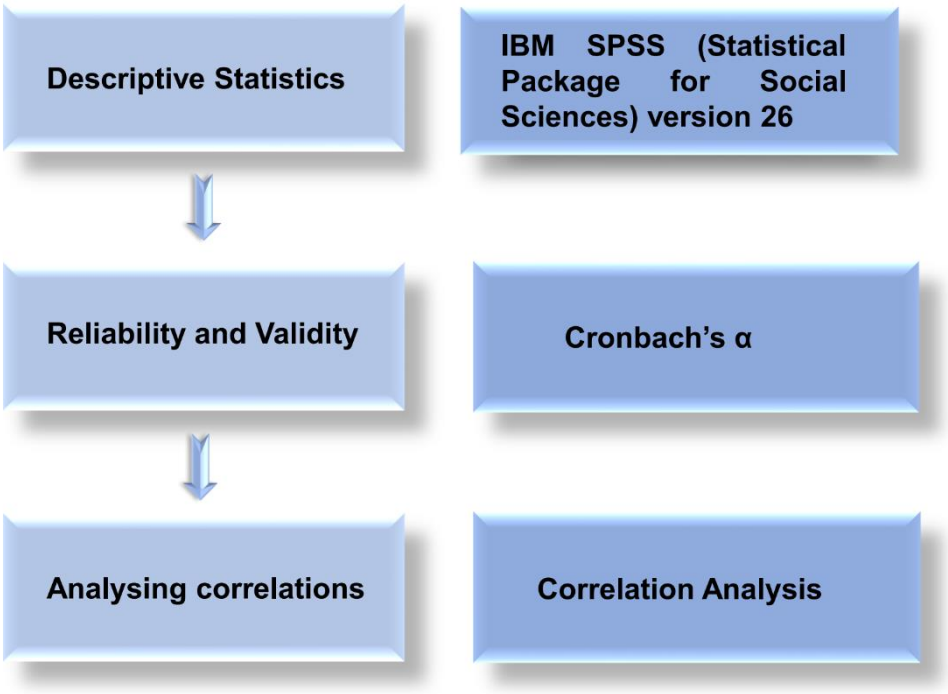


FIGURE 3. DATA ANALYSIS OF THIS RESEARCH.

The research methodology is presented in Chapter 5.

This research is an attempt to fill in the gaps in the literature and for this reason to propose knowledge to the Circular Economy concept. Its purpose was to propose new theoretical understandings as well as managerial instruments to promote CE transition in the hotel industry.

The originality of this study and its contribution to knowledge are displayed in the following section.

1.5. The originality of the study and contribution to knowledge

1.5.1. The theoretical contribution

This research seeks to strengthen knowledge on Circular Economy and its R-Principles applied to the hotel industry and the overall dimension interrelationship with the organisational performance.

Circular Economy has mostly been examined in the context of industry, hydric resources, energy, civil construction, textile industry, food and beverage sector, as indicated in section 1.2. of Chapter 1. The transition and implementation of Circular Economy into services, particularly in the hotel industry, seems to have been receiving little attention (Manniche at al., 2017; Julião et al., 2020; Rodríguez et al., 2020; Sørensen and Bærenholdt, 2020; Martins, 2021; Manniche et al., 2021; Zorpas et al., 2021; Tomassin and Cavagnaro, 2022) even though it is an industry where a massive consumption of energy, water, and excessive generation of waste along with food waste, and CO_2 emissions take place. Furthermore, there is little empirical research and stakeholders' comprehensive assessments regarding the effective environmental performance goals achievement (Zorpas et al., 2021).

This study attempts to carry out a more comprehensive analysis of Circular Economy relatively to the hotel industry, in particular the Portuguese hotel industry, by researching its awareness relatively to the CE concept and its R-Principles, the strategies and initiatives that have already been adopted by this industry, the enablers that could enhance the transition, the benefits that this transition to a circular model could bring, and the challenges that ought to be overcome, and finally, the overall predictive implications on the adoption of CE model on the organisational performance of hotels.

Cross-sectional studies have been used in some of the previous research analysed. According to Levin (2006: 24), cross-sectional studies 'are usually conducted to estimate the prevalence of the outcome of interest for a given population (…) cross-sectional studies provide a 'snapshot' of the outcome and the characteristics associated with it, at a specific point in time', which, for the present study was considered 2018 to 2020.

To explore the organisational performance, literature was analysed and on a first research it was possible to conclude that little attention has also been put on the assessment of the impact of a Circular Economy implementation on the companies organisational performance. Therefore, this study tried to identify the predictive impact of CE on the Portuguese hotels organisational performance by resorting to a set of performance indicators (more customers, the reduction of CO_2 emissions, improve profitability, acquire new competencies, access to new markets and consumers, better access to raw materials, increase customer satisfaction, and increase the companies' overall performance in the long run).

1.5.2. The managerial contribution

The Portuguese hotel industry has not been the focus of a such an exploratory, and explanatory and descriptive, cross-sectional study. It allowed that knowledge on Circular Economy and on the Portuguese hotel industry would be enhanced, and it has explored the context in which this industry operates. This research also identified the predictive positive impact of Circular Economy on the organisational performance of Portuguese hotels.

The current research results will allow hotel stakeholders to better understand, conceptualise, and, eventually, design a CE transition / implementation model, in their decision-making strategies. This study also establishes a set of guidelines which exemplify possible actions regarding the CE transition process, which may assist the developing of policies and strategies for the sector.

As a means to support the understanding of this research process, the thesis structure is presented in the following section.

1.6. Thesis structure

The scientific research that composes this doctoral thesis has been structured in seven chapters.

It starts with an introductory chapter, **chapter 1**, which establishes the background to research, identifies the theoretical gap in the literature, and determines the purpose of this research.

Chapter 2 denominated circular Economy: literature review, introduces the Circular Economy construct and its R-Principles. It also puts forward considerations on the prevailing economic paradigm, the linear economic model, reflections on awareness, benefits, challenges, attitude, and constrains concerning Circular Economy, followed by the organisational performance construct. The concept of sustainability and its differences and similarities with Circular Economy were also addressed and assertions on the tourism industry and Circular Economy as well as CE and the hotel industry are presented.

Chapter 3 contextualises the Portuguese tourism sector, the Portuguese tourism in the economy and the Portuguese hotel industry.

Chapter 4 displays the conceptual framework and outlines the research questions as well as the hypothesis considered, which illustrate the different dimensions of this research and their correlations. The conceptual framework is an attempt at providing insights on Circular Economy and its R-Principles and the Portuguese hotel industry. It attempts to illustrate CE impact on the organisational performance of hotels. The conceptual framework stands out as the basis of the search questions and hypothesis development and displays the data collection method.

Chapter 5 portrays the research methodology employed to undertake the research objectives, by highlighting the research strategy and purpose, and the data collection method and analysis. It frames the use of the strategy positivism approach and the use of exploratory, secondary data collection on a first stage, and a descriptive and explanatory, cross-sectional study by means of a questionnaire, on a second stage. A quantitative method was used, and its strengths and weaknesses are displayed, and the course of the investigation is presented and discussed.

Chapter 6 focus on the data analysis, presents the findings and discusses the results in the light from previous researches.

Chapter 7 introduces the main conclusions based on the research purpose, the development of the research problem; it examines the findings on the light of the research questions, describing the managerial and theoretical contribution to the knowledge. Furthermore, research limitations and suggestions for future research are also provided.

In order to summarise and promote the understanding of the way the research processes, Figure 4 was composed. It outlines the thesis structure and each chapter's contribution and interconnection to the research process.

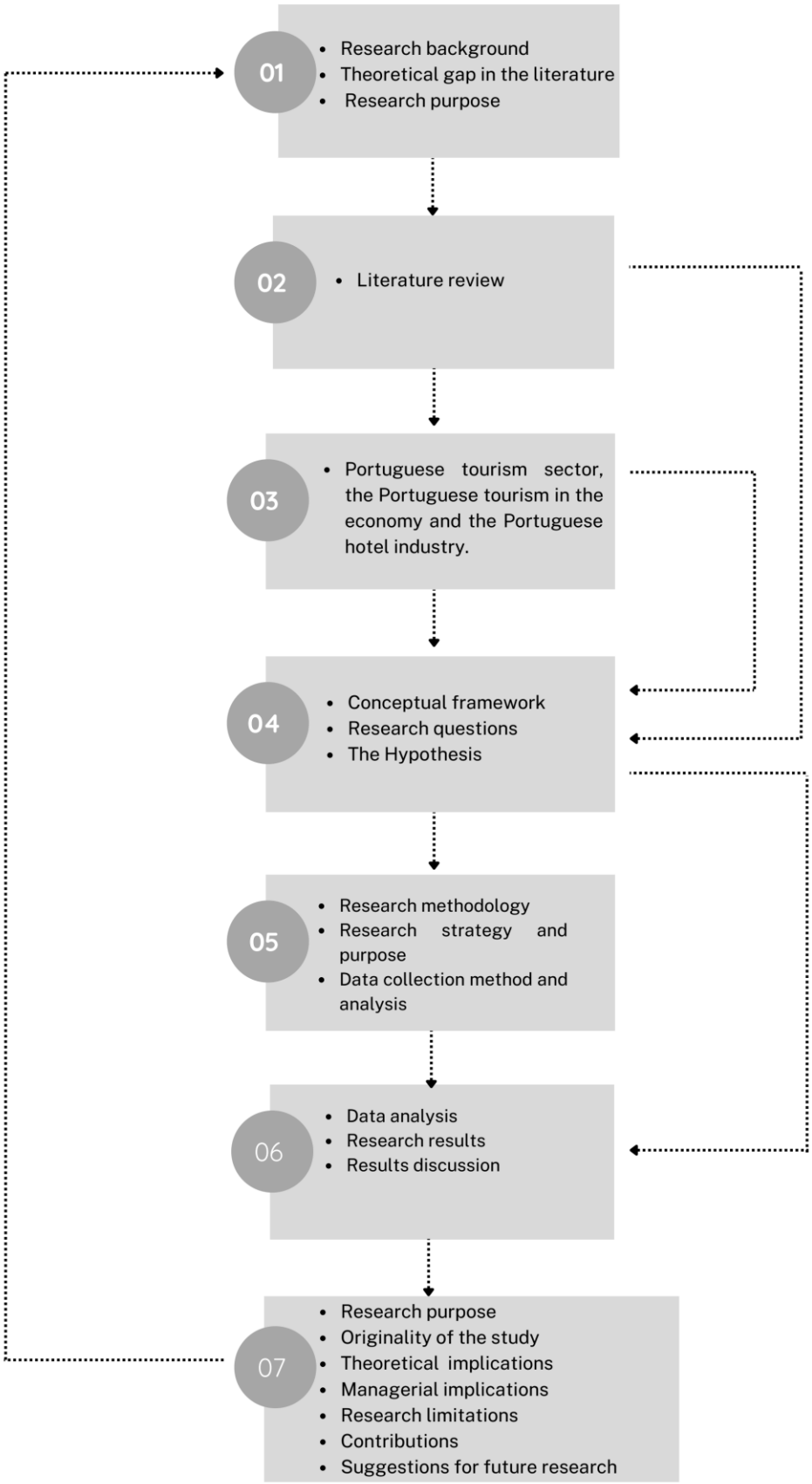


FIGURE 4. THESIS STRUCTURE.

Chapter 2 - Literature Review

2.0. Introduction

In order to enhance the understanding of the concept of Circular Economy in general as well as more particularly for the hotel industry, a structured overview of the theoretical background of the aforementioned concept is provided. Firstly, the concept of Circular Economy is clarified as well as its R-Principles. These are followed by an analysis of the considerations on the predominant economic paradigm, i.e. the linear economic model. Subsequently, awareness, benefits, challenges, attitude, and constrains concerning Circular Economy, followed by the organisational performance construct are examined. The concept of sustainability as well as its similarities and differences relatively to the concept of Circular Economy is also addressed as to clarify these terms and summarise their relationship.

2.1. The concept of Circular Economy

The fist approach to the concept of Circular Economy dates back to the 18th century (1758), when François Quesnay introduced the circular flow of income concept, inspired by William Harvey (1628) and Marcello Malpighi's (1661) research on blood circulation, i.e. the circulation of blood around the body was used as a metaphor to represent the inputs and outputs of capital in an economic system (Murray, 2015).

Within this framework, it is important to examine the theory proposed by August Wilhelm von Hofman (1848) (Cucciniello and Cespi, 2018) who considered that in an ideal and flawless chemical industry, waste does not have a place, i.e., a company puts to use all its waste material, and as it gets closer to this assumption, the more significant is its profit. Following the same line of thought, Simmonds (1862), introduces the construct of industrial metabolism by introducing a similar approach concerning waste, particularly a waste-free strategy by mimicking nature, as in nature material waste is not to be found,

every material is naturally processed and reused, fundamental principles of Circular Economy.

Throughout the first decades of the 20th century, with the acceleration of economy, after World War II, the prevailing economic paradigm relied on the extraction of resources, mass production and marketing, and garbage disposal after utilisation (i.e. the take-make-dispose model), leading to the generation of considerable amounts of waste. This was the starting point to a worldwide challenge that has been putting pressure on humanity and on the natural world. Thus, waste management, environmental pollution, natural resource over exploitation, as well as limits to growth have driven governments and policymakers to promote waste prevention and recycling strategies and programmes.

Concepts as industrial metabolism (IM) (Simmonds, 1962), industrial symbiosis (IS) (Parkins, 1930; Fischer-Kowalski and Haberl, 1998) receive increasing attention and become the become the centre of attention of researchers and academia, and some time later are considered to lay the groundwork of the contemporary sustainable economic movement designated as industrial ecology (IE). Frosch and Gallopoulos (1989) coined it as a field of science, and in association with Pearce and Turner (1990), environmental economists, formulated the concept of a CE system, by adapting previous research performed by the ecological economist Kenneth Boulding (1966). Boulding presents the economic system as one that has synergies with the environment, the open cowboy economic model with its apparent unlimited resources, as opposed to the fascinating spaceship economy (Andersen, 2007; Ghisellini et al., 2016; Lieder and Rashid, 2016), which portrayed the life in a spaceship, where waste could not be disposed and resources are limited, so recycling and reusing becomes essential to guarantee survival and a successful mission. This type of approach was subsequently improved by Stahel and Ready-Mulvey (1977) and Murray et al. (2017) who developed the closed-loop economy

concept and its impact on the creation of employment, resource preservation, economic competitiveness, as well as the prevention of waste.

The 1970s brought environmental consciousness and organisational movements that brought to public the environmental impact of economic development in addition to the improvement of the quality of life through a cleaner and safer environment. Governments and organisations proposed strategies and policies to handle the challenging industrial growth which produce disposal and solid waste by enhancing the expeditious increase of landfills and incineration, as well as the expedition of waste to less wealthy countries (Moyer and Francis, 1991). It is in this context that the 3R-Principles (reduce, reuse, recycle) grow in popularity and the remanufacturing R-Principle gains more visibility as it enables the withdrawal of value of used products and materials by replacing components or by recycling functional parts by rebuilding or recovering them. By resorting to a disassembly, repair and cleaning, and replacement of deteriorated and obsolete components, products are brought to as a like-new condition and are as just reliable as the original ones (Steinhilper, 1998).

In a context of such a socioeconomic progress and growth, with the population growing at an unprecedent level, particularly the middle-class, the exploitation of natural resources increased exponentially. Nevertheless, natural resources are not inexhaustible, which means that this economic growth along with raw materials and energy exploitation, as well as humankind's modus vivendi is unsustainable and represent an economic and environmental challenge (Meadows et al., 1972). In this scenario and taking into consideration the limitations of such an economic model, the linear model, the foundations of the paradigm appointed as Circular Economy are framed.

Circular Economy, as a construct, was primarily coined and presented to academia by Pearce and Turner (1990) (Su et al., 2013; Ghisellini et al., 2016; Geissdoerfer et al., 2017). Such researchers also point out that natural resources have an essential function on economic systems and also that the contemporary linear economic paradigm is no longer

sustainable as resources are finite and Earth's capacity as a waste sink (Cooper, 1994) is limited.

Robèrt (1991) considered Circular Economy as a broader construct that comprises all the activities and operations associated with the reducing, recycling and reusing processes, and also that CE offers the potential of processing materials in cycles, by resorting to industrial processes and human interference, otherwise ecological mankind life-support systems will degrade at an incomparable pace. Additionally, Cooper (1994) highlighted the fact that governments have put into practice recycling strategies and objectives regarding domestic waste generation, but did not succeed regarding to the introduction of effective and efficient measures that promote and stimulate the production of products that last for longer periods of time, despite all the increasing awareness relatively to the 3R-principles (reduce, reuse, and recycle).

Designing new solutions to cope with the nature of disposed products, as some products go through complex production processes and may contain and be contaminated with hazardous substances, was imperative. Nevertheless, insufficient emphasis has been put and still is to the products resistance and durability, with the emphasis being put primarily on the recycling process. In fact, CE is commonly associated with this R-Principle, however, this could be the least sustainable approach, in comparison to the other R-Principles which permit to address sustainability in an efficient and profitable way (Stahel, 2013, 2014, 2019). Some products can only undergo a recycling process to some degree and others cannot be recycled at all. For instance, fibers can be recycled 4-6 times, whereas some metals aren't recyclable in any way (Reh, 2013), some types of plastic are recyclable on account of impurities (metals or ink) in their composition (Prendiville et al., 2014). Furthermore, McDonough and Braungart (2002) expose some misleading information regarding some beneficial recycling practices and consider that companies commonly put into practice a 'cradle-to-grave' design concept (i.e, concerns the entire life cycle of a

product until it is disposed at a landfill), in preference to a 'cradle-to-cradle' manufacturing model, in which products undergo design and manufacturing process that allow them to last for longer periods of time, along with waste-free manufacturing processes (Geissdoerfer et al., 2017).

Cardoso (2018) acknowledges that Circular Economy cannot sustain recycling, as it at a given stage may become too difficult and expensive, as the volume of waste generated is not in line with the resources depleted as the economic system relies on an open-ended model. Resorting to a circular production paradigm has the ultimate goal of producing products which reach their end of life and have the possibility of re-entering a material circular flow within new production processes in an industrial cycle, which pictures a closed system.

Putting Circular Economy to use does not ensure that goods or their parts/components are fully recyclable, as an economic system cannot be totally circular regarding residues, energy, and waste, as a result of the entropy law (Daly, 1977; Andersen, 2007).

Time and history have shown that the industrial and manufacturing sector ought o to undergo thorough adjustments, considering that the current linear economic model is depleting and mitigating natural resources (McDonough and Braungart, 2002). In order to obtain environmental harmony, stakeholders (environmentalists, designers, entrepreneurs, and governments) should coordinate strategies and reconsider and review the concept of 'eco-friendly', and what it represents in a production process. With this in mind, McDonough and Braungart (2002) and the EMF (2012) believe that CE ought to encompass a new, scientific, and design oriented approach, i.e. 'eco-effectiveness'. It stands out as an approach that enhances the reduction and dematerialization of the material flow system, and one that would enable a harmonised interchange between environment and economy and gradually abandon the prevailing 'eco-efficiency' manufacturing strategy.

Circular Economy is also considered as a fundamental approach in attaining economic development, in enhancing resource productivity, in the optimization and reactivation of production processes, as well as in improving management strategies by mimicking the natural closed circulation cycle of products and materials, respecting the natural laws and the correct use of raw materials (Feng et al., 2007; Yang and Feng, 2008; Geng and Doberstein, 2008; Hu et al., 2011). Hilsop and Hill (2011) propose CE as a vehicle to assist circularity within economic systems, as it allows the reduction of energy inputs and the consumption of raw materials, that are essential for a sustainable resource preservation.

The Circular Economy concept has commonly been linked to an economic alternative to waste management policies/approaches, that can be considered a very narrow stand point. Thus, Geng et al. (2014) reckon that a preservative strategy along with a regenerative eco-industrial approach should be put into practice. These coupled with the utilisation of 'green' technologies, the design of unconventional solutions, together with interactions between manufacturing processes, the economic system, and the environment will enable the materials regeneration, energy recovery, and ultimately achieve the long-expected sustainability (Annarelli et al., 2016).

From this perspective, Circular Economy is not just a purely preventive economic approach with the potential of mitigating the depletion of resources and waste generation, but it goes far beyond the sustainability concept and the correlation between industry and environment, highlighting that efficiency by means of design and service supply allows the decrease of inputs in the manufacturing processes and an upgrade in resource usage, as well as economic development (Cooper, 1999; Nakajima, 2000; McDonough and Braungart, 2002). Achieving this goal, implies that policies and strategies ought to contemplate and emphasise three strategies designated by the United Nations Environment Programme (UNEP) Paris Report on CE, (2006), namely 'low energy consumption', 'low emission of pollutants', and 'high efficiency', and except that major changes and collaborative actions

prevent the overuse natural resources, its consumption will be more than twice as high by 2060.

Andersen (2007) considers that the environment has four major roles that correlate among reciprocally, it provides service values, it provides resources, it stands out as a waste sink, and finally it is the fundamental system that allows the support of human life. With these in mind, implementing the Circular Economy principles will be of great value to the economy, as it will not only allow a decrease in the utilisation of raw materials in the economic activity, but also mitigate environment function as a waste sink. Furthermore, Andersen (2007) also emphasises *The First Law of Thermodynamics* which establishes that the energy and matter amount is consistent in a closed system, and the volume of waste produced has to be analogous to the quantity of resources utilised, and the waste percentage produced ought to be transformed into raw material. As a result, economy would become circular if material flows along with economic assets would be considered (Feng et al., 2007; Yang and Feng, 2008; Geng and Doberstein, 2008; Hu et al., 2011)

The Ellen MacArthur Foundation (2010) and Mathews and Tan (2011) also suggest that it is essential to emphasise circularity regarding the chain production by transforming waste into an advantageous input in another process and recommend that companies make use of eco-industrial initiatives as a strategy to attain sustainble goals. The increasing demand for redesigning, rethinking have been strengthened as the contemporary economic model is leading to the depletion of natural resources, increasing products prices, and related raw materials supply volatility. From this perspective, Circular Economy, stands out as new alternative apart from the prevailing ‘take-make-dispose’ extractive industrial paradigm. Economic progress ought to be reconsidered with the purpose of withdrawing positive outcomes and dissociate economic operations away from the exhaustion of natural resources, which are finite, and move towards renewable energy sources utilisation.

The fundamental premisses on the basis of the concept of CE is that it is restorative and regenerative by intention and design, so as the maximum value and utility of products, components, and materials is obtained. For this purpose, it is fundamental to strengthen an economic model in which durable design, remanufacturing, refurbishing, recycling, and reusing, are contemplated. Waste and harmful substances are discarded without generating residues, as they may constitute advantageous resources, which enable the decrease regarding the extraction and consumption of natural resources, and ultimately their impact on the environment (Liu et al., 2009; EMF, 2012). Such an approach emphasises the assumption that an economic and industrial system based on the 'reuse' and 'remanufacturing' R-Principles of components and products is the right direction to enhance environment's natural capacity to restore itself (Bastein, 2013; EMF, 2013).

It has been proved that implementing a CE approach ought to consider system thinking, as stakeholders decision making involved in production operations has consequences on the supply chain. Within a restorative by intention and design industrial approach, the key question ought to be reuse of goods and their components/parts until their value is completely explored, rather than discard them (Wijkman and Skânberg, 2015; Waste Resource Action Programme [WRAP], 2016).

In contemporary economic systems, characterised by consistent volatile prices, Circular Economy puts forward significant business opportunities. To benefit from these opportunities stakeholders have to focus on compiling and exchanging data, sharing advantageous and preventive strategies, consider research and innovation, and most importantly, encourage collaboration among the various players (companies, governments, academia). These play a crucial role in accelerating and promoting the transition to a CE paradigm in a time span consistent with the response to planetary challenges, namely resource depletion and scarcity, climate change, and pollution. Making accountable

decisions may also contribute to attain sustainable development in an acceptable timeframe.

In conclusion, as a feasible approach, CE, distinguishes itself as an important approach in improving companies' performance regarding sustainability, the circular flow of materials, and products' lifespan (Mesa et al., 2018). Moreover, CE has been highlighted as a reliable economic model which allows companies to enhance their business through a more preventively and regenerative approach, by promoting a paradigm shift so that not only the negative externalities of the prevailing linear economic model are mitigated, but also to establish enduring adaptability and resilience and create opportunities for development while obtaining environmental and social advantages

2.1.1. Circular Economy and the tourism industry

According to Zorpas et al. (2021) the tourism industry enables economic growth as well as urban development along with employment opportunities. In contrast it disrupts tourism areas metabolism by putting pressure on the environment, particularly due to waste production, local resources usage, and the construction and development of infrastructures necessary to cover tourists' demand. These give rise to a significant environmental footprint in the form of pollution and ultimately biodiversity loss, which is frequently strengthened by mass tourism, o contemporary challenge that has been putting many ecosystems at risk.

Embracing an eco-friendly attitude, environmental awareness, and sustainability are topics that have received increasing attention during the past few decades and continue to draw stakeholders' attention. The tourism industry is one of the world's biggest economic sector regarding business development. From this perspective, it can play an important role in transforming the prevailing environmental behaviours and practices which have led to the depletion of natural resources, and ultimately to address present generations' needs without putting at risk the future of forthcoming generations (Rio Declaration, 1992). In this light, the

major challenge is to transition from a linear economic paradigm, contemplate the design and improvement of products and services, consider waste an advantageous resource, rethink logistics networks, reconsider the involvement of stakeholders and policymakers in granting and developing a support framework regarding a CE implementation.

The tourism sector requires the implementation of approaches and strategies that are more sustainably responsible and that consider the triple bottom line (Elkington, 1997) so as to engage society socially, economically and environmentally. To Chiliya and Groenewald (2017) decision making regarding sustainble development ought to involve stakeholders at various levels (communities, the private sector, authorities, Non-Governmental Organisations (NGO), and no longer be of the sole domain of governments. In addition, the more sustainable challenges are contemplated at the planning and implementation stages, and the more players are engaged in the process of decision making, higher is the possibility of success and of accomplishing sustainability goals.

Currently, the transition to a CE paradigm along with the United Nations (UN) Sustainable Development Goals (SDGs), the European Union CE Action Plan (2015), The European Union (EU) Green Deal (2019), as well as the United States of America (USA) Green New Deal (2018) have been gaining prominence in tackling climate change and assist environmental sustainability by addressing waste as a resource. Thus, transitioning to a circular model encourages the achievement of multiple United Nations (UN) sustainable development goals (SDGs), particularly and more prominently, SDG 1 on tackling poverty, SDG 2 on hunger, SDG 6 on energy, 8 on economy growth, SDG 11 on sustainable cities, SDG 12 on sustainable consumption and production, SDG 13 on climate change, SDG 14 on oceans, and SDG 15 on life on land (Shröder et al., 2018). Progress and development on the other SDGs, that are not directly linked to CE, will also benefit the implementation of CE strategies. In this regard, CE is considered a means that can be employed by countries, social stakeholders, and institutions to attain several SDGs. In reality, the European Union

Action Plan for the CE purpose was to contribute to the accomplishment of some SDGs, in its own terms:

> "The circular economy will also need to develop globally. Increased policy coherence in internal and external EU action in this field will be mutually reinforcing and essential for the implementation of global commitments taken by the Union and by EU Member States, notably the U.N. 2030 Agenda for Sustainable Development and the G7 Alliance on Resource Efficiency. This action plan will be instrumental in reaching the Sustainable Development Goals (SDGs) by 2030, in particular Goal 12 of ensuring sustainable consumption and production patterns."(https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52015DC0614&from=ES)

This action plan demanded the transition to a more circular paradigm, in which goods, materials, and natural resources ought to be kept in the system for as much time as possible, and waste production minimised. And, its main purpose was to address production, consumption, the generation of waste, and the latter utilisation as a resource in new products, innovation, investment, and also monitoring CE strategies. The main areas of intervention were plastics, food waste, vital raw material areas, construction and demolition, as well as energy and bioproducts (Rodriguez-Anton et al., 2019). Therefore, it appears to exist a strong link between Circular Economy and the SDGs.

Relatively to The European Union Green Deal , which comprehends EU discourse on the sustainability and sustainable development topic of the past four decades, comprises some of the most recent collection of policy initiatives regarding sustainable development, by exploring sustainability strategies and by prioritising environmental protection. According to Harvey and Rankin (2020) its purpose is to enhance people's well being by resorting to cleaner air and water, access to better health care, and a prosperous natural world without decreasing wealth. This way, European Union would be converted into an equitable and economically flourishing society, by relying on a contemporary economy that uses efficiently all the resources available. Thus, The European Green Deal stands out as a strategy for

economic development, and one of its major goals is to mobilise industry in adopting a clean and circular economy (Smol et al., 2020).

The United States of America Green Deal main goal is to promote the USA decarbonisation while decreasing economic inequalities and protecting and enhancing vulnerable communities' rights, in its own terms: "to achieve net-zero greenhouse gas emissions through a fair and just transition for all communities and workers, to create millions of good, high-wage jobs and ensure prosperity for all the people of the United States" (Green New Deal, 2018:5). According to Pettifor (2020), The Green New Deal stands out as a *plan* developed to decelerate planet Earth's life support system degradation.

Taking all the above in consideration, these frameworks address the different issues that are significant to the debate around environmental sustainability and protection, achieved through the implementation of Circular Economy.

The promotion of the transition to circular businesses models in the tourism industry is the essential driving force to enhance environmental performance, and simultaneously induce cost savings and revenue growth, while at the same time create employment opportunities locally. This driving force ought to rely on Environmental Management Systems standards along with the R-Principles implementation (Recycle, Reuse, Reduce, Rethink, Remanufacture, etc.) emphasising staff training and customers' awareness.

Circular Economy R-Principles ought to be put into practice by the tourism sector by resorting to the businesses' operationalisation based on sustainable principles, and by relying on the transition to a circular economic model. Developing a circular tourism strategy along with a sharp and viable supply of the various services offered by this sector might improve and strengthen the sustainable use of natural resources, which this sector relies on.

Rutty et al. (2015) examined the economic, environmental and sociocultural dimensions of sustainable tourism on a macro-scale, the global environmental footprint of

the tourism industry and its impact on development, and concluded that tourism relies on natural resources, contributing to their depletion, it also performs an important role in energy use and in the generation of greenhouse gas emissions, straining pressure on global water sources (Telfer and Wall, 1996).

The accommodation industry (the various accommodation facilities and hotels), one of the industries within the tourism sector scope, has more than ever to engage in sustainable practices, as it is responsible for 1% of the global CO_2 emissions, figures that are expected to increase as it is predictable that this sector continues to experiment development and demand (UNWTO, 2019). There is also evidence that 75% of this sector's impact on the environment refers to resources usage (water, energy, and consumables), and waste.

Furthermore, the *Hotel Global Decarbonisation Report* (2017) demonstrates that the accommodation industry must decrease CO2 emissions per room, 66% from 2010 levels, and 90% by 2015 so that it can align with the *Paris Climate Agreement* (2015), an agreement that aims to preserve global warming levels below the 2ºC boundary.

The adoption of CE by the tourism industry would trigger and promote circular flows allowing a harmonisation between this sector and a sustainable resource management, as it enhances circularity of production and consumption without mitigating the planet's limited resources. CE also proposes that all the stakeholders (supply chain, tour operators, hosts, tourists) get involved by embracing an environmentally friendly approach.

Within this framework, keeping pace with the tourism industry growth is one of the major challenges, along with the number of people travelling, which has been increasing at an enormous pace, accommodation for the increasing number of travellers and developing infrastructures, and simultaneously decrease the sector's the carbon footprint. Transitioning to a Circular Economy model, implementing its R-Principles, and drawing a circular tourism paradigm would not only strengthen the sustainable utilisation of natural resources, but also

supply sustainable accommodation, wellness programmes, food, water flows, energy, and all the remaining services which enable the travelling experience (Manniche et al., 2018).

Quite recently the Portuguese organisation *Turismo de Portugal* (2021) brought to light several action areas within the tourism sector in order to address the sustainability challenges that this sector now faces, in a document entitled “Turismo Sustentável: um futuro melhor para [com] todos”. This is in line with the National Tourism Strategy 2020-2027 and with the goals set by the Environmental Fund regarding Circular Economy and environmental sustainability, and its main goal is to assist environmental strategies in order to accomplish the sustainable development goals, along with national and international responsibilities and commitments, particularly those in respect with climate change, hydric resources, waste, nature and biodiversity conservation by sporting entities, projects, and activities.

This document assembles several guides – Guides and Tools – which main purpose is to offer tourism stakeholders the opportunity to enhance their knowledge, encourage and stimulate ongoing initiatives and highlight the best ones, and support development so that better revenue results are attained, customer satisfaction and ultimately enhance environmental conservation. The aforementioned guides address various areas of the tourism sector, namely, the food and accommodation industry targeting a circular approach, carbon neutrality and sustainable construction in tourist enterprises, reduction of plastic in the hospitality sector and within tour operators, and an analysis of the hydric efficiency in the Portuguese golf courses. The guide which deals with the accommodation sector is going to be addressed in the following section.

Considering that is was not possible to identify significant research literature, case studies, or even confirmatory approaches, or empirical validation to build upon the Circular Economy concept implementation and its R-Principles relatively to the tourism sector, these

guides stand out as a quite useful tool to the sector and academia, as it illustrates, resorting to practical examples, how the tourism operations may benefit this sector.

2.1.2. Circular Economy and the hotel industry

The hotel industry is committed to sustainable practices to attain economic advantages, as practices associated to water consumption and energy, and the reduction of waste production, whereas socio-cultural and environmental challenges are seldom taken into account (Girard and Nocca, 2017).

From the 1990s, an established strategy in the hotel industry has gradually been implemented, the supply of amenities (soaps, shower gel and shampoos) and optional laundry services to the guests, which constitute the first steps towards the implementation of the CE principles. These type of practices have been putting into practice sustainable initiatives for some time now and the transition to circular measurements was embraced mainly within the Reduce R-Principle (Manniche et al., 2017). Implementing sustainable innovations in hotels is an important step forward towards circularity, but this is not enough.

Customers also have to be involved in this transition process by engaging them as players in adopting sustainable actions (Manniche et al., 2017), which means that this breakthrough ought to be embraced by the overall tourism chain together with a firm engagement from all the stakeholders involved. Zorpas et al. (2021) even consider that local authorities are those that have a more prominent role to perform in the transition process, as they are those that are able to enhance and promote more advantageous measures for hotels which attain higher environmental performance levels. These initiatives would go from fiscal incentives, a reduction of administrative costs, a prolongation of the validity of permits, a financial guarantees reduction, sustainable production and consumption strategies, bank credit opportunities, and funding assistance. If these initiatives would be adopted, it would positively enhance the hotel industry to adopt the goals set by *The USA*

Green Deal, the *EU Green Deal*, and the *United Nations Sustainable Development Goals* (UNSDGs), and also the CE principles. Ultimately, they would also allow the hotel industry to increase their environmental performance, efficiency, and consequently profitability by decoupling from natural resource consumption, which would basically transform these destinations into more attractive ones.

According to Florido et al. (2019) the transition to a circular model ought to encompass various areas, namely, to take into consideration the destination boundaries by reducing the effects of tourism related operations and activities on the environment and culture and support its conservation; assist local businesses; and always perform environmentally sustainable activities. Destinations should enhance the development of circular infrastructures (building and construction) and operation services, as well as reduce service seasonality by broadening tourism activities. These authors also consider that implementing a circular strategy would enhance the cooperation bonds between local stakeholders and assist the promotion of CE solutions, namely, the implementation of measures that would restrain food waste; obtaining green certificates; recourse to shared economy platforms; green energy self-sufficiency; and circular agricultural practices, which may also involve local producers. These strategies would ultimately strengthen synergies among the hotel industry stakeholders.

The guide *Guia de boas práticas para uma Economia Circular no alojamento turístico* (2021) developed by the Portuguese organisation *Turismo de Portugal* in collaboration with a set of partners, is organised in nine chapters, which establish the fundamental principles of circular and sustainable businesses, and provides a series of responsible practices and encouraging examples that are among the ones that the accommodation sector has currently being implementing. It demonstrates, in a phased approach, the requirements to implement a circular, economic, and sustainable business approach.

Embracing initiatives that lead to environmental and economic sustainability is a major step to enhance tourism enterprises competitiveness and assist Portugal in becoming a growingly sustainable destination. Defining a 'circular business model' within the tourism accommodation sector presupposes that waste has been eliminated and the resources it employs are optimised, generating value.

By implementing the principles of CE, hospitality businesses would achieve sustainable goals in the tourism sector, as it has not concentrated completely neither place enough efforts into Circular Economy strategies nor exploited feasible future routes regarding a more functional exploration of the construct (Bohdanowicz, 2001; Girard and Nocca, 2017; Pamfilie et al., 2018). Vargas-Sánchez (2018) considers that this is a field of investigation that is worth of further attention, in the future, not only at a national level but also at an international one, from stakeholders, academia, and policymakers. When analysing scientific research, it is difficult to find accurate guidelines to that provide guidance to the transition of the tourism sector in general and particularly the hotel industry to a Circular Economy, as can be found relatively to the industrial sector.

Additionally, natural resources and materials flows within the tourism sector in general, and in the hotel industry, intersect with those of other sectors, which emphasises the transition to a more circular paradigm (Florido et al., 2019).

2.2. Circular Economy R-Principles

Several different R-Principles have been employed particularly by academia and stakeholders for the last decades, nevertheless, tracing specific literature which identifies the starting point for these classification has been a challenge and cannot be traced back to a precise article (Sihvonen and Ritola, 2015; Yan and Wu, 2011). Zhu et al. (2010a, 2010b) and Reh (2013) consider these R-Principles as the progressive steps of a Circular Economy approach and therefore they represent CE's fundamental principles.

Commonly, Circular Economy materialises in the literature through the 3R-Principles of *Reduce, Reuse* and *Recycle* (Ren, 2007; Feng and Yan, 2007; Sakai et al., 2011; Preston, 2012; Reh, 2013; Su et al., 2013; Lett, 2014) and eventually other R-Principles were considered. The 4R framework was considered by the European Union Waste Framework Directive (European Commission, 2008) by introducing the *Recover* R-principle. Academia presented other R frameworks, and the 6R (Sihvonen and Ritola, 2015) and even the 9R (van Buren et al., 2016; Potting et al., 2017) materialised. These different R-Principles ought to be considered in a hierarchy and classified for priority according to their circularity degree (Kirchherr and Hekkert, 2017; Potting et al., 2017).

The R-Principles are examined as circularity strategies that allow the reduction of the consumption of natural resources and materials, while minimising the generation of waste, and are implemented in the various stages of the value chain. In a Circular Economy waste is regenerated, and the R-Principles assist looping materials in the course of time and reduce the raw materials utilisation, by transforming used materials into secondary raw materials. Figure 5 displays Potting et al. (2017) interpretation of the 9R-Principles, their prioritisation according to the circularity level. In the current research this classification was considered, nevertheless, *Redesign*, *Remine* and *Return* R-Principles were incorporated designing a 13R. Re-educate and *Redesign* were added as R2 and R3 respectively to the group classified as ‘Smarter product use and manufacture’ and *Remine* and *Return* as R12 and R13 respectively and to the ‘Useful application of materials’ group. These R-Principles will be outlined in the following sections, as they served the purpose of the questionnaire distributed to the Portuguese hotel industry.

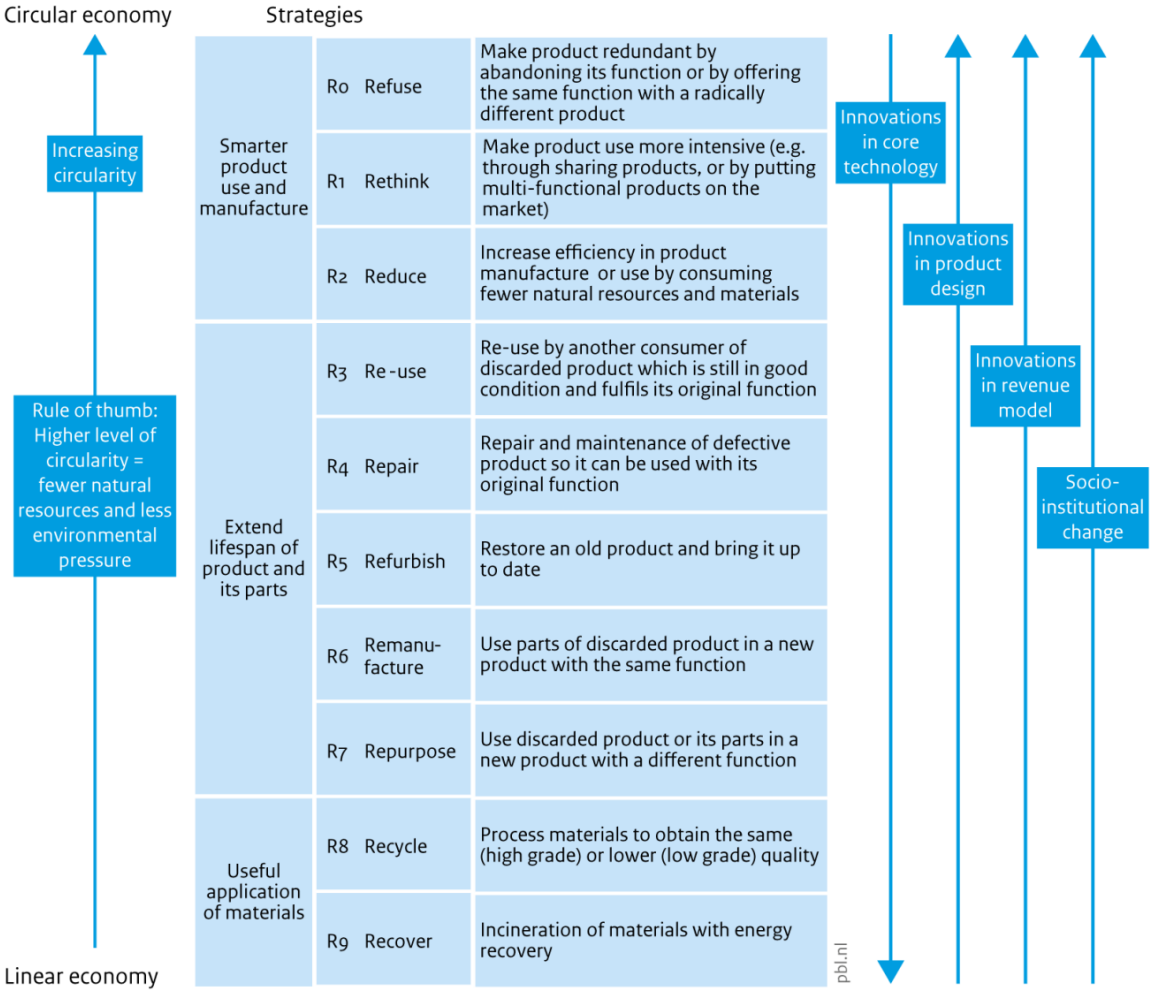


FIGURE 5. CE R-PRINCIPLES CLASSIFICATION.

Source. Potting et al. (2017:5).

Section 2.2.1. examines the *R0-Refuse, R1-Rethink, R2-Re-educate, R3-Redesign*, and *R4-Reduce*, as these enable better production and consumption approaches. Section 2.2.2. displays *R5-Reuse*, *R6-Repair*, *R7-Refurbish*, *R8-Remanufacture*, and *R9-Repurpose*. In section 2.2.3. the *R10-Recycle* and *R11-Recover* are examined. Finally, in section 2.2.4. the *R12-Remine* and *R13-Return* are addressed.

2.2.1. R0-Refuse, R1-Rethink, R2- Re-educate, R3-Redesign, R4-Reduce

The *R0-Refuse* is presented as a concept that builds on two different perspectives: the consumer and the producer perspectives. From the consumers' perspective this construct is linked to the opportunity that consumers are granted relatively to the possibility of choosing to acquire reduced quantities of products or simply reduce its usage (Miller and Spoolman, 2002; Black and Cherrier, 2010; Alwood et al., 2011). It may also concern the refusal to accept packaging, bags or containers whenever they represent waste (Clapp and Swanston, 2009; Kasidoni et al., 2015). Analysing the producers' perspective, Bilitewski (2012) considers that the design and lifespan of products should be examined, as designers are given the chance of refusing to approve or accept certain production strategies and processes, which may include waste generation and/or the use of dangerous substances.

R1-Rethink stands out as design oriented approach in which ecological and environmental concerns ought to be part of the design process in order to manufacture 'eco-effective' products which will ultimately dematerialise the material flow system. In the contemporary economic model, even the most thoughtfully designed product is discarded, commonly after just a utilisation. In some situations, products are intentionally designed just to last for short periods of time, particularly due to hygiene issues, cost, and often convenience. This linear economic model has successfully provided low-priced items on a mass-scale. Nevertheless, the outputs (waste) of this model are also at the base of the environmental negative externalities that have been affecting the planet. In such an energy and material exhaustive economic system, products acquired for consumption are not reused, which represents an enormous economic loss. For this reason, it is imperative to rethink production and consumption patterns as well as design strategies, and enable the necessary transformation of how products are made, used and reused.

Circular Economy, which proposes to decouple production and consumption processes from natural resources mitigation and step away from the contemporary linear

economic model and transition to a circular one, can remarkably assist sustainable development and mitigate the pressure put on finite resources. Presently, consumers are aware of waste challenges and are, more than ever, willing to adopt strategies within the reusing and recycling framework, and take advantage of long-lasting products. They are also predisposed to support companies and organisations that adopt circular strategies while, at the same time, engage in circular approaches themselves. Nevertheless, they may face some challenges when involved in these circular practices. For instance, the lack of information/education on how to implement a circular approach may prevent them from engaging in circular practices.

Companies ought to consider the *R2-Re-educate* principle and commit themselves in building their institutional foundations for a circular attitude by offering more information, developing CE awareness, and enabling consumers' mindset.

Regarding the *R3-Redesign*, it is important to acknowledge that in a Circular Economy model a 'cradle-to-cradle' design approach is implemented in detriment of a 'cradle-to-grave' strategy, as the life cycle of products can be optimised, so that they do not end in a landfill without having undergone all the possibilities offered by the various R-Principles. Following a 'cradle-to-cradle' process, products are designed and produced from a long-lasting perspective and through waste-free industrial processes (McDonough and Braungart, 2002; Geissdoerfer et al., 2017). In such a context, Circular Economy not only stands out as a preventive model which has the goal of reducing the depletion of natural resources, but also materialises as a paradigm that respects the correlation between industry and the natural environment (Cooper, 1999; Nakajima 2000; Barungart and McDonough, 2002). The CE concept goes beyond the concept of sustainability, as it emphasises efficiency through the design and service supply which implies that inputs are also reduced, resource use decreases and decouples from economic development decouples.

The *R4-Reduce* along with the other R-Principles enables the reduction of the pressure and impact of the linear economic model on the global resource stocks. It aims at decreasing the consumption of non-renewable raw materials by those that are renewable, biodegradable, or even recyclable in production processes (Yong, 2007; Tse et al., 2015, 2016). By resorting to this approach natural resources are preserved. It also presupposes a reduction of the use of energy within the production and consumption processes and ultimately a decrease of the amount of waste produced, by improving these processes efficiency. The use of more efficient forms of packaging, the employment of modern technologies and the design and development of more lightweight and compact goods (Jun and Xiang, 2011). Ghisellini et al. (2016) consider that *Reduce* stands for a decrease in resource consumption per product produced or to replace all the toxic substances by less hazardous ones. Additionally, consumers can moderate the purchase of goods and rethink their patterns of consumption. Companies can reduce their dependency on raw material utilisation and consider products' design in terms of durability, repairability, and recyclability. Therefore, this R-Principle is of major importance in waste management strategies.

2.2.2. R5-Reuse, R6-Repair, R7-Refurbish, R8-Remanufacture, R9-Repurpose

Products and materials ought to be reused continually and redistributed in their primary shape or with insignificant alterations and improvements to new customers (EMF, 2019). In this context, in an economic system that is restorative by intention and design, the emphasis is put on the *R5-Reuse* of products in detriment of being discarded before their value is exploited to the full (Wijkman and Skânberg, 2015; Waste Resource Action Programme, 2016).

R6-Repair concerns the expansion of a product lifespan (King et al., 2006) by repairing its components and parts (Stahel, 2010), or by making transformations (Thierrry et al., 1995). Extending the life of a product can be performed by various actors (technicians,

repair companies, and ultimately owners) without involving the transfer of ownership (Hultman and Corvellec, 2012).

It is noteworthy that the contemporary economic paradigm is based on a linear paradigm which is driving to the exhaustion and mitigation of resources and that is not viable anymore. To address this challenge and also the increasing need to rethink, redesign a more encouraging future, the EMF (2010), whose main purpose is to enhance and promote the transition to a CE model, has been closely cooperating with companies, business, as well as with governments to develop a framework that allows CE implementation, and at the same time is preparing society to this transition. Lacy and Rutqvist (2015) also consider that implementing a Circular Economy model that prioritises the *R7-Refurbish*, long-lasting design, reuse, recycle, remanufacture, will be economically beneficial as these will allow products to preserve the highest utility and value for longer periods of time, and ultimately, the natural capability of the environment to regenerate itself (Bastein et al., 2013; EMF, 2013).

It is also corroborated that the transition to a CE model should contemplate system thinking, as stakeholders decision making involved in production processes has a major influence on the value chain (EMF, 2015). Decoupling the economic model from the consumption of raw materials has to be one of the key principles of the transition. The focus has to be placed on value retention, on product lie extension, and on stock optimisation (Stahel, 2013, 2019).

Reike et al. (2018) also consider that the *R7-Refurbish* consists of the process undergone by products, materials or products' components once upgraded. Parts or components of a different structure are replaced so that the lifespan of a certain product is extended (Brito and Dekker, 2003; Fernández and Kekale, 2005).

The *R8-Remanufacture* is portrayed as the process of upgrading a product by means of repair, which may start with a complete inspection, followed by its disassembly, cleaning,

and repair by resorting to industrial processes performed in supervised atmospheres (factory, shop) (Gehin et al., 2008; Lieder and Rashid, 2016).

R9-Repurpose concerns the strategy of putting to use discontinued and/or obsolete components or products' parts and grant them a new purpose or new and sometimes different function from the one it was primarily designed for, preventing these discarded goods of being landfilled and allowing them to have another function and re-enter production processes and start a new life cycle (Reike et al., 2018; Yan and Feng, 2014). Stahel (2010) also considers that 'repurpose' also relates to the extraction of parts or components of products that are unfit for usage.

2.2.3. R10-Recycle and R11-Recover

Circular Economy encompasses all the operations a d actions in the context of the reducing, reusing and recycling R-Principles materials processes, in addition to the allocation and consumption of all these products and materials. Natural resources are processed in cycles, by resorting to geochemical procedures or by human intervention, which is one of Circular Economy assumption, if not environmental deterioration will endure and increase at an alarming pace (Robèrt, 1991).

It is also a fact that governments have introduced recycling policies and goals for domestic waste but it is also acknowledged that they have failed when it comes to strategies that would enable waste prevention and the design and production of longer lasting products (Cooper, 1994).

Although, strategies that enclose the *R10-Recycle* have been considered and developed, focusing on consumer durables and packaging are also an imperative. Additionally, recycling cannot be a continuous practice as it can become too difficult and challenging, as products contain certain substances that make the process of recycling

difficult and sometimes almost impossible. In such an economic system, matter costs and energy are not levelled, as in a closed economic system there is a balance as the waste produced is equivalent to the amount of resources used (Andersen, 2007). It is also possible to convert the waste produced into raw material and reuse it in the production line again. As a result, economy becomes circular, and dissociates itself from the traditional 'take-make-waste' economic paradigm, and decouples the economy from the natural resources exhaustion by shifting to renewable energy sources.

Circular Economy is commonly associated with the *R10-Recycle*, nevertheless, this approach stands out as the least sustainable in addressing environmental sustainability challenges, in comparison to the other R-Principles when tackling profitability and resource efficiency (Stahel, 2013, 2014, 2019). Some industrial waste can only be recycled to some degree and various materials cannot be recycled at all (fibers can be recycled 4-6 times; some metals cannot be recycled; plastics cannot be exposed to certain recycling processes as some of their components contain impurities) (Reh, 2013; Prendiville et al., 2014). As a result, different strategies and solutions which consider the nature and components of products are mandatory, as not all products' components are 100% recyclable.

R11-Recover stands out as the R-Principle commonly overlooked when considering Circular Economy R-Principles as it refers to the "retrieval of materials after landfilling phase" (Yan and Feng, 2014; Reike et al., 2018), which stands out as a practice generally put into practice in developing countries.

2.2.4. R12-Remine and R13-Return

Concerning the *R12-Remine* and *R13-Return* it is fair to say that are commonly forgotten when operationalising Circular Economy strategies. The *R12-Remine* refers to the recuperation of materials promptly before the landfilling phase, i.e. valuable components

from discarded items are selected, retrieved, and reused in the production or remanufacture of new products and/or products' parts (García-Rodríguez et al., 2013; Reike et al., 2018).

With respect to the *R13-Return*, it refers to the process of throwing back components or parts of products but in an environmentally controlled and nontoxic way, which, in some situations, may comprehend adequate treatment and handling or containment.

An overall and efficient approach of the R-Principles and their utilisation is an important strategy in addressing a Circular Economy model implementation, given the fact that some of these principles are the natural result of the laws of physics, whereas others are connected to the prevailing economic paradigm of developing countries.

Circular Economy distinguishes itself as an effective construct in the path towards sustainability and development. Nevertheless, debate, analysis, and critical research on its implementation and principles is mandatory in order to ensure its proper dissemination, adoption, and implementation, not only by companies but also by policymakers.

Table 1 displays the various R-Principles considered and examined above.

TABLE 1. CE R-PRINCIPLES.

Source: Adapted from Potting et al. (2017).

STRATEGIES	R-PRINCIPLES	DESCRIPTION
Better production and consumption approaches	***R0-Refuse***	the refusal to approve packaging, bags or containers whenever they constitute waste; to accept or approve certain production processes; choose to purchase limited quantities of products or reduce its use
	R1-Rethink	a new and design oriented technique known as 'eco-effectiveness', so as to minimize and dematerialize the material flow system; promote an intensive use of products for longer periods of time
	R2-Re-educate	train and educate consumers to change their behaviour towards consumption

	R3-Redesign	products are designed and fabricated with a new purpose and with 'long-lasting' design through waste-free industrial processes
	R4-Reduce	minimise the amount of waste produced; decrease energy consumption in production processes; reduce the use of unnecessary packaging, and avoid disposable items
Circularity higher degree	***R5-Reuse***	use items and products as many times as possible
	R6-Repair	extend the lifetime of a product by replacing broken or damaged parts
	R7-Refurbish	it corresponds to the process that products undergo when upgraded, i.e. parts and components of a bigger framework have to be replaced so that the life cycle of the product is extended
	R8-Remanufacture	the process of repairing a product, starting by setting up an inspection, followed by the product disassembly, cleaning, and repairing, through industrial processes in monitored atmospheres
	R9-Repurpose	the strategy of utilizing discontinued or obsolete parts or components and providing them with a new purpose or another function, enabling these discarded equipments to re-enter a new life cycle
Advantageous utilisation of materials	***R10-Recycle***	products are recycled by disassembling components and separating parts
	R11-Recover	retrieval of materials after landfilling phase
	R12-Remine	the recuperation of materials promptly before the landfilling phase
	R13-Return	refers to the throw back of products or components but in an environmentally innocuous way, which may include appropriate treatment and handling or even containment

2.3. From Linear to Circular Economy

The contemporary economic model relies on a linear model of resource extraction, products' production and consumption, whereupon items are utilised for very short time

periods and shortly after discarded, which causes the generation of massive quantities of waste.

In Ellen MacArthur Foundations' (2013) view, this economic paradigm has its foundations on the historical, global, and variable distribution of wealth. Taking into consideration that the consumers of resources are largely centered in the more developed and developing areas, industrialised nations have experienced natural resource abundance and energy, which has stimulated the proliferation of businesses that intensely rely and depend on raw material extraction. This strategy presupposes that an economy based on a consumption paradigm that works on the cost of the natural resources unmaintainable usage has strong and impressive costs throughout the entire supply chain. Moreover, the increasing and strong development of such an economic paradigm since the mid-20th century has led to the increase of negative externalities, mainly caused by population growth and related urbanisation, consumption per capita, the unparallel extraction of resources and consequently their consumption in yet more remote areas, and finally the environmental costs of natural resources exhaustion (Steffen et al., 2004).

Taking into consideration the flow of materials in a value creation conceptual model wherein simply natural resources are utilised in production operations, unnecessary losses throughout the production chain will arise, enormous quantities of waste are generated, excessive use of energy will be consumed, and the ecosystems depletion will also take place (EMF, 2012). Considering these facts and the present resource depletion indicators, stakeholders, academia, environmentalists, and policymakers ought to seek for a new model of economic growth and development that is advantageous within the natural boundaries of planet Earth (EMF, 2014).

As stated by EMF (2012) businesses concluded that the present linear economic model, that pursues a 'take-make-dispose' model, is the actual source of resource price increase. Consequently, companies experience both higher resources prices on one side

and on the other stagnating demand in consumer markets. For this reason, in a context of socioeconomic growth, with the world's population growing, particularly middle-class, the struggle for resources has been increasing sharply. And as Meadows et al. (1972) have shown natural resources are not abundant and infinite, and such an accelerated economic growth, resources, energy consumption, and humanity's production and consumption model is unsustainable and represents economic and environmental challenges.

Against this background, Circular Economy features a circular production and consumption model, in which resources are extracted from the environment and utilised in production processes, and subsequently, waste is transformed into a resource and continually recycled in the economic process, as portrayed by Figure 6.

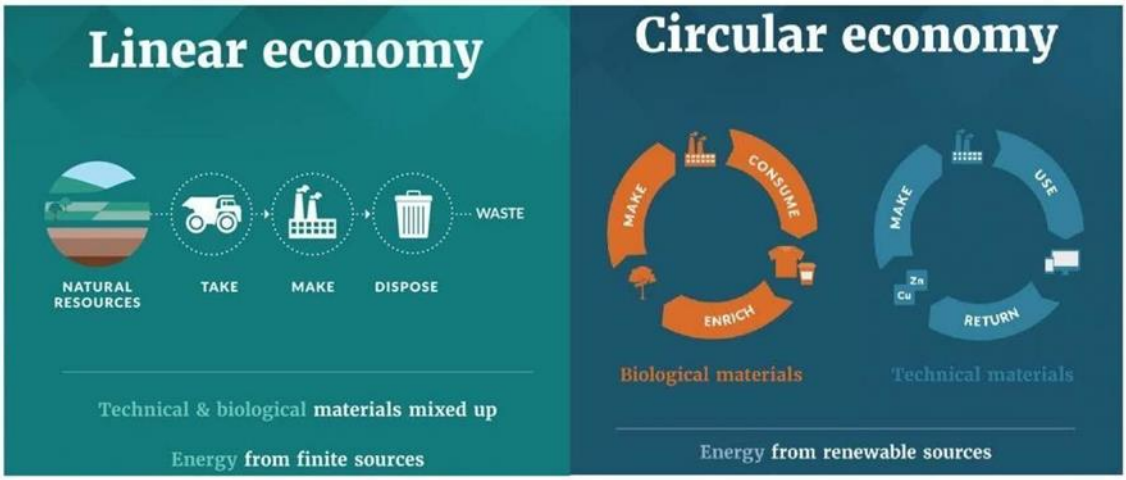


FIGURE 6. MINISTRY FOR THE ENVIRONMENT OF NEW ZEALAND

Retrieved from: https://environment.govt.nz/what-government-is-doing/areas-of-work/waste/ohanga-amiomio-circular-economy/

Therefore, transitioning to a CE ought to grant the decrease and subsequent rejection of the present throw away pattern that characterises contemporary society. It might also imply the refusal of the present model of 'take-make-use-dispose' paradigm and transition to a model that would consider all the CE R-Principles.

Since CE refers to the operations performed in an economic model, its operationalisation ought to begin with the products, services, and processes design. Goods should be designed to be durable, repairable, and upgraded, in order that their lifespan can be prolonged, which would ultimately facilitate recycling and remanufacturing inside the same companies or for other businesses. Therefore, the key element that permits establishing a distinction between Circular Economy and linear economy, arises from the fact that in the first, goods, production processes and services are developed and manufactured to grant them a broader lifespan, as well as the possibility of being upgraded, restored, or remanufactured, or even be an input for different companies (Bonciu, 2014). Table 2 outlines of the concepts of Circular Economy and also linear economy.

TABLE 2. GENERAL OUTLINE OF THE CONCEPTS OF CIRCULAR ECONOMY AND LINEAR ECONOMY.

Author – Costa et al. (2020).

	Linear Economy	Circular Economy
Business Model	**Production-consumption-disposal:** ▪ The linear economic model is based on a linear paradigm of production and consumption.	**Production-consumption-reuse:** ▪ The circular economy model is based on a circular production process.
Products	**Short life cycle** ▪ Products are used for a brief period of time and afterwards disposed.	**Long life cycle** ▪ Products, services and industrial manufacturing are formulated and produced to allow them a more extended life cycle and the potential to be restored, improved or remanufactured, and even inputs for other businesses
Resources	**Unlimited use** ▪ Considering the material flow in a conceptual model of value creation, only raw materials are used in production processes.	**Looping use** ▪ Resources are collected from the environment but at a subsequent stage waste is turned into a resource and continuously recycled in the economic process; ▪ Recognises decoupling of the economic system from resource consumption. ▪
Energy	**Fossil energy** ▪ Disproportionate energy use and of pricing levels, and volatility of raw materials supply.	**Renewable energy** ▪ It promotes circularity by reducing the energy inputs and raw materials consumption.
Economy	**Linear economic model** ▪ A linear economic system, which follows a 'take-make-dispose' pattern; ▪ Open-ended economic model.	**Circular economic model** ▪ "Re-use and recycle" process; ▪ It is restorative and regenerative by design; ▪ It emphasises value retention, stock optimization and product life extension. ▪ A closed economic model, which mimics the ecological circulation of raw materials.

Energy	**Fossil energy** ▪ Natural resources thrive, and planet Earth has an unlimited capacity as a waste sink.	**Renewable energy:** ▪ It associates environment and industry and minimises waste emissions.
Environmental impact	**Ecosystems overexploitation** ▪ It has depleted natural resources.	**Ecosystems conservation** ▪ It alleviates resource depletion. ▪ It focus on the social, economic and eco-conscious perspectives.
Manufacturing model	▪ 'Cradle-to-grave' manufacturing model.	▪ 'Cradle-to-cradle' manufacturing model.

Finally, the present economic paradigm, the linear economy, has revealed its ineffectiveness to address the future needs of humankind, as well as its limited potential to appropriately maintain and support the contemporary level of natural resources overutilisation.

2.4. The concept of sustainability

Apprehension about sustainability and environmental preservation and depletion and increasing economic and social inequalities with persistent deprivation of a part of the world's population turned out to be an important issue in 1990s and have thriving in recent decades (Rockstrom *et al*., 2009; Piketty, 2014; Steffen et al., 2015). As a result, it is necessary to highlight the source of the sustainability concept and how it has been brought to light.

In accordance with Geissdoerfer et al. (2017), the sustainability construct has its origins on the French verb 'soutenir', which means 'to hold or to support' (Brown, 1987), and its modern definition is established on the field of forestry (Du Pisani, 2006; Grober, 2012; Caradonna, 2014). In its base is the silviculture proposition that states that the amount of harvested wood shouldn't exceed the quantity that is farmed (von Carlowitz, 1713). Over time, this construct was embraced by ecology, and it was related to nature's capacity to restore itself (Duden, 2015).

Additionally, Malthus (1798) influenced by the effects of the industrial revolution, brought to discussion the limits of economy as well as demographic progress, displaying

his concerns over the growing population consequences, by referring that the population significant increase could eventually put the planets' function of food supplier at risk. Moreover, throughout the 19th century and early 20th, it was already visible two distinct lines of thought regarding environment, the anthropocentric conservationists, who promoted natural resources preservation of and enhanced their sustainable utilisation, and the biocentric preservationists, who advocated that the conservation of nature by virtue of its inherent importance (Callicott and Mumford, 1997).

The contemporary approach and the debate around sustainability was exposed in the 20th century, when the discussion on natural resources sustainability and depletion reached the conclusion that their utilisation and exploitation should be regulated, as their rate of utilisation and consequently low value contributed to a devastating and excessive utilisation (Hotelling, 1931).

As the result of a period of debate and ecological turbulence (ozone loss, food shortage, biodiversity loss, and climate), which were the result of inadequate management policies and strategies, the Organisation for Economic Cooperation and Development (OECD) (1960) promoted those that would allow sustainable economic development, along with job opportunities in subscriber countries, to improve employment and life standards.

Following this line of argument, Kenneth Boulding (1966) introduced the spaceship allegory presenting planet Earth as a spaceship with an arduous journey in the future. It was powered by solar energy, and all the necessary resources to this expedition were put aboard before departure. With time, resources are exhausted and unless everything is recycled and reused time spent in space and travelling will definitely decrease. With this allegory, this author recognised that planet Earth ought to be examined as a closed economic system, with economy and environment acting together.

This debate was taken to a different level and international discussion on sustainability as well as on the interaction between society, environment, and economy was triggered (Kates et al., 2005).

The report *Limits to Growth* (Club of Rome, 1972) and The Stockholm Conference (1972) acknowledged that there was an imperative to decrease the ecological footprint per unit of consumption in order to prevent exceeding the world's natural boundaries. It also launched discussion on Earth's potential to sustainably support increasing economic and human development. And, in 1980, the International Union for the Conservation of Nature (IUCN) brought to light the World Conservation (WC) policy who determined that the true essence of sustainable development ought to be considered as the planet Earth life-support system preservation.

The sustainable development concept proposed by the Brundtland Commission (1987) emerged as the confirmation of the growing environmental awareness which increased throughout the 1980s, and included in the programme of policymakers, academia, and businesses. It was introduced as the path in the direction of economic growth whilst preserving the ecological processes essential and required to healthily sustain generations to come, without compromising their potential to address their own needs (*Our Common Future* - World Commission on Environment and Development, 1987; McMichael et al., 2003; Ehrenfeld, 2005).

Furthermore, a global agenda for sustainable development delineated by the aforementioned report "Our Common Future" (1987) which set objective targets so that sustainble development would be enhanced by 2020 and ahead. Adding to this, it strengthened collaboration amidst developing and developed nations, by setting joint objectives that would consider the triple bottom line, i.e. people (society), natural resources (environment), and economic development (economy) and how to protect environment and

rehabilitate it where and when necessary; it also encouraged environmental constrains management; i.e. a programme for the following decades.

Following and growing in a sustainable pattern by addressing poverty, mitigating environmental negative externalities and waste generation are the key elements of the process to enable social, economic, and environmental sustainable development. It is also acknowledged that environmental and economic issues should be dealt in association as development might trigger environmental negative outcomes, which might weaken economic development (UNWCED, 1987). This commission determined that following a different path is mandatory throughout the following decades and put 'sustainable development' in stakeholders' agenda as the central issue of the environmental challenge that humanity is already facing (UNWCED,1987).

The Rio 92 – Summit (1992) joined around one table heads of state diplomats, international organisations, government officials, non-governmental organisations, and chiefs of governments of 179 countries with one particular goal and announcing "…the beginning of a global partnership" (1992:7) in dealing with the impact of human social and economic activities on the natural environment. The key goals of this conference was also to highlight the interrelationship between society, economy and the environment, and how success in one of this areas demands action in another sector so that they all are sustained over the years. Another objective was to develop a global agenda with a new strategy for international environmental and development action that would instruct countries and enable their cooperation in the improvement of development policies for the 21st century.

Additionally, *The Declaration of Rio* (1992) aimed "to reconcile the twin requirements of a high quality environment and a healthy economy for all people of the world, while identifying key areas of responsibility as well as offering preliminary cost estimates for success" (1992:6), which can be seen as a recognisable step forward that led to international understanding on accomplishing sustainable development.

Subsequent environmental summits (in Istanbul, in 1996; and in Johannesburg, in 2002) precipitated the international agenda on environmental conservation by means of promoting the sustainble use of resources, with poverty becoming the central point in developing countries instead of wealth in developed countries (Martinez, 2002). This adaptation allowed the economic development and growth framework to be adapted as the required route was to address environmental depletion (Gómez-Baggthun and Naredo, 2015). The report Agenda 21 (UN, 1992), which portrays the final action programme in the environment field and its recognition by the governments of the different countries corroborates the emphasis put on sustainable development by the international community.

In addition, Leal (2000) considers that since the 1980s much has been done and research produced regarding environmental challenges by academia, and relevant material was issued, namely the Magna Carta of European Universities (1988); the Talloires Declaration of University Presidents for a Sustainable Future (1990); the Halifax document "Creating a Common Future: An Action Plan for Universities" (1991); the "Urgent Appeal from the CRE" to the Preparatory Committee of United Nations Conference on Environment and Development (UNCED) (1991); the "Universities Charter for Sustainable Development" (1994); and the Lund Declaration (1999).

The concept of 'Green Economy' (GE) was employed at the Rio+20 Summit (2012) as the representation of sustainble development and as the major directive in the multilateral debates. Nevertheless, a year before, in 2011, the United Nations Environmental Programme (UNEP, 2011) report 'Towards a green economy: pathways for sustainable development and eradication of poverty', already presented CE as an economic model as one that would meet mankind's essential needs and economic and social equality and growth, while minimising environmental exhaustion, proposition also considered at the Rio+20 Summit final declaration.

Geissdoerfer et al. (2017), outlining Johnston et al. (2007), emphasise that an assortment of interpretations and usages of the sustainability construct have been brought to light in the last decades (Munda, 1997), and proposed in different areas of study (D'Amato et al., 2017), in politics, and even in the private sector in order to acknowledge some businesses and procedures. This has led the various societal actors to interpret these different definitions in various forms, allowing gradations of disparity. Bearing this in mind, Geissdoerfer et al. (2017) also proposes a new interpretation to the concept of sustainability, i.e. "the balanced and systemic integration of intra and intergenerational economic, social, and environmental performance". Considering this interpretation, it is possible to conclude that reflecting on how to achieve intragenerational welfare and sustain vital life-support systems is mandatory.

As seen in the considerations above, this global discussion on sustainability and its diverse interpretations, an innovative framework to measure companies performance was considered, namely the 'triple bottom line' (Elkington, 1994, 1997). This approach transcended the traditional profits estimation, return on assets, as well as stock value to also consider the social and environmental dimensions. For this reason, a correlation of the people (social), the planet (environment), and the profit dimension (economy) has emerged as a significant strategy in promoting sustainability goals.

The economy dimension emphasises the bottom line and the flow of capital, expenses, employment, taxes, and the overall business context. The social dimension highlights the social scope of the community and comprises educational capacity, equality, and opportunity to benefit from social resources. The environmental dimension refers to environmental performance and their applicability. In this variable, water and air quality, the use of energy, resource systems, and waste generation are considered. The interconnectedness of these dimensions ought to be consistently related "interdependent

and mutually reinforcing pillars" (UN General Assembly, 2005), and they influence each other (Mckelvey, 2002).

Environmental issues have progressively become quite a global imperative and concern, and so sustainability has been considered a key concept when it comes to worldwide investigation and an established policy objective (Garud and Gehman, 2012; Markard et al., 2012). The overall challenges are to understand if welfare policies are sustainable in the long term (Clark and Crutzen, 2005; Rockström et al., 2009), together with the insufficient capability to store resources, as well as their irregular spatial allocation (Georgescu-Roegen, 1977), there are also questions regarding planet Earth's capacity as a waste sink (Daly and Townsend, 1993).

Taking into consideration this concept weaknesses and strengths, efforts are currently underway so as to make the transition from academia research, and independent stakeholders agendas to initiatives that encourage observable and sustainable projects.

2.4.1. Circular Economy and Sustainability

CE and sustainability have broadly been examined separately as two different areas of research and study (Pieroni et al., 2019) but have often been confused, and frequently followed by a certain degree of definitional and ambiguity uncertainty. Nevertheless, similarity and differences between these two concepts were found, however, the correlation between them is not explicit as most researchers just highlight the environmental performance of CE rather than accounting for the three dimensions of sustainability, and conceptually reduce the Circular Economy concept to raw material utilisation and waste generation (EMF, 2013; Rashid et al., 2013; Bakker et al., 2014; Bocken et al., 2016; Geissdoerfer et al., 2017).

In this regard, this section examines the correlation between these concepts and explores the main similarities and differences between them based on the literature review

as a contribution to discussion by presenting new insights to the CE and sustainability research. By highlighting their conceptual similarities and differences, this research is assisting the conceptual development of these constructs so that they can be accurately used not only in research but also in practice, even though the object of this research is the concept of Circular Economy.

2.4.1.1. Similarities

Circular Economy and sustainability have gained momentum among academia, policymakers, and stakeholders worldwide, in the last decades. Both concepts emphasise intra and intergenerational principles founded on the premise that environmental negative externalities are the main reason to the contemporary growth emergency the humankind is experiencing (Geissdoerfer et al., 2017).

In addition, development global issues, as well as global collapse ought to be addresses collective and collaboratively by all the stakeholders by resorting to cross-sectoral strategies so that value is created. These concepts rely on regulations, i.e. governmental legislation and codes of good practice require that companies contemplate sustainability. The violation or neglect of these regulations involves costs as fines or sanctions. However, rewards ought not only to be to be considered for those who act in compliance with the established legislation, but ought also to be regarded as crucial tools for implementation in achieving and improving performance (Geissdoerfer et al., 2017).

Independent businesses are fundamental actors among stakeholders since they function amidst a broader diversity of resource facilities and possess relevant systems and structures which allow them to strengthen companies' sustainability. Technological solutions/services are also accounted for, when they are input efficient, as their utilisation in production processes permits a higher production per unit of input. However, they often present implementation difficulties (Geissdoerfer et al., 2017).

Undoubtedly, the quest for sustainability is currently reshaping companies and businesses, and contributing to the transformation in the way they consider goods, manufacturing processes, technologies, and also business models. Achieving environmental targets, prosperity, and development is pursuing innovation and technological improvement (Nidumolu, 2009).

2.4.1.2. Differences

The aforementioned constructs, Circular Economy and sustainability, have a number of differences which range from their background to the design, goals, timelines, and incentives.

Circular Economy is based on different philosophies, in various researchers and periods of time, which demonstrates that its underlying principles have persisted for centuries, however only some years ago were presented to public consideration.

It has its origins on epistemological areas such as biology, ecology, economy, and it is considered an ‘umbrella construct’ (Hirsch and Levin, 1999:199), and according to Costa et al. (2020) it incorporates a set of diverse theories and is based on different empirical conclusions, namely ‘circular flow of income’ (Quesnay,1758), ‘industrial metabolism’ (Simmonds,1862), the ‘spaceman economy’ (Boulding, 1966), ‘limits to growth’ (Meadows at al., 1972), ‘cradle-to-cradle’ (Stahel and Ready-Mulvey, 1981; McDonough and Braungart, 2002), ‘industrial ecology’ (Frosh and Gallopoulos, 1989; Graedel and Allenby, 1995), ‘regenerative design’ (Lyle, 1996), ‘remanufacturing’ (Steinhilper, 1998), ‘natural capitalism’ (Hawken at al., 1999), biomimicry (Benyus, 2002), ‘eco-effectiveness’ and ‘eco-efficiency’, (McDonough and Braungart, 2002; EMF, 2012), ‘steady state economy’ (Daly, 2005), and ‘performance economy’ (Stahel, 2010). However, its modern conceptualisation and one of the first interpretations is assigned to Pearce and Turner (1990) (Su et al., 2013; Ghisellini et al., 2016; Geissdoerfer et al., 2017).

The sustainability construct materialised during the 1960s in answer to the overall apprehension regarding the environmental collapse which was already taking place and that was decades later validated by policymakers, and environmental organisations, particularly following the publication of the Brundtland Report (1987), and as it became apparent that mankind would not support the widespread production and consumption model without depleting planet Earth limited resources.

CE focus on the principle of circular flow, of economy as a closed loop system, relying on continuous growth with resource inputs. Waste is eliminated or minimised supporting, that way, the extraction and usage of natural resources, which creates effective environmental and societal results (Kraaijenhagen, 2016). A circular economic model is adopted in detriment of the 'take-make-dispose' model (Ness, 2008) that has been controlling the economy up till now. Business following a circular framework presuppose intercommunication and collaboration between all the stakeholders so that value within a closed material loop system is achieved (Mentik, 2014).

Sustainability implies an open-ended model, wherein the economy, society and environment play a central role and are the unequivocal beneficiaries, model known as the 'triple bottom line' (Elkington, 1997). This model enables sustainable and levelled outcomes in these three dimensions, but if one of these becomes more vulnerable than one of the others, the system in general becomes unsustainable, once it is difficult to sustain management efficiency that incorporates the environmental and social dimensions (Geissdoerfer et al., 2017).

CE enhances an economic model of 'eco-effectiveness', so that the materials flow is dematerialised, which, ultimately, will promote counterbalanced exchanges between economy and environment (McDonough and Braungart, 2002; EMF, 2012). In contrast, sustainability promotes 'eco-efficiency', the best instrument to achieve sustainable industrial development, as it allows the distribution of competing raw materials as well as services by

gradually reducing the impact of natural resource consumption (WBCSD, 1992; Hueseman, 2003).

Being one of the beneficiary dimensions, environment benefits from less resource extraction and depletion, less toxic waste, and society (the social dimension), on its part, takes advantage of the environmental improvements, along with further advantages as jobs and proper revenue (Webster, 2015). Circular Economy beneficiaries are all the players engaged in the transition and implementation process.

Literature indicates that the sustainability concept is very wide, and it can acquire various interpretations according to the contexts in which it is applied (Brundtland Report, 1987; Rashid et al., 2013). CE concerns the economic and environmental benefits to its beneficiaries comparatively to those obtained from a linear economy model.

An additional central difference can be found in the actors engaged in the transition. Relatively to sustainability, the fields of action are set by all the parties involved engagement, together with the acceptance that sustainability can create value for companies and businesses by means of revenues and lower costs, despite the fact that the incentive to the implementation of sustainable practices come from economic demand, governmental policies and even NGOs (Epstein, 2009; Geissdoerfer et al., 2017). Regarding Circular Economy, its driving force comes from companies and also governments (Webster, 2015).

The chronological timeframe is undetermined, as goals, targets, purposes can be adjusted or improved over time, since sustainability strategies can only be assessed prior to the implementation. In comparison to sustainability, Circular Economy also experiences theoretical and functional barriers throughout the implementation process depending on the region where it is being put into practice (EMF, 2013).

Furthermore, the assignment of competencies relatively to these tow concepts is also different. Concerning sustainability responsibilities, objectives and involvement are shared

by all the stakeholders, nevertheless, they are not obviously emphasised. With respect to Circular Economy, policymakers and governments are held responsible for the economic incentives for companies, and to encourage and promote the reduction in resource usage and of environmental negative externalities.

Geissdoerfer et al. (2017) indicate that the relationship between these two concepts continues vague as it has not been clarified in literature, which is a disadvantage relatively to progress in the sustainability field of research. Benson and Craig (2014) highlight that it is imperative to address the sustainability construct straightforwardly.

Even though, the quest for sustainability principles by academia, in debates and lectures, along with the unparallel and irreparably biodiversity loss (Sala, 2000; Wolinsky, 2011), the growing consumption levels per capita (Myers, 1997), and the worldwide climate change (Intergovernmental Panel on Climate Change [IPCC], 2007) are impelling mankind in the direction of unparallel transformations (Costa et al., 2020; Barnosky et al., 2012) and to a "no-analog future" (Fox, 2007). Table 3 displays a summary of the aforementioned differences between these two constructs.

TABLE 3. DIFFERENCES BETWEEN THE CONCEPT OF CIRCULAR ECONOMY AND THE CONCEPT OF SUSTAINABILITY.

Author – Costa et al. 2020.

	Circular Economy	**Sustainability**
Origins	The CE construct draws on epistemological fields as biology, economy, and ecology: ▪ 'circular flow of income' (Quesnay,1758); ▪ 'industrial metabolism' (Simmonds,1862); ▪ the 'spaceman economy' (Boulding, 1966); ▪ 'limits to growth' (Meadows, Randers, Meadows, and Behrens, 1972); ▪ 'cradle-to-cradle' (Stahel and Ready-Mulvey,1981; McDonough and Braungart, 2002); ▪ 'industrial ecology' (Frosh and Gallopoulos, 1989; Graedel and Allenby, 1995); ▪ 'regenerative design' (Lyle, 1996), ▪ 'remanufacturing' (Steinhilper, 1998); ▪ 'natural capitalism' (Hawken, Lovins and Lovins, 1999); ▪ biomimicry (Benyus, 2002); ▪ 'eco-effectiveness' and 'eco-efficiency', (McDonough and Braungart, 2002; EMF, 2012); ▪ 'steady state economy' (Daly, 2005);	▪ This concept is traced back to the 1960s and stands out as a response to some concern over ecological collapse and environmental damage; ▪ It was conceptualised as the 'triple bottom line' (Elkington, 1997); ▪ It was formalized by environmental movements and policymakers after the disclosure of the Brundtland Report (1987); ▪ Society became aware that humanity could no longer maintain the current global path toward economic growth without exhausting Earth's finite resources.

	▪ 'performance economy' (Stahel, 2010).	
Main Purpose	**Circular Economy focus on:** ▪ circular flow; ▪ a closed loop system; continuous growth which eliminates waste resource inputs, creating effective societal and environmental outcomes (Kraaijenhagen, 2016); ▪ enhancing natural resource exploitation, by adopting a circular rather than linear 'take, make and dispose' model (Ness, 2008); ▪ mimicking natural life cycles (Benyus, 2002). ▪ Collaboration and communication are required among stakeholders to achieve value within a closed material loop system (Mentik, 2014).	**Sustainability presupposes:** ▪ an open-ended system, in which the environment, economy and society play key roles (Elkington, 1997);T
Target	▪ It promotes 'eco-effectiveness', ie to minimize and dematerialize the material flow; ▪ It promotes well-balanced swaps between environment and economy (McDonough and Braungart, 2002; EMF, 2012).	▪ It enhances 'eco-efficiency', the ultimate tool for achieving industrial cohesiveness (Hueseman, 2003).
Beneficiaries	▪ The environment ▪ Society ▪ The parties involved in the system implementation.	▪ The environment ▪ Society
Focus	▪ CE focus on governments and private companies (Webster, 2015).	▪ Stakeholders, governments, NGOs (Epstein, 2009); ▪ Non profit organisations at a global level.
Competencies	▪ Private companies, regulators and decision makers have the responsibility, emphasise economic incentives for firms, and promote a reduction in resource consumption and environmental pollution.	▪ Competencies, goals and interests are shared among stakeholders.
Timeline	▪ CE outlines theoretical and practical constraints when conducting the implementation of a CE strategy in a certain region (EMF, 2013).	▪ The chronological timeline is indefinite, as targets, goals, intentions can be adapted or reorganised in the course of time.

2.5. Key elements of the Circular Economy implementation: awareness, attitude, benefits, enablers, challenges, and the organisational performance

Regardless Circular Economy ongoing acceptance and popularity, a limited level of implementation has been successfully attained so far, particularly because research and related literature on the CE concept is dominantly theoretical or conceptual, and hardly ever based on empirical research (Linder and Williander, 2017; Ormazabal et al., 2018), and so as Mayer et al. (2018), Donner and de Vries (2020), Ghisellini and Ulgiati (2020), and Towa

et al. (2021) put it, the transition to Circular Economy is, nevertheless, in a pre-development phase and to some distance from a global implementation level.

To promote deeper knowledge relatively to the concept of Circular Economy and the realization that the hotel industry's awareness and attitude, along with the identification of the benefits, challenges, and enablers that the implementation of the CE model bring along with their correlation with the organisational performance of hotels, play a central role in enabling the transition, and stand out as major driving forces to perform such transformation.

The following sections highlight the research and improve knowledge of the literature findings relatively to the aforementioned key elements which constitute the construct dimensions addressed in the questionnaire displayed among the Portuguese hotel industry. In this regard, examining these constructs is of major importance in attaining the research goals.

2.5.1. Awareness

Relatively to stakeholders' perception on **awareness** on the Circular Economy is crucial as it will allow them to understand that this concept implementation is necessary to enable the transition to a more sustainable economic model and thus to a more sustainable society. From this perspective, awareness and perceptions regarding this concept from a general and societal standpoint were examined and came to the conclusion that research reviewing and assessing awareness emphasize mostly individual players, namely companies and consumers, disregarding stakeholders, policy makers and academicians and it also focus on the perspective of embracing Circular Economy in strategies instead of concentrating on a CE the management model (van Langen et al., 2021).

The literature reviewed revealed that CE awareness is associated with the level of education of the participants and with the degree of the participants' economic

development. Van Langen et al. (2021), and Masi et al. (2018), also state that in general, European Union companies, namely Portuguese companies, Spanish, Italian and others, have gradually become aware of the CE concept and demonstrate some level not only on the corporate culture but also on the implementation of CE practices which indicates a certain level of innovation (Kirchherr et al., 2018).

It is also evident that consumers are aware of this concept and of its possibilities to assist environmental sustainability (De Koch et al., 2020; Jaca et al., 2018). Furthermore, consumers' awareness considers not only the Recycling R-Principle (De Koch et al., 2020), but also Remanufacturing (Laitala et al., 2021) and Repair (Diddi and Yan, 2019; Ramos et al., 2021).

Dangelico and Pujari (2010), Vanner et al. (2014), Rizos et al. (2015), Adams et al. (2017), Pheifer, (2017), and Hart et al. (2019) also consider that some lack of awareness and low participation levels of stakeholders (suppliers, manufacturers, and customers,) in the process as well as the lack of cooperation between companies may not allow progress. Markets and business are primarily aware of policies concentrated on end-of-cycle solutions to deal with waste production (EC, 2011) in prejudice of a 'restorative and regenerative by design' economic approach (EMF, 2013).

2.5.2. Attitude

For the last decades business organisations of different sectors have been pressured to encourage and support innovation relatively to the conceptualisation, design, and production practices, as well as consider the limits of natural resources (Gallarza et al., 2002; Bungau et al., 2015). Investigation on the perceived advantages of Circular Economy, which has been globally acknowledged as a strategy to tackle resource shortage, environmental constrains triggered by overconsumption paradigms assumes greater importance if green innovation success may rely, among other determinants, on meeting

consumers' demand and expectations (Porter and van der Linde, 1995; Yang and Chen, 2011; Sezen and Cankaya, 2013).

Circular Economy model emphasises the optimisation of products that are currently in use and throughout their entire life cycle. This would allow to address humanity's present and future needs by operating within a closed loop or system. To tackle or to reduce waste production companies would have to reuse materials resorting to processes of dismantling, recovering, recoupling, enhancing, and even repurposing (Bungau et al., 2016; Popescu et al., 2016; Tit et al., 2016), and emissions are reduced by means of narrowing and decelerating, or even closing materials and energy loops, with waste being considered an input in manufacturing processes (Geissdoerfer, 2017).

With the purpose of preserving environment, improving the balance between manufacture and waste production impact on the environment is mandatory, and so all the supply chain actors and consumers' ought to be engaged in the realignment of the 'take-make-dispose' contemporary economic model that the implementation of CE allows.

In this regard, and concerning consumers' **attitude** towards Circular Economy, Heshmati (2015) presents China as the country where Circular Economy has materialised as a development strategy. Its implementation is considered at three levels: at the micro, meso, and macro levels (Zhu and Huang, 2005; Yuan et al., 2006; Geng and Doberstein, 2008; Su et al., 2013), and ranked into different areas, namely production, consumption, waste management, and other support (Su et al., 2013).

With respect to the micro level, in the production area, manufacturers are assisted in considering cleaner production (reduce energy and material usage, and harmful externalities) in their production processes along with eco-design. These refer to low emission levels and to incorporating environmental issues, respectively, in production processes. Relatively to the consumption and waste management areas, the use of environmentally friendly products and services is encouraged, and waste produced has to

be recycled and utilised into new production phases within the industrial eco-system (Geng and Cote, 2002; Geng and Doberstein, 2008).

In terms of the meso level, Circular Economy strategies involve developing eco-industrial parks and ecological agricultural systems, which are enhanced by the environmentally friendly design of these parks and to the proper management of waste (resource recovery and waste trading systems) (Geng et al., 2009). Eco-industrial parks resort to common infrastructure and services, which allows them to have companies clusters collaboratively managing resource flows and trading by-products (negative impact). This action mode allows companies to reduce their resource dependency and overall production costs, which enables industrial productivity and competitiveness. A comparable result is attained by the eco-agricultural system (Chertow, 2000; Yin et al., 2006; Liu et al., 2012). Along with these parks, the green design for residential areas is promoted so that an eco-friendly residential environment may be established. Once more the emphasis is put on regulation and management of energy, water, and land usage so that their utilisation is reduced, and also on recycling and managing wastewater and solid waste, as a means of improving the residents quality of life and well-being (Zhu and Huang, 2005).

Regarding the macro level, broad collaborative and active networks ought to be formed between industries and industrial parks (primary, secondary, and tertiary sectors) in manufacture areas and also in the residential sector. In China, this level is geared towards bigger cities or even regions or provinces. As a result of these approaches concerning the attitude dimension in China, other countries then began promoting their own national engagement in the Circular Economy (Su et al., 2013).

Additionally, Lakatos et al. (2018) findings relatively to the research on generations X, Y, and Z ‘sustainable production, consumption and waste generation in line with Circular Economy in Romania’ indicate that these three generations exhibit a positive and encouraging attitude towards businesses that have a minor environmental impact. The most

common attitude identified was to separately collect paper and plastic and also used batteries, take used light bulbs to recycling facilities, and even carpooling.

Nevertheless, the results of this study indicate that consumers' behaviour plays a significant contribution to the transition to a Circular Economy model. It was also possible to conclude that who follow a 'take-make-dispose' economic pattern do it primarily on a financial perspective, would be easily persuaded to follow a circular model if convinced that acquiring more expensive products would decrease their overall costs in the future. These same customers would be predisposed to return products after usage it this would mean to be financially.

This research also revealed that half of the millennials considered in the study, do not embrace different and experimental consumption behaviours, sticking to the more traditional ones, which is an evidence that companies who adopt circularity will have to invest in education by resorting to awareness strategies and campaigns.

Smol et al. (2018) highlighted that consumers' attitude/behaviour is a crucial element in the transition from a linear economic model to a circular one. Research indicates that they resort to transportation sharing platforms, to housing/room rental facilities (Airbnb, Couchsurfing, and others) directly from their owners, as they suppose these services allow them to save money as they are cheaper than traditional ones.

The findings also indicate that consumers do not commonly use transportation rental services (bicycles, cars), as they often consider that renting has higher costs than having their own item, and others there is a lack of these rental services offer. Consumers also referred that the opportunity of taking advantage of these services allows them to have economic, social, and environmental benefits.

Waste disposal is also consider one of the most important practices when it comes to identifying consumers' attitudes. Smol et al. (2018) also concluded that, in their research, that consumers consider waste disposal practices by separating waste at home; not wasting

food is also a common practice; and buying products made out of recycled materials and remanufactured items are increasingly popular; nevertheless, sharing and collaborative services are not particularly popular.

This research also indicates that funding and research on Circular Economy strategies, and action programmes on Circular Economy awareness could shape consumers' attitudes and behaviour.

Promoting and disseminating Circular Economy may contribute to its public acceptance, greater integration, and participation.

2.5.3. Benefits

The transition to a CE model provides a diversity of economic, social, environmental, and political **benefits**, reinforcing the relationship between society and industry. Closing the loop will allow companies to have a lengthy collaboration throughout the supply chain (Geng et al., 2012; EMF, 2013). It also offers opportunities to enhance employment possibilities locally and investment possibilities (Yuan et al., 2006; Park et al., 2010; Geng et al., 2012; EMF, 2013), as well as public health care and environmental awareness (Park et al., 2010; Geng et al., 2012). At the end of lifespan, products and components should be recovered as the value chain no longer finishes with consumers (EMF, 2013). This positioning will allow companies to perceive customers' demands and expectations and proceed accordingly in the manufacture process.

A CE transition will mitigate the consumption of natural resources allowing their preservation, reducing the carbon footprint (Pratt and Lenaghan, 2015; EMF and McKinsey, 2017). It may lead to a GDP increase and a decrease in the supply and price volatility risk (EMF, 2013; Morgan and Mitchell, 2015). Nasr (2013), Lacy et al. (2014), the European Environmental Agency (EEA) (2016), Stahel (2016), and Rodrigues et al. (2020) believe that a CE implementation will increase competitiveness among businesses, raw materials

availability, along with the opportunity of enhancing products value creation. In addition, CE promotes the optimization of materials, components and products so as to decrease the creation of waste, following a cradle-to-cradle model (Sehnem et al., 2019).

Bressanalli et al. (2021) consider four categories regarding the benefits a CE implementation may bring to companies, these are environmental, economic for the supply chain, economic for the consumers, and social benefits.

The environmental benefits concern the value creation decoupling from resource extraction and consumption, by enhancing waste streams value capture through reuse, recycling and even remanufacturing.

The economic benefits for the supply chain are those obtained from the efficient and effective improvement of products and services. This allows companies to save costs in supplies and add value solutions which can strengthen companies' competitiveness and market presence. The economic benefits for consumers are attained if the transition to CE brings net savings, which provide supplementary value and access to products that have the same expected purpose.

The social benefits of CE involve consumers' social welfare by enabling the development of new and aligned market sectors aimed at products life extension and close-loop approaches. These, ultimately lead to job creation and access to products that improve consumers well-being.

Circular Economy emerges as a contemporary economic model that 'rethinks the overall economic process and human activities within the ecological boundaries of the planet' (Ghisellini et al., 2016).

2.5.4. Enablers

Training and education on the CE construct regarding its implementation along the chain, as well as governmental benefits (taxes benefits, financial support, banking incentives) would allow the transition process to be more effective, efficient, and less costly. Companies would also have to operate within regulations, so as to create organisational legitimacy (Velis and Vrancken, 2015; Dong et al., 2016; Kumar et al., 2019; Costa et al., 2020).

Circular Economy also enables companies to reduce production costs, minimise environmental constrains and waste production, by resorting to a supply chain that is more sustainable and end-of-life management policies, profitability will increase (Park et al., 2010; Geng et al., 2012; EMF, 2013; Kumar et al., 2019). Governmental support by establishing directional regulations, along with encouraging taxation and recycling policies are also drivers for a CE transition (Desrochers, 2002; Velis and Vrancken, 2015; Dong et al., 2016; Witjes and Lozano, 2016).

Four different types of **enablers** have been identified and discussed (Hart et al., 2019; Gusmerotti et al., 2019; Tura et al., 2019; Suman, 2020:17-18). They can be cultural, regulatory, financial, and sectoral. The cultural ones refer to companies 'leadership', 'sustainability/environmental drivers', 'demand', 'value chain engagement', 'long term relationships and partnerships', and 'systems thinking'. The regulatory enablers considered were 'policy support and public procurement', regulatory reform', 'fiscal support', and 'producer responsibility'. Regarding the financial enablers 'whole life costing' was the one highlighted by these authors. The sectoral enablers identified concern case studies with proved evidence, 'collaboration and design tools and strategies', 'research and development', 'innovation', 'standards and assurance schemes', and 'reverse logistics infrastructure.

Nevertheless, some researchers consider that consumer demand is the driver to circularity and to the adoption pf circular strategies. Customer-oriented service and the role customers play during and after using a product or service, along with the products/services sustainble production methods is the main enabler when it comes to CE transition. Gusmerotti et al. (2019) and de Jesus and Mendonça (2018) state that economic enablers are the major ones, along with cultural and regulatory in raising awareness and assist CE implementation.

Ranta et al. (2021) consider that stakeholders encouragement ought to be examined as a strong driver in a CE implementation. In addition, Jensen et al. (2019) state that developing remanufacturing business models will guarantee the transition and to control resource extraction and utilisation. D'Agostin et al. (2020) refer that companies act first based on environmental concerns and on pursuing sustainable lifestyles.

According to Mathews and Tan (2011), Zhu et al. (2011), Lacy and Rutqvist (2015) and Tura et al. (2019) operating in international markets and technological development act as social enablers which increase the pressure put on companies to search for alternatives to the traditional business models. Circular Economy implementation also provides the opportunity of enhancing job creation, as new opportunities created by companies production transformation involve more specialised labour (Fisher et al., 2011; European Commission, 2014a).

Comprehensive awareness and attitude from all the intervenients in the transition process are also major enablers for an effective CE implementation.

Implementing a Circular Economy model can create new opportunities for companies and further actions will be necessary to strengthen the ones that are already in progress.

2.5.5. Challenges

For the business community it is undeniable that CE has clear benefits, however, when putting its principles into practice several **challenges** can arise, namely the evaluation of future benefits relatively to present costs, lack of knowledge on CE and on its implementation, as well as pull and push market factors, technological availability and consumer demand, and expectations for sustainable products (Rizos et al., 2017). Another challenge that companies face is to identify attainable strategies and initiatives that may allow the decoupling of economic growth from natural resources consumption.

Kirchherr et al. (2018), Paletta et al. (2019), Hart et al. (2019), and Grafstrom and Asama (2021), also state that the challenges mostly documented by researchers are technological, economic, regulatory, social and cultural challenges, outcome indicators, and customer awareness.

According to Kirchherr et al. (2018), the technological challenges are primarily related to the lack of existing technologies to assist the implementation of a CE model, which includes the lack of expertise to produce high quality remanufactured products, insufficiency of circular production systems, lack of evidence regarding implementation projects, and lack of available data on the impact of CE.

Concerning the economic challenges, Kirchherr et al. (2018) consider the inadequate economic sustainability of CE business models, that derive from low prices of raw materials, lack of regulations, investment paid in advance, as well as the limited funding assigned to businesses that are willing to implement CE.

When it comes to the regulatory challenges it stands out the lack of policies that would support the transition to a CE paradigm, namely a global lack of consensus regarding the transition to CE and obstructing law and regulations. The social and cultural challenges arise from indecisive corporate culture to make the transition along with insufficient

enthusiasm to cooperate with all the intermediaries in the supply chain, consumers' limited awareness and interest regarding the CE concept, and operating in a linear economic system.

2.5.6. Organisational Performance

With the purpose of keeping up with the exponential growth of the tourism sector, the hotel industry needs to comply and support adequate standards to build its brands and gain advantage among competitors (Jayasinghe, 2015). In this respect, hotels performance measurement is presented as a process that allows businesses to assess their attainment of goals and objectives, it assists companies in obtaining customer satisfaction, it allows progress monitoring, to measure procedures and activities, and encourages change (Enoma and Allen, 2007; Pit and Trucker, 2008; kavrakov, 2015).

Contemporary research on the Circular Economy concept shows that this concept has been comprehensively explored, nevertheless, its impact on the organisational performance of companies is not yet fully investigated and theoretical studies referring to the hotel performance drivers are scarce. The vast majority of the research conducted is based on empirical analysis based on general management literature (Bozic and Cvelbar, 2018).

Nevertheless, the advantages of the implementation of environmentally sustainable practices on their performance has been the target of multiple analyses and considerations (Álvarez et al., 2001; Tarí et al., 2010; Rosa et al., 2020). These have demonstrated that this industry performs better financially and environmentally, decrease their costs, namely with energy, are more efficient concerning the control of costs, and decrease their dependence on natural resources by implementing environmentally sustainable practices and measures (Goodall, 1995; Chen, 2009; Kapiki, 2012; Chen and Chen, 2012; Fukey and Issac, 2014).

Hotels also achieve better competitiveness levels, enhance their brand identity, implement more efficient marketing strategies, which increase brand value, greater confidence from customers, and ultimately companies' performance (Goodall, 1995; Ayuso, 2006; Bohdanowicz et al., 2006; Kasim, 2007; Chan, 2009; Duric and Topler, 2021).

The lack of strategies to monitor the implementation of CE materialises as a challenge to the CE implementation. Organisational performance is an intricate and multifaceted concept that is hard to comprehend and assess. Performance indicators are metrics used to assess companies' performance and to evaluate its degree of effectiveness (Rodrigues, 2002). They can also be used to determine goals and to establish parallels between competing companies or the industry standards.

Accordingly, different businesses have specific performance goals which differ in conformity with the firm's goals, the timeframe contemplated, the guidelines used, and the perspective-taking. So, the set of attainable performance indicators is wide, diversified specific to each company.

Popova and Treur (2005) considered the number of clients, the clients' satisfaction, financial indicators, motivation, and safety as essential performance indicators. Nevertheless, these authors also affirm that while establishing the primary performance indicators and goals to attain the wished performance, the company has to relate these indicators to each other, as in the end some may prove to be incompatible. Popova and Sharpanskykh (2011) identified the number of clients, costs, and market share, whereas Mittal et al. (2019) regard skill mapping, as it enables performance trends recognition, and to map the employees' skills to allow them to endure in the company.

Neely (2004) and Dasandara et al. (2021) identify customer satisfaction, customer loyalty, business results, and the quality of the services provided, which should be high quality in order to ensure customers' demand. This indicates that measuring customers' satisfaction and comprehending them is a significant element in improving companies'

continuous pursuit for quality improvement, which will to a business performance improvement, and ultimately to an enhancement of economic performance.

To Duric and Topler (2021) hotels business performance is impacted by the excellence of management solutions and regulations when it comes to tackling environmental questions. Odar et al. (2012), Pereira-Moliner et al. (2015), and Bacik et al. (2020) point out the size of the hotel, as well as the ownership structure, and the rating system as the core elements when it comes to selecting metrics.

The implementation of key performance metrics in bigger hotels is quite different of impending those in smaller hotels, with the latter not always introducing these indicators or reducing them in order to downsize the costs. Relatively to bigger hotels, the implementation of adequate metrics allows them to control costs, effectively manage resources and improve service relatively to quality. Pereira-Moliner et al. (2015) considers that larger hotels which implement metrics beyond financial metrics (non-financial indicators) obtain better levels of performance, which ultimately has a greater market impact.

A circular economic model cannot be implemented and improved by single businesses or stakeholders, but by entrusting in large scale economic, social, and political transformations, which should embrace changes in legislation, production and consumption patterns, and manufacturing networks (Manniche et al., 2021).

It is observable an imperative necessity to adjust practices and initiatives, regulations and measures, so that the transition to a more sustainable economic model can be attained to overstep the prevailing initial stage. Moreover, understanding the hotel industry performance indicators is crucial to guarantee that hotel stakeholders take well-informed decisions and obtain the highest and best possible performance.

Since investigation/research on CE and companies' organisational performance is limited and the concept highly unexplored, hotels organisational performance was assessed

resorting to the following indicators: customers, carbon footprint/gas emissions/ greenhouse gas effects, improve profitability decrease, new competencies, new markets and consumers, access to raw materials, customer satisfaction, and overall performance increase.

2.6. Conclusions from the literature review

Literature on the concept of Circular Economy, its principles, the linear economy, sustainability, awareness, benefits, enablers, challenges, attitude, and organisational performance have been examined and discussed in detail.

To enhance understanding regarding the Circular Economy concept and its R-Principles several approaches from the most prominent researchers were examined. The theoretical analysis of these approaches has allowed the recognition of the different and various views on the aforementioned concept. Thus, CE materialises as an innovative and restorative economic paradigm that proposes to remodel worldwide production and consumption processes and also to reduce the inconsistency between economic development and environmental sustainability.

This is a model that enables a major transformation relatively to the role of natural resources within the economy, i.e. the waste generated is converted into profitable inputs in alternative processes, goods repaired or upgraded rather than being discarded. Furthermore, the comprehensive and systematic scrutiny of the R-Principles and their utilisation is a valuable approach for a successful Circular Economy implementation.

By addressing the diverse interpretations of concept of sustainability and examine its similarities and differences regarding Circular economy it was possible to determine that CE portrays the leading force to accomplish sustainable development at the production and consumption levels. Moreover, general literature concerning the prevailing linear economic model, suggests that this economic paradigm has exposed its ineffectiveness to meet the

needs of future generations and also to sustain the predominant level of resource overexploitation and overutilisation.

Relatively to the Circular Economy: awareness, attitude, benefits, enablers, challenges, and the organisational performance, an overview of the literature is provided based on different research considerations.

This section provides a comprehensive understanding of the aforementioned constructs and the identification of core elements to support the development of an empirical research framework, as well as the identification of the research gap.

2.6.1. The literature review and the development of a research framework

Whereas the main purpose of the aforementioned literature review is to contribute to existing research on Circular Economy, it is important to distinguish and highlight from the literature analysis the key concepts that the research process will address.

The aim of this section is to briefly summarise these core constructs with the purpose of conveying the context in which the empirical research phase will be developed and performed.

a) transitioning to a **Circular Economy** model could provide an alternative and circular flow model that mimics natural ecosystems (EMF, 2012; EMF, 2013; EMF, 2015), and that aims to preserve products, materials and even components at their most significant level of usefulness and value for the longest period of time possible. It is also portrayed as a regenerative economic model by intention and design, that allows the improvement of natural capital and the optimisation of natural resources. However, CE relevance and implementation by service dominated industries, namely the hotel industry that is predominantly based on a linear economy, is

scarcely researched, and scientific research regarding the implementation of CE and its principles by this industry is still unexplored;

b) concerning the **awareness** relatively to the CE construct it was possible to conclude that there is awareness mainly by consumers and companies, leaving aside stakeholders and policy makers and researchers. It is observable that the perception focus particularly on implementing CE in existing practices preferably to emphasising on CE management;

c) relatively to the **attitude**, literature indicates that the adoption of certain CE strategies is already taking place, as the hotel industry is committed to sustainable environmental practices as they allow companies to improve performance;

d) the **benefits** considered by different researchers are economic, social, and environmental. By closing the production and consumption loops, and narrowing the collaboration throughout the supply chain, which will ultimately generate benefits (employment and investment opportunities, public health care and environmental awareness, a decrease on the consumption of natural resources, reduction of the carbon footprint, strengthening of business competitiveness, raw materials availability and products value creation, products and materials optimization, mitigation of waste generation);

e) the **enablers** identified concern mainly training and education, as well as comprehensive awareness and attitude throughout the entire transition and implementation processes;

f) with respect to the **challenges**, the evaluation of future benefits, the lack of knowledge and awareness on CE and on its implementation stand out. The necessity of pull and push market factors along with technological availability to cope with a CE transition, as well, as the difficulty in identifying feasible strategies and initiatives which may allow the decoupling of economic growth from natural

resources consumption, regulatory, social and cultural challenges were also identified;

g) with reference to the **organisational performance,** it is noteworthy that the hotel organisational performance prior to a Circular Economy implementation has been poorly researched, and theoretical studies referring to it are scarce, as the vast majority of the research conducted is based on empirical analysis based on general management literature. From the literature scrutiny it is possible to conclude that performance metrics vary according to the specifications of the company, and the following indicators were identified: companies' goals, period of time under analysis, guidelines used, perspective-taking, companies' number of clients, clients' satisfaction and loyalty, financial indicators as well as business results, motivation, safety, operations' costs, market share, employees skill mapping, regulations, the size of the company, and ownership structure.

Chapter 3 - The Portuguese tourism sector and the Portuguese hotel industry

3.0. Introduction

The purpose of this chapter is to describe the Portuguese tourism sector in general, its positioning in the Portuguese economy along with the Portuguese hotel industry context in which the research has been accomplished. The main goal is to bring to discussion data which allows an accurate assessment of the development of this sector recently.

3.1. The Portuguese tourism sector - characterization

According to the Hotel Market Report (2019) the tourism industry continues to constitute one of the best positioned industries in the Portuguese economy, and over the last 20 years Portugal has been putting together improvements on the tourism sector that after substantial efforts, have finally attained the desired outcomes. It generated €15 billion in 2017, and 2018 stood out as another record setting year, with an unprecedented €16,5 billion. This growth momentum persisted throughout 2019, with a 6% growth rate in the first half of that year and with the Portuguese government predicting a 2019 closure above €17 billion. From 2014 to 2019, the Portuguese tourism industry generated approximately €75 billion, which means it has recorded a two-digit growth factor in each year.

The World Economic Forum (WEF) Travel & Tourism Competitiveness Report (2019) attests Portugal's tourism competitiveness by positioning it in the 12th place of the Travel and Tourism Competitiveness Index with a score of 4.9, and ranking 1st in the Tourist Service Infrastructure, with a score of 6.7.

Further considering the Hotel Market Report (2019), Oporto and Lisbon have become tourist destinations of excellence exceeding leading European destinations in major classifications as accommodation occupancy growth rate, prices growth rate, *RevPar* (a metric used to assess the ability of a property to fill its available rooms at an average rate) growth rate, and airport arrivals growth rate. This escalation led to an extraordinary boost

in accommodation provision in both cities assisted by achievements in digitalisation and urbanisation, and consequently in globalisation.

The OECD Tourism Trends and Policies (2020) also acknowledges that in 2018, the Portuguese tourism sector contributed 8.0% of GVA (Gross Value Added), and that it expanded twice as fast as the overall economy (8.0% in comparison with 3.9%). Based on the Tourism Satellite Account (TSA) (2019) developed by the World Tourism Organization, the tourism industry employed 9.0% of the active population in 2017, i.e. 413 000 people, which represents a 8.7% growth when comparing to 2016, once more higher than general economy (3.4%). The travelling industry exports estimated for 51.1% of the global service exporting in 2018. From here it follows that the Portuguese tourism sector has evolved and expanded significantly, primarily driven by the increase, not only in volume but also in value, of intercontinental American and Asian markets. International tourism revenues comprised 16.8 billion euros in 2018, which represents an increase of 8.3% relatively to 2017, portraying 18.7% of the overall Portuguese exports.

In 2018, foreign visitors comprehended 22.8 million, a 7.5% growth when compared with 2017. The main international origin markets in level of importance were headed by the United Kingdom, followed by Spain, France, and Brazil. This top five countries were responsible for 58.5% of demand. Nevertheless, when it concerns growth, the leading economies were United States (25%), Brazil (14%), China (14%), and Australia (12%). Still in accordance with the data disclosed by the OECD Tourism Trends and Policies (2020), in 2018, the number of overnight stays in the various types of accommodation reached 76.1 million, which accounted for a rise of 4.8% when compared to 2017. Of these stays, 32.5% were of national tourists, and 67.5% were of foreign ones. The total number of nights spent by the latter tourists reached 51.4 million, an increase of 4.1% relatively to 2017, with a medium duration of stay of 3.1 nights.

Considering the data from the Statistics Portugal Institute in its 2020 edition, evidence from several sources were considered, namely the International Monetary Fund, Eurostat, the World Tourism Organization, Portuguese Central Bank, and the Travel Survey of Residents. In 2019, according to the Statistics Portugal (2020), calculations show that the number of overseas tourists entering in Portugal must have reached 24.6 million, which corresponds to 7.9% when compared to 2018.

Furthermore, the number of foreign tourists checking in at all the existing types of tourist accommodation (tourist accommodation establishments, camping sites and holiday camps, and youth hostels, which in 2019 were 7,155 establishments in operation) totalled 29.5 million and the number of nights spent were of 77.8 million, an increase of 7.4% comparatively to 2018. 92% of the guests chose tourist accommodation establishments(hotels, local accommodation, and rural/lodging tourism), representing 90.2% of the overnight stays, camping sites centralized 6.8% of tourists and 8.9% of the stays, whereas holiday camps and youth hostels 1.2% and 0.9% respectively and in the same order.

Further data provided by this institute (2020:6) reveals that the overnight stays in tourist accommodation establishments amounted 70.2 million, a rise of 4.6% relatively to 2018; hotels recorded 58 million, +2,5% than in 2018; local accommodation documented 10.2 million, +16.9% concerning 2018; and in tourism in rural and lodging areas the numbers attained were of 2 million, +9.7% than in 2018. In addition, camping sites documented 6.9 million, +1.5% than in 2018; and holiday camps and youth hostels totalled 722.1 thousand of overnight stays, an increase of 3,9%.

The domestic market contributed with 26.1 million overnight stays, the equivalent to 33.6% of the total, and increased in 5.9% concerning the previous year. The number of overnight stays in external markets expanded in 3.5% and attained 51.7 million, which represents 66.4% of the total. However, the average overnight stay, which stood around

2.64 nights, dropped by 2.9%, regarding national tourist the decrease was of -1.5% and concerning international tourists it was of -3.5%.

The United Kingdom continued to be the main origin of tourists, representing 18.8% of overnight stays concerning foreign visitors with a growth of 1%; the German market, portraying 12.3% of the total, dropped 5.3%; the Spanish one, with a representation of 11%, increased 7.6%. It should be noted that international markets like the North American (+21%), the Chinese (+16.8), the Brazilian (+14.9%), the Irish (+9.9%), and the Canadian (+9.6%) also distanced themselves.

Accommodation structures (hotels, local accommodation, and rural/lodging facilities) contributed with €4.3 billion and revenue from accommodation itself amounted €3.2 billion, decelerating compared to 2018, +8.1% and +9.1% respectively. In conformity with the Travel Survey of Residents, 2019 provided the opportunity for around 4.5 million Portuguese residents to make at least one trip with a homologous overnight accommodation out of their usual context, thus representing to 53% of the resident population, against 48% in 2018.

Recreational and leisure activities stood out as the central motivation for Portuguese tourists to travel in 2019, explaining 12.1 million trips (49.4% of the overall trips), pursued by visiting friends and family members with 9.2 million trips (37.8%), and, finally, business with 2 million, which represents 8.2% of the overall amount.

The Statistics Portugal (2020:7) also states that the trips referred above lasted, generally, 4.1 nights against 4 in 2018. International trips, on average, lasted 7.2 nights, 7.3 in 2018, and national trips 3.6 nights, 3.5 nights in 2018. During these trips the Portuguese tourists spent around €134.8 per person/trip, around €121.5 in 2018, whilst in international trips the amount spent was around €626.8, +19.2% in comparison with 2018.

In 2020, the trips undertaken by the Portuguese residents have decreased around 41.1% of a total of 14.4 million (+10.8% in 2019). National trips have also decreased 35.7%

and international travels diminished 78.1% /+0.9% and 24.7%, correspondingly in 2019). Private accommodation has been gaining expression as the main type of accommodation representing (69.2%, +8% than in 2019) and the average number of overnight stays per tourist increased 23.2%, from an average of 5.45 nights in 2019 to 6.72 nights in 2020.

Statistics Portugal (2020) also highlights that in 2020, 14.4 million trips took place, which represents a significant drop regarding 2019, -41.1%, the lowest number in the last decade. Considering these facts, recreational and leisure activities represented 54.1% of a total of 7.8 million travels (-35.6%), visiting friends and relatives stood out as 33.8% of those trips of an amount of 4.9 million (-47.3%). Business portrayed 7.1% of a total of 1 million travels (-49.5%). Throughout this year, travelling abroad decreased 78.1% (+24.7% in 2019), which represents 4.7% of the total amount, the majority of these concerning recreational and leisure activities (43.9%). Domestic travels decreased 35.7% (+9% in 2019), being recreational, and leisure activities the reason associated to the undertaking of a bigger number of trips (54.6%).

The Central Region of Portugal has continued to be the main travelling destination region, concentrating 32.4% of the total, followed by the North Region with 21.8%. The Algarve stood out as the region which detached from the other regions, concentrating 16.1% of the travels concerning 2019, surpassing the Lisbon Region, which concentrated 15.9% of the overall trips.

3.2. The Portuguese tourism in the economy

According to the OECD (2019), the Portuguese economic recovery is currently well established, with its GDP back on track and at a pre-crisis level. Nevertheless, consequences of the 2010-2014 critical juncture persist, mainly a high public debt and distinct fragilities regarding the financial sector, which makes the economy less flexible. This report also highlight that the unemployment rate has been decreasing to below 7% since 2013, which represents one of the biggest reductions among the OECD countries over the

last decade. Furthermore, poverty among the working class population continues high and the concept of well-being is at the same level as it was before the aforementioned crisis.

The strong growth in the tourism sector along with exports throughout a variety of manufacturing sectors supported the economic activity shortly after the crisis and reflected an enhancement in product quality and consequently a decline in relative export prices. Additionally, the investment in machinery and equipment rose sharply. Consumption was also instrumental to the GDP growth, encouraged by an increasing in private earnings.

The OECD report (2019) also states that the public debt ratios have been decreasing, nonetheless the high ratio restricts the Portuguese government capability to act in future economic collapses. Development and enhancement in economic budgets made possible the decrease in the ratio of public debt to GDP from 130,6% in 2014 to nearly 121% in 2018, which stands out as one of the highest ratios throughout the OECD countries. Diminishing the fiscal debt and sustaining a primary surplus would provide support for the improvement of public finances. Portugal is also being challenged by a rapidly ageing population, which has led the Portuguese government into seeking reforms not only to the national health system but also to the country's national pension organization.

Individual perception of wellbeing is relatively low, which mirrors humble living standards comparatively to other OECD countries, and in fact, minor convergence has been taking place. This economic survey (2019) also considers that there ought to be an ongoing operation of placing the marginalised or unemployed populations back into their jobs. Despite the progress achieved in the area of employment, the long-lasting unemployment rate continues quite high, particularly among the low-skilled population. The employment of this Portuguese society fringe has been promoted by the government by the allocation of hiring subsidies, and re-qualification programmes.

In addition, the aforementioned survey claims that convergence in living standards among OECD countries should be encouraged by drawing on a revitalization of production

systems, which declined in the past decades. One of the crucial advantages of an increase in productivity would definitely be the enhancement of economic external competitiveness. Moreover, exports as a percentage of GDP along with the stock of overseas investments continue to remain below the ones of other equivalent small European economies, however, larger than the euro area average.

Although dissociation of greenhouse gas emissions from GDP has been in progress, transportation is responsible for a substantial part of the gas emissions, in spite of having reduced its environmental consequences, at a very modest pace than in other economic sector, in recent years. Such circumstance reflects the prevalence of the use of private transport relatively to public transport. The OECD report (2019) also proposes that taxes on forms of energy as coal and natural gas are increased and new formats of shared transport solutions ought to be put into practice, and controlled or monitored.

The following figure (Figure 7) presents the OECD (2019) main findings concerning the Portuguese economy and the major key recommendations in different areas.

MAIN FINDINGS	KEY RECOMMENDATIONS
Improving fiscal sustainability and financial stability	
There have been steady reductions in the fiscal deficit as a share of GDP. Nevertheless, public debt is high and poses risks in an environment of heightened global economic uncertainty.	Continue gradual fiscal consolidation to ensure the decline of public debt.
Tax administration remains particularly cumbersome for businesses.	Simplify the tax system by reducing the use of special provisions (e.g. tax exemptions, special rates) and ambiguity in the tax language.
The non-performing loan ratio remains high, weighing on banks' profitability and solvency.	Competent authorities should continue to monitor NPL reduction plans, translating performance in achieving targets into capital requirements.
Banks should be better able to enforce collateral without going through long and uncertain court proceedings.	Make bankruptcy a viable solution for heavily indebted individuals, reducing the time to discharge and exempting more of the debtor's assets from bankruptcy proceedings. Introduce an out-of-court mechanism to facilitate the liquidation of non-viable firms.
Further promoting export performance	
The skills of the population aged over 24 are lagging. Participation in lifelong learning activities are particularly modest for those with initially low skill levels.	Target lifelong learning opportunities to the low-skilled, including by collecting information on the private returns to skills and making it publicly available.
The efficiency of Portuguese ports is held back by regulations and practices that reduce competition between private operators.	In awarding port concessions, take into account the price that bidders will charge port users in addition to other criteria. Ensure that port concession contracts specify a minimum level of investment by the operator and do not renew concessions without opening a new public tender.
Enhancing the judiciary to foster economic activity	
Court proceedings remain very long, hampering timely contract enforcement for businesses. In spite of recent reforms, there are significant bottlenecks in some court districts, thereby inducing court congestion.	Increase the managerial autonomy of the courts so that they can effectively allocate resources such as judges, other judiciary staff and budgets. Fully analyse the data collected from the information system on court proceedings (CITIUS) so that it allows the courts to identify problematic cases and those that should be prioritised.
Productivity in the legal sector is low. The Bar Association represents the legal profession and regulates its services. Such self-regulation tends to identify with the interests of the profession, rather than the public interest.	Set up an independent supervisory body to ensure that regulations in the legal profession are in the public interest.
The authorities have made significant efforts to investigate and fight economic and financial crime, including corruption. Nevertheless, there is still room to improve institutional arrangements in this area.	Continue to enhance the capacity of the Public Prosecution Office to address economic and financial crime, including corruption. Public prosecutors should continue to undertake specialised training in this area. Establish an electronic registry of interests for all government members and senior civil servants that is regularly updated.
Improving labour utilisation and reducing poverty	
Despite recent progress, the long-term unemployment rate remains comparatively high, especially among low-skilled workers.	Avoid across-the-board rises in hiring subsides, limiting them to those at high risk of long-term unemployment and those at risk of poverty. Expand well-designed vocational training programmes (i.e. "*Aprendizagem*" and "*Cursos de Educação e Formação de Adultos*"), so that they reach more of the low-skilled population. Consolidate the two vocational education systems into a single dual VET system with strong workplace training and perform a thorough evaluation of all vocational training programmes.
Recalibrating the economy for greener growth	
The transport sector is responsible for a large share of Portugal's energy consumption and CO2 emissions, which have not been declining in recent years. Portugal uses a high proportion of passenger cars relative to public modes of transport.	Encourage public transport use and the development of new shared transport solutions, accompanied by appropriate supervision and regulation.
Pricing of carbon emissions remains low and uneven. More consistent pricing of energy consumption according to its environmental impact would prepare Portugal for meeting longer-term environmental targets.	Raise taxes on diesel fuel, and increase energy taxes on coal and natural gas.

FIGURE 7. OECD (2019), OECD ECONOMIC SURVEYS: PORTUGAL 2019, OECD PUBLISHING.

In conformity with the OECD Tourism Trends and Policies (2020), in 2018 the tourism sector assisted with 0.8% of GVA, and grew twice as fast as the whole economy (8.0% in comparison to 3.9%). Considering data from the Tourism Satellite Account, the tourism industry represented 9.0% of the working population in 2017, i.e., 413.000 people. These

figures portray a growing ratio of 8.7% concerning the previous year, and also an increase relatively to the economic growth (3.4%). Furthermore, travel exportation are responsible for 51.1% of the overall service exports in 2018.

The Portuguese tourism industry has been growing at a significant pace, specifically driven by the volume and value of the American and Asian markets. International tourism revenues reached €16.8 billion in 2018, which represents a growth of 8.3% concerning 2017. This corresponds to 18.7% of the whole Portuguese exports.

This favourable development that characterized the last decades was compromised during 2020 as a consequence of the Covid-19 pandemic, which has subjected this sector to an incredible pressure leading it into an unprecedented crisis. As a result, the Portuguese economy has been receding, pushing this economy into a GDP decline never seen before in the last half century. GDP decreased by 7.6% in volume to €202.7 billion. Nonetheless, the government estimates a collapse of 8.5%, which is a slightly higher projected decline (Horwath HTL, 2021). Some interesting Key facts are presented in Figure 8.

Key Facts
Tourism demand: 2019: 15.4% of GDP 2020: -35 / -55% vs previous year
Balance of payments December 2020: 46% reduction in exports 40% reduction in imports
2020: 56% decrease commercial flights 69.4% fewer passengers

Source: INE Portugal

FIGURE 8. HORWATH HTL. (2021). HOTEL, TOURISM AND LEISURE. MARKET REPORT. PORTUGAL FUTURE OUTLOOK & PIPELINE.

The Covid-19 pandemic undoubtedly affected the hotel, tourism and leisure sector in such a degree that it is necessary to go back to 1993, a year which recorded 23.6 million overnight stays, in order to encounter such low figures. In 2020, the national market contributed with 13.6 million (-35.3%) and international markets with 12.3 million (-74.9%) concerning overnight stays. As a consequence of the decline in the activity, the hotel sector welcomed 6.5 million guests and offered 14.5 million overnight stays throughout 2020. From this perspective, the hotel industry total revenues diminished by 68.6%.

The origin markets were the same as in former years with the United Kingdom, Germany and Spain guaranteeing high-ranking positions and representing 16.3%, 14.6% and 14.5% respectively. Since 2015, overnight stays have dominantly been overtaken by international markets over domestic ones, situation which was modified by the Covid-19 pandemic, driving to a setback of this tendency during 2020. Even though all markets have been registering revenue declines around 65% and considering mobility restrictions, lockdowns, and quarantines the main tourist incoming markets prevailed at the top of the list.

In 2020 the hotel industry was seriously affected by the suspension of its activity, which led to an enormous reduction in numbers of guests and in overnight stays, 14.5 million, which represents an enormous loss perceived in almost all hotel classifications. Nonetheless, in 2020 lower classifications hotels (three, two and one star) report an overnight stays growth in comparison to 2019.

Considering the hospitality indicators and all the data that demonstrate that the total revenues of 2020 for the hotel industry nearly collapsed. However, it is a fact that the hospitality indicator has been growing since 2015, which allows to conclude that there has been a positive development of this sector highlighting the positive outcome of the hotel sector. It is believed that with the recovery and revitalization of the sector and analysing the

pre-pandemic data, there is strong confidence the recovery and that Portuguese economy will gradually boost.

To conclude, throughout 2020 it was observable an increase in demand for destinations with minor election respecting mass tourism and involving nature, peacefulness, and safety (Alentejo and the interior). Amongst the most popular Portuguese tourism destinations, the Algarve, assisted to an increase in demand during the summer months, mainly due to the opening of air corridors and also on account of domestic demand, as summer corresponds to the holiday months of the Portuguese population in general. Additionally, the Madeira Island was one of the regions that most profited, due in large part to its insularity and positioning as a secure and not so massified location. Lisbon and the North of Portugal, and the Azores were regions which were strongly affected.

Considering the tourism sector dynamics before the Covid-19 pandemic and taking into consideration all the diligences and efforts in dealing with this sanitary crisis, there is strong belief in recovery, which is being anticipated by the OECD and the European Commission. This foresight is associated with the well-established strength of the Portuguese tourism sector and also because Portugal is internationally acknowledged as a sustainable and secure destination.

3.3. The Portuguese hotel industry

The hotel sector, a vital branch of the travel and tourism sector, has experienced, in the last decades, incomparable growth mainly driven by globalization by the improvement of living and working conditions, and especially the increase of disposable income which made possible to invest in the travel and tourism industry (Fyall & Garrod, 2005).

Between 2010 and 2019, Portugal benefited from top positions in the international travel and tourism market doubling these mentions. In the World Travel and Tourism Awards 2019, Portugal was positioned as the top of the world's best destinations, receiving

24 prizes, among which Europe's leading beach destination, leading cruise destination, and city break destination. Additionally, in 2020 the Executive Digest[1] in the category *Country Brand Awards*, ranked Portugal first with the best touristic brand in Europe and the third best in the world.

According to the 2018 report "Estatísticas do Turismo" of the Statistics of Portugal (INE – Instituto Nacional de Estatística), concerning data from the Portuguese Central Bank, the International Monetary Fund, The World Tourism Organization, and the Eurostat, and the, it was possible to conclude that in July 2018, there were 6,868 companies operating in the accommodation sector with the capacity 423.2 thousand beds.

The number of tourists totalled 25.2 million and the overnight stays 67.7 million, corresponding to a growth of 5.1% and 3.1% respectively (+12.9% and +10.8%, accordingly in 2017).

It is also indicated by the Statistics of Portugal (2018) that the referred sector attained €4983.5 million just in 2018. Of these figures €3367.2 million derive from "hotels" in 2018, which represents 67.56%. Concerning 2017, the numbers stand out for an increase of €176.3 million. It is anticipated that this tendency is not expected to continue in 2019 and also in 2020 due to the Covid-19 pandemic.

The market research referred above also affirms that 65.68% of the accommodation sector is made up of micro-businesses and 25.16% of small companies, 8.18% of medium size and 0.99% of big companies accordingly.

With respect to the location of these companies, the study considers that more that half of these businesses are to be found in the region of Lisbon, Faro and Oporto, which

[1] https://executivedigest.sapo.pt/country-brand-awards-portugal-e-eleita-a-melhor-marca-turistica-da-europa-e-a-terceira-a-nivel-mundial/

represent 52.65% of the hotel sector in Portugal. The region of Funchal, in the Madeira Island, and Leiria, represent 5.65% and 4.86% of the market respectively.

According to the 2018 INE data, the population was of 10.291.027 people, disseminated by the five areas of the country: North, Centre, the metropolitan area of Lisbon, Alentejo and the Algarve, being the North part of the country the most populated one. Furthermore, the minimum wage in 2018, quite below the European average, with a monthly minimum of €676.7.

The accommodation market is a very competitive one but at the same time it is also fragmented, in which the main companies are part of national ones and occupy a predominant market position. In this segment of the market companies like M&J Pestana SA, stands out with 6,5% of the business in 2018, and Vila Galé SA and Minor International PCL with 2.5%.

The average amount spent per tourist is of €39.53. In 2017 the primary consumption reason was business, with €36.94, which corresponds to € 58.4of a daily average. Then, it stands out expenses with leisure and holidays, with 25.87% of the total, with a daily average of €40.9. Finally, with visiting family and relatives, tourists spend an average of €27.9, which represents 17.65% of the total.

In 2018, calculations estimate that figures relatively to the non-resident tourists entering Portugal reached 22.8 million, which represents an increase rate of 7.5% if compared to 2017. This growth rate is lower than that accounted for 2016, 16.6%. According to the Hotel Market Report, (2019), the data published by Banco de Portugal concerning the *Balance of Payments*, the focus was put on the 9.7% growth in the balance of the rubric "Travel and Tourism" i.e., in 2016 it was 12.7% and in 2017, 23%. This growth reflects the increase in the revenue/ credits of 9.6% in 2018, +19.5% than in 2017, which totalled €4.7 billion in 2018. 2019 distinguishes itself as an exceptional year, registering a remarkable 70.1 million overnight stays, with hotel revenues increasing since 2015.

Considering the county's exponential growth, the beginning of 2020 brought with it expectations that this would be another successful year for the Portuguese tourism sector in general and for the hotel industry in particular. Nevertheless, the hospitality sector was completely paralysed by the coronavirus pandemic and its effect on this industry is unquestionable.

The UNWTO World Tourism Barometer (2020) documented a decline of around 71,9% in the international arrivals to the country when compared to the same period of 2019. Data made available by the Statistics Portugal (2020) revealed that, during the first nine months of 2020, the hotel industry registered a significant decrease, as the sector only registered 3,6 million overnight stays, 53% less in comparison with the same period in 2019 (Hotel Market Report, 2020). Undoubtedly, the closure of borders, restricted travelling conditions and also a general fear regarding travelling has impacted immensely this industry.

Concerning the year 2021, the hotel industry welcomed 14.5 million guests and 37.5 million overnight stays, which stands out as an increase of 39.4% and 45.2% (-61.6% and -63.2% in 2020, respectively). Aside from the results obtained in 2020, it is necessary to go back over to 2010 to find such low numbers in overnight stays (37.4 million) (Hotel Market Report, 2022). In 2021, contradicting the usual pattern, were not the summer months (July to September) that registered big numbers concerning overnight stays, but the period between August and October that recorded 49.6% of the overall overnight stays. The data made available also shows that there was a decrease in overnight stays all over the country when compared to 2019. Revenue from the hotel industry was of €1.8 million, an increase of 62.8%, but -45.8% when compared to 2019.

In this chapter the context wherein the Portuguese tourism sector and the Portuguese hotel industry operate was provided. The next chapter provides the research questions which have been developed after the literature review and that will be put to the test.

3.4. Portuguese tourism sector strategies and programmes

According to the OCDE (2020:264-265), in 2017, the Portuguese government released the *Tourism Strategy 2027*, which is an approach to boost economic, social and environmental development on a national level and position the country as a competitive and sustainable tourism destination globally. This strategy is based on five strategic poles:

1- Valuable resources – to preserve the authenticity of historical and the Portuguese cultural heritage, to meet the tourists' demands;

2- Enhance the economy – improve competitiveness of tourism related companies, supporting innovation and drawing foreign investment;

3- Encourage knowledge – enhance skills, qualified jobs and dissemination of perceptiveness concerning the tourism industry;

4- Trigger networks – encourage support systems among stakeholders;

5- *Elevate Portugal* – strengthen the positioning of the country as an appealing place to study, invest, to explore, and to live in. *Tourism Strategy 2027* has the United Nations Development Goals deeply embedded in its tourism strategies, thus having financial objectives assessed by means of overnight stays and tourism revenues; social objectives are estimated considering seasonality, workers' skills and qualifications, and customers' fulfilment; sustainability goals are mirrored in the adoption of policies in relation to energy, water and waste. Existing significant projects are developed in the area of investment, innovation, cultural heritage improvement, assessing tourism sustainability, education, and training (OECD, 2020:264-265):

   - *Valorizar* programme, with a budget of €90 million, was planned to allow the dissemination of demand not only geographically, but also seasonally. Primarily this programme prioritised projects in different ranges: enhancing sustainable

and accessible tourism, upgrade Wi-Fi distribution in historic areas, boosting the quality of remote, inland destinations, and provide to the recovery of communities that were affected by wildfires. In this regard, more than 650 projects have received financial assistance.

- *Tourism 4.0* is another programme put into practice by *Tourism Strategy 2027*, with the main goal to encourage the transition of this sector to a digital economy, supporting innovation and entrepreneurship. This assumption seeks to enhance innovation so as to strengthen the tourists' global experience by boosting efficiency in this sector. In order to meet these goals, a network of 41 incubators from the various and different regions of the country sustain innovative ideas and working models. Furthermore, in 2018, there were 15 acceleration programmes that were put into practice, an investment of more than €1 million, invested to aid more than 300 start-ups.

- The *NEST-Tourism Innovation Centre*, a private association created in the early 2019, with key partners including the *Airports of Portugal*, *BPI Bank*, *Portugal Highways*, *Google*, *Microsoft Portugal*, *Millennium BCP*, *NOS (Telecom)* and *Turismo de Portugal*. The group provides a percentage for the centre's finances and contribute to its expertise. *NEST* assists the digital transformation of the sector and in the future wishes to develop into a global centre for innovation. Its main purposes are enhancing entrepreneurship, research and innovation in the field of tourism; to promote and assist innovative and creative businesses; develop innovation hubs cooperatively with universities, tourism schools, incubators and knowledge clusters, so as to attain and convey knowledge to enterprises. The *NEST-Tourism Innovation Centre* acts in the following areas: digital academy to support tourism related star-ups; provision of incubation and acceleration facilities in accordance with environment preservation; counselling to micro, small and medium size

companies; assistance in product and technology innovation and development, along with prototype certification (Living Lab); start-ups and innovation international advertisement; and observation of international digital tourism trends.

- The *Revive Programme* is s intergovernmental approach which purpose is to attract private capital in order to boost the touristic patrimony, and to promote investment in sustainable tourism approaches. In order to do so, meticulous monitoring frameworks at destinations ought to be conceived. These are already in progress in a number of pilot projects that are evaluating and monitoring indicators of relevance and applicability through a specific platform, *Travel BI* (travelbi.turismodeportugal.pt), which is a repository of all the available data in Portugal regarding tourism, such as key markets, major tourism trends, and a particular area targeted to tourism sustainability.

- *Turismo de Portugal* manages a network of 12 hotel and tourism related schools with around 8000 students, who are involved not only in academic but also in training courses. According to the OECD Tourism Trends and Policies 2020, the *Tourism Training Talent* (TTT) project, in line with *Tourism Strategy 2017*, enhances an entrepreneurial mindset and a culture of innovation among the students, encouraging the improvement of the Portuguese tradition of hospitality. Furthermore, the *TTT* project also seeks to transform the tourism sector into one of the main drivers for economic, social and environmental progress. *Turismo de Portugal* adjusted the *Tourism and Schools Strategy* by creating a Premium Hospitality Service sustaining the development of an engaging travel destination that remains faithful to its authenticity values.

Chapter 4 - The conceptual framework

4.0. Introduction

In accordance with the literature analysis and on the data collected, this chapter provides an overall view of the conceptual framework developed and attempts to answer the research questions and the hypothesis proposed.

This chapter is divided into three sections. The first section describes and discusses the conceptual framework. It proposes to answer the research questions and address the hypothesis developed through a combination of a theoretical approach and empirical evidence.

The second section is supported by the literature review and proposes a set of research questions and one hypothesis that will be addressed in the data. The third section finalises the chapter by analysing the conceptual framework, and the research questions as well as the hypothesis relatively to the broad objective of this thesis.

4.1. The conceptual framework

The main goal of this section is to present the conceptual framework of this research so as to enhance knowledge on Circular Economy. Figure 9 displays the CE constructs considered in this research framework and their organisation as independent, dependent and moderator variables. As independent variables it is considered *CE Implementation*, referring particularly to *CE Awareness*, *CE Attitude*, *CE Challenges*, *CE Benefits*, *CE Enablers*; as the moderator variable it is considered the *Accommodation profile*; and as the dependent variable it is proposed the *Organisational Performance.*

Relatively to the independent variables, here referred to as *CE Implementation* (CE *Awareness*, *CE Attitude*, *CE Challenges*, *CE Benefits*, *CE Enablers*), they influence the dependent variables and are not perceived as being dependent on any of the other variables. By resorting to these variables, it was possible to perceive if there was awareness relatively to Circular Economy and if so, what are the initiatives/strategies that are being put

into practice by hoteliers. Additionally, it was necessary to understand what were the challenges and enablers that hoteliers encounter if implementing of Circular Economy, as well as the benefits of such an implementation. Resorting to these variables allowed addressing the research questions proposed initially (RQ1, RQ2, RQ3, RQ4, RQ5).

The *CE Accommodation Profile* was considered a moderator variable once it affects the relationship between the independent variables (CE Implementation: *CE Awareness*, *CE Attitude*, *CE Challenges*, *CE Benefits*, *CE Enablers*) and the dependent variables (*Organisational Performance*), so as to examine if there is homogeneity relatively to the hotel industry profile of the companies implementing Circular Economy and the organisational performance of these companies, here displayed as Research Question 6.

CE Organisational Performance was considered the dependent variable as it depends on the independent variables (*CE Awareness*, *CE Attitude*, *CE Challenges*, *CE Benefits*, *CE Enablers*) and on their values. This variable tested the relationship between the Circular Economy implementation and the overall organisational performance of the hotel industry, here presented as Hypothesis 1. Figure 9 illustrates representatively the research questions and the hypothesis considered and reflected in the questionnaire.

The relationships between the constructs that are identified as these different variables are going to be tested. In order to do so and considering the literature analysis performed as well as the data collected, the following constructs of independent variables were considered:

- CE *Awareness*
    - *CE Awareness – R-Principles* – Reduce, Reuse, Recycle, Redesign, Rethink, Refurbish, Remanufacture, Repair, Repurpose, Recover, Refuse, Return, Re-educate;

  - CE *Awareness* (Measures) – reduce carbon footprint, use of clean, renewable energies, water management, waste management, use of environmental responsible materials, measures that are not financed by the government;

- CE *Attitude*
  - CE Attitude – Reduce, Reuse, Recycle, Redesign, Rethink, Refurbish, Remanufacture, Repair, Repurpose, Recover, Refuse, Return, Re-educate;
  - CE *Initiatives* – CO_2 emissions, renewable/clean energies consumption, energy efficiency improvements, water management, waste management, circular products purchase, environmentally sustainable products, environmental conservation;

- CE *Challenges* – lack of CE knowledge, lack of interest on CE and its R-Principles, lack of investment, lack of time to implement it, lack of human resources, lack of governmental support, lack of infrastructures support, the low value of products at the end of life, policies focused on waste treatment, lack of incentive to design circular products, lack of market mechanisms to promote waste recovery, lack of CE legislation, price-quality ratio of outcomes, expensive to implement CE, resistance to adoption of new business models, the use of secondary materials, perceived benefits;
- CE *Benefits* – a sustainble environment, innovation, job creation, save costs in the future, establish brand and reputation;
- CE *Enablers* – governmental initiatives to support CE implementation, governmental financial support, governmental training support, governmental CE's ecosystems support, tax reduction, national awareness strategy, national educational strategy

(CE wide dissemination), specialized CE consultancy, collaboration practices between companies, stronger support from supply agents, technology to adopt CE.

Relatively to the *Accommodation Profile,* the *moderator variable*, the following constructs were considered:

- CE *Accommodation Profile* – region, stars, scope, type of company.

And concerning the dependent variable the following constructs were considered:

- *Organisational Performance* – more customers, reduction of carbon footprint, profitability improvement, acquire new competencies, access to new markets and consumers, better access to raw materials, customer satisfaction increase, overall performance increase.

The literature review and the data collected allowed the identification of the aforementioned constructs/dimensions and all the variables considered. From this analysis, it was found that real and solid evidence of Circular Economy in the hotel industry, particularly in Portugal, is less prevalent than in other sectors, with literature published being relatively fragmented. Examples from one sector cannot always be imparted to others and the transition to new economic models, as in this case the transition to a Circular Economy paradigm, is not always validated in practical case studies, or with empirical validation.

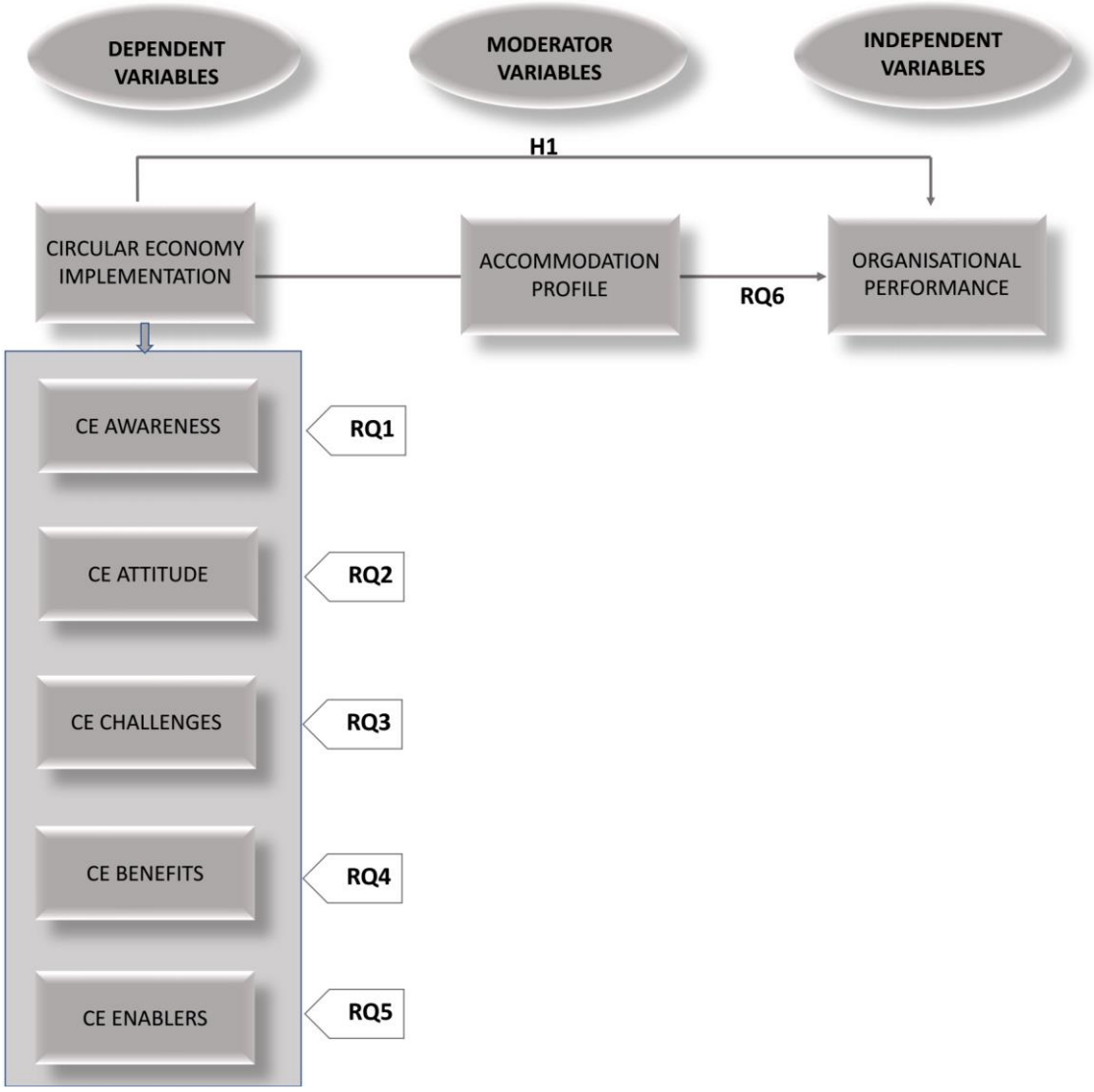


FIGURE 9. THE CONCEPTUAL FRAMEWORK.

Prior to the development of the conceptual framework the research questions and hypothesis, which have been formulated based on the literature review, are discussed in the following section, which introduces the aforementioned research questions and hypothesis that the data analysis chapter will address.

4.2. The research questions and the research hypothesis

4.2.1. The research questions

With the aim of enhancing knowledge in the field of Circular Economy and to assist hotel industry stakeholders in their decision-making process, several research questions were developed, and were formulated as follows:

RQ1 - Is the Portuguese hotel industry aware of Circular Economy?

RQ2 - Is the Portuguese hotel industry implementing circular economy?

RQ3 - What are the challenges that the hotel industry addresses to implement Circular Economy?

RQ4 - What are the benefits of a Circular Economy implementation?

RQ5 - Which initiatives would enable Circular Economy implementation?

RQ6 – Is there a homogeneous organisational performance distribution of the CE hotels profile?

These research questions aim to clarify the general objective proposed by this research, namely, to examine the adoption of Circular Economy by the Portuguese hotel industry. The literature reviewed allowed their development and enabled that the following assertions:

Research Question 1. *Is the Portuguese hotel industry aware of CE?*

Analysing awareness on the concept of Circular Economy is of major importance when considering the transition to a new economic model, which is an intricate process that demands transformations and developments at different levels beyond the economic system.

The urgency to address environmental depletion relatively to the tourism industry in general and the hotel industry in particular is becoming a point of interest for researchers and corporate circles. Nevertheless, the applicability and significance of Circular Economy to this sector, tourism and accommodation, has been insufficiently researched, and as a result literature on this subject is still scarce (Sorin and Sivarajah, 2020). However, research indicates that there is awareness regarding the concept of Circular Economy and according to Kirchherr et al. (2018) there is a certain level of CE implementation on the corporate level. Regarding consumers it was also possible to identify a certain level of CE awareness, and Circular Economy potential to assist environmental sustainability (Diddi and Yan, 2019; De Koch et al., 2020; Jaca et al., 2020; Laitala et al., 2021).

Sorin and Sivarajah, (2020) consider that awareness or perceptions regarding the concept of Circular Economy is particularly focused on individual actors, consumers' behaviour and their attitude regarding green purchasing solutions, which are in line with circular packaging (Boesen et al., 2019; Testa et al., 2020; van Langen et al., 2021), behaviour regarding remanufactured goods (Van et al., 2016; Hazen et al., 2017; Onete et al., 2018; Wang et al., 2018; Muranko et al., 2019), as well as the purchase of products with various obsolescence strategies (Atlason et al., 2017).

Research Question 2. *Is the Portuguese hotel industry implementing Circular Economy?*

Relatively to the attitude towards Circular Economy, scientific literature indicates that the hotel industry is already on the path to attain the desired sustainability, as certain strategies and measures have already started to be put into practice. It is possible to find and identify hotels that have been implementing diverse environmental initiatives (water, energy, and CO_2 emissions management policies) along with technologies that allow an improvement of their environmental performance. Regarding energy, used renewable sources such as biomass, thermal, and geothermal have been implanted, as well as the

use of natural gas (Vourdaubas, 2016; Alonso-Almeida et al., 2017). Relatively to water utilisation and consumption, the hotel industry has also been equipped with water control systems and installed water retention and storing systems, which are utilised in gardening, particularly in destinations where it is an expensive resource or where it is scarce (Alonso-Almeida et al., 2012; Férnandez-Robin et al., 2019). With respect to waste, produced in massive amounts by this industry, waste management strategies have already been implemented, nevertheless, implementing Circular Economy R-Principles would largely enhance circular tourism as smaller amounts of resources would be extracted and ultimately wasted (Florido et al., 2019).

The implementation of some Circular Economy R-Principles has already been introduced, particularly reduce, reuse, repair, and recycle, and have ultimately assisted the outgrowth of 'green hotels' (Teng and Chgang, 2014; Rahman and Reynolds, 2016; Winans et al., 2017). These companies recognise that implementing 'green management' approaches allows a reduction of expenses, it enhances customer engagement, employee commitment, and in the long run, attain short term operational goals (Chen, 2008).

Consumers are getting increasingly aware of the contemporary environmental constrains and as a result they are growingly looking for accommodation that offers alternative strategies/approaches/solutions that are environmentally friendly. Customers are more compliant with paying more for these services and products, and the hotel industry has also been showing enthusiasm and eagerness in adopting these practices, as at some point in the future they will provide acknowledgement. However, the implementation of these eco-friendly solutions represent the preliminary steps towards circularity, however they are not enough. CE exceeds these steps, it is a vital component of customer-host correlation, in which consumers take part as participants, by their actions, in the pursuit for sustainability (Florido et al., 2019).

Additionally, the hotel industry has been adopting a number of sustainable approaches in order to reduce the utilisation of waste materials in the construction sector

as well as secondary raw materials; the design for dismantling and waste prevention, which enables buildings to be as flexible as possible so that components and products may be reused; the use of non-hazardous building materials; supply chain cooperation optimisation; and the use of clean technologies relatively to the contents of the construction materials used (Florido et al., 2019).

Relatively to the Portuguese hotel industry and as previously referred, it is already putting Circular Economy strategies and approaches into practice, as demonstrated by the HOSPES programme presented down the line.

The HOSPES programme

The *Associação de Hotelaria de Portugal* (AHP), is the major hotel association in Portugal, with about 700 members from independent hotel units and large chains. This association represents around two-thirds of hotels revenues to the Portuguese economy. It stands out as a private, non-profitable association acknowledged as a Public Utility Institution in 2013. AHP centralizes its work on enhancing the best corporate environment in the Portuguese hotel industry. It offers consultancy services, and it also exchanges expertise amongst stakeholders; it discusses contracts and partnerships, and takes action in the political, economic and social areas, so that the tourism and hospitality sector are viewed as central regarding the country's sustainable and responsible economic development.

HOSPES, the abbreviation of the Latin root of the words hotel, hostility and hospitality, stands out as a corporate social responsibility and environmental sustainability programme of the *Associação de Hotelaria de Portugal,* which was created in 2012 during the peak of the economic crisis that was devastating Portugal. The first action of this programme consisted on the donation of used mattresses of associated hotels to social solidarity and non-governmental institutions. This initiative has an enormous adherence, not only concerning the donations materialised by hotels, but also in requests by these social

solidarity institutions. Soon the project boosted, and the donations were not only of mattresses but they also included furniture, kitchen and electronic equipment, bed and bathroom linen, uniforms, among others. The result of this is the creation of the WE SHARE project, known as the first seed of the HOSPES programme. From 2012 to 2020, the Portuguese hotel sector, through the hands of the AHP, has donated 228 885 used goods to around 100 social solidarity institutions, according to the AHP (https://www.hoteis-portugal.pt/a-associacao/programa-hospes/3/4).

Since 2012 the AHP has been celebrating numerous protocols with various companies e social solidarity institutions, in order to broaden its area of operation concerning social responsibility e environmental sustainability programmes. Some of the projects contemplated are: cooking oil recycling, *Paper for Food*, recovery of electrical end electronic equipment residues, recycling of textiles, and paper residues.

The AHP has been distinguishing the adherent hotels since 2015, with social responsibility (WE SHARE) and with environmental sustainability (WE CARE) label classifications, with the goal of distinguishing those hotels that assist the responsible and sustainable development of this sector through projects and initiatives sponsored by the AHP itself. This also seeks to engage the hoteliers in social responsibility e environmental sustainability questions, and finally it also intends to raise public acknowledgement through the display and exhibition of those classifications as social and environmental committed companies.

Table 4 shows the number of classifications WE CARE and WE SHARE assigned to Portuguese hotels in the period from 2015 to 2020.

TABLE 4. WE CARE AND WE SHARE LABELS AWARDED TO PORTUGUESE HOTELS.

Year	2018	2019	2020
Number of hotels	58 – WE SHARE 122 – WE CARE	74 – WE SHARE 109 – WE CARE	59 – WE SHARE 83 – WE CARE

In 2019, the associate hotels donated 29343 products to social particular institutions of social solidarity, in a total of 224 379 products since its creation. In 2020, the HOSPES programme was recognised by the European Commission in the category "Responsible & Inclusive Entrepreneurship" in the *European Enterprise Promotion Awards* of this commission.

Projects that integrate the HOSPES programme:

1. ***Earth Group – Meals for Children***

   This is a project created to fight global famine, and is carried out in cooperation with the World Food Programme of the United Nations. This programme provides a minimum of around 250 000 school melas to children all around the world. Through this initiative, more than 1 million school meals have already been distributed. Portuguese hotels can embrace such a cause by making products *Earth* available to their guests. By doing so, they are fomenting the financing of thousands of meals for deprived children. One particular and effective way to assist a better and more sustainable world, *Earth Water*, replaces plastic water bottles by Tetra Pak packaging. This way they are protecting the environment and maintain water fresher for longer periods of time (www.earthgroup.org).

2. ***Food Bank – Paper for Food***

   The AHP associated itself to the Portuguese campaign "*Papel por Alimentos*", supported by the *Federação Portuguesa dos Bancos Alimentares Contra a Fome*, in 2013. This initiative, besides its social dimension it also anchors on a environmental dimension as it allows the assortment, the recovery and reuse of the manifest non-value waste. Currently there are 17 *Bancos Alimentares* involved in this campaign and, in short, the process consist in stockpiling paper (journals, magazines, leafleats, etc.) from associate companies. The amount of paper collected is then commuted in food items, once the company responsible for the

waste recovery gives the equivalent to €100 in food articles for each ton of paper collected, to be delivery for the underprivileged. The Covid-19 pandemic did not decelerate the Portuguese hotel industry solidarity, as throughout this period this sector contributed to the construction of campaign hospitals, lodging to healthcare personnel, and it also donated goods and equipment, actions which were emphasised during the presentation of the digital platform, by the AHP president at the time, Raúl Martins. This digital platform will also aggregate new dimensions to its solidarity programme. To the sustainability strategic approach and philanthropy, the AHP will also include inclusive labour and corporate volunteering programmes, challenged launched by the President of the Portuguese Republic, who keeps track of these initiatives since 2015.

3. Electrão by AHP

The *Electrão* – it is the association of residues management responsible for the recovery and treatment of electrical and electronic residues as well as battery and accumulators. A specific and exclusive campaign to the AHP associates, named *Electrão by AHP* was developed with the main goal of allowing the recovery of electrical equipment along with light bulbs and used batteries. This action guarantees that the supply of ethical packaging according to the hotels' needs; signage (stickers, flyers, and posters) indicating the hotels' adoption of the campaign; awareness campaigns to the hotels' associates; all the legal procedures regarding residue management are ensured; the entire amount of the equipment collected will be converted into financial support and assigned to a Social Particular Institution of Social Solidarity designated by the AHP; at the end of campaign a report is issued and the outcomes achieved can be included in the hotels' reports of social responsibility. Adhering to this campaign allows the hotels to be eligible to the sustainability label WE CARE.

4. Collection of used edible oils

This campaign enables the collection of used edible oils from AHP associate Hotels and was the result of a protocol celebrated between the AHP and AMI (International Medical Aid). The company responsible for the collection of the oil from these establishments donates a certain value per litre of oil collected to AMI. So, the main goal of this campaign is to provide AMI with funding source to humanitarian, medical, and social actions that this entity undertakes in and out of Portugal. Adhering this campaign qualifies companies to the WE CARE label.

5. Textile recycling

Campaign created at the end of 2019, in collaboration with *Bratum* (company specialised in the textile design and production) with the aim of collecting all the textile material at the end of life and which is unsuitable to be donated within the scope of the HOSPES donation of goods and equipment programme. *Bratum* collects all the textiles and the annual amount collected is considered and converted into a monetary value or goods to support a Social particular Institution of Social Solidarity designated by AHP. The engagement in this campaign enables the reduction of textile residues and to promote their recycling.

6. Paper residues collecting

This campaign results from the collaboration with *Gândara – Gestão de Resíduos* (company that operates in the residues management area) and AHP, with the purpose of enabling the collection and destruction of confidential documents and well as old files, as well as other paper residues. These are sent to factories which use this type of materials as resources in the production processes. *Gândara* has been dispatching around 20 000 tons of paper residues, which corresponds to 400 000 trees. This campaign allows hotels to have their archives legally destroyed

with confidentiality and ensuring data protection; it allows environmental preservation and protection.

The social responsibility (WE SHARE) and environmental sustainability (WE CARE) labels aim to recognise the hotels that promote projects and initiatives which enhance the sustainable development of the industry; to involve hoteliers in the social responsibility and environmental sustainability subject area; and to raise awareness relatively to these theme areas through the display of the WE SHARE and WE CARE labels as indicators of socially and environmentally engaged companies.

Research Question 3. *What are the challenges that the hotel industry addresses to implement CE?*

The analysis of the literature allowed to identify the following challenges when pursuing a CE implementation. The perception of the future benefits relatively to the costs that such a transition implies, along with lack of knowledge on CE and its principles, pull and push market factors, technological availability and customer demand, as well as the demand for sustainable products, and the identification of strategies that allow companies to dissociate economic growth from natural resources consumption (Rizos et al., 2016). Literature also identifies technological, economic, regulatory, social and cultural challenges, outcome indicators, and awareness as major challenges (Kirchherr et al., 2018; Paletta et al., 2019; Hart et al., 2019; Grafstrom and Asama, 2021). Relatively to the technological challenges, these relate to the lack of contemporary technologies which assist CE implementation, and lack of evidence concerning implementation initiatives. Relatively to the economic challenges, research identifies the economic sustainability inadequacy of circular business models, the lack of CE implementation regulations, paid in advance investments, along with financial constrains. Concerning the regulatory challenges, literature considers the lack of transitory supportive CE policies, and with respect to the social and cultural ones, lack of determination to accomplish the transition as well as a

certain lack of motivation in developing a circular collaboration approach between all supply agents, consumers lack of awareness and engagement relatively to the CE concept, and finally but not less important, the fact that the contemporary economic paradigm is based on a linear model (Kirchherr et al., 2018).

Research Question 4. *What are the benefits of a Circular Economy implementation?*

With respect to the benefits that a Circular Economy model would convey, literature identifies several economic (supply chain and customers), social, and environmental benefits, highlighting the interrelationship between society and industry (Bressanalli et al., 2021). Some of the benefits identified involve closing the businesses loop, which will enhance companies cooperation throughout the supply chain. This will allow the creation of jobs locally, and raise environmental awareness (Yuan et al., 2006; Park et al., 2010; Geng et al., 2012; EMF, 2013). When at the end of life, products and components ought to be remanufactured, or recovered, as their value may be extended, which would allow manufacturers to operate according to these premises and according to customers' demands.

Literature also indicates that a CE implementation will reduce the depletion of natural resources, allowing their preservation, which will ultimately enhance their availability, and a reduction of CO_2 emissions (EMF and McKinsey, 2014; Pratt and Lenaghan, 2015). Other perceived benefits concern a GDP increase and a reduction in the supply and price volatility risk, an increase in companies competitiveness, an opportunity to strengthen products value creation. The optimisation of products, materials and components is promoted, reducing the quantities of waste generation (cradle-to-cradle approach) (Sehnem et al., 2019).

Research Question 5. *Which initiatives would enable Circular Economy implementation?*

Training and education on the CE construct regarding its implementation along the chain, as well as governmental benefits (taxes benefits, financial support, banking incentives) would allow the transition process to be more effective, efficient, and less costly. Companies would also have to operate within regulations, so as to create organisational legitimacy (Kumar et al., 2019; Costa et al., 2020). CE also enables companies to reduce production costs, minimise environmental constrains and waste production, by resorting to a more sustainable supply chain and end-of-life management policies profitability will increase (Park et al., 2010; Geng et al., 2012; EMF, 2013; Kumar et al., 2019). Comprehensive awareness and attitude from all the intervenients in the transition process are also major enablers for an effective CE implementation.

The reviewed literature also identified four types of enablers regarding a CE transition, they are cultural, regulatory, financial and sectoral, whereas other researchers indicate that consumer demand is the enabler to circularity. Customers behaviour and customer-oriented service along with sustainable production processes are also regarded as important drivers (Hart et al., 2019; Gusmerotti et al., 2019; Tura et al., 2019; Suman, 2020).

Mathews and Tan (2011), Zhu et al. (2011), Lacy and Rutqvist (2015), and Tura et al. (2019) established that international markets demand and technological innovation act as social facilitators to the implementation of alternatives to the traditional business models.

Research Question 6. *Is there a homogeneous organisational performance distribution of the CE hotels profile?*

Relatively to the hotel industry profile, the variables considered were the hotel region (where it is located), the star categorisation, the hotel scope and the type of company. This research is an attempt to validate homogeneity of organisational performance relatively to the CE hotels' profile.

Previous research indicates that large hotel chains already address these issues, and they endeavour to align their strategies in handling and coping with their operations impact

on the surrounding environment. In fact, there is a perceived relationship between a hotel belonging to an international affiliation and implementing sustainable practices, which are ultimately less costly to implement. Environment. Hotels which are part of hotel chains generally comply with specialised regulations required by brands, mainly by the parent company, and also apply international standard business and management techniques. These allow hotels to have a legitimate access to expertise, information, and advantages that enables them to put into practice alternative approaches, and strategies that allow them to succeed and increase the overall resilience and at the same time achieve best performance levels (Cai and Hobson, 2004; Pine and Philips, 2005; Bailey and Ball, 2006; Orfila-Sintes and Mattsson, 2009; Lomanno, 2010; Such-Devesa and Mendieta-Peñalver, 2013; Jones et al., 2014; Rhou and Singal, 2016; Costa, 2018; Rodríguez-Antón and Alonso-Almeida, 2019; Camisón et al., 2020; Martins, 2021).

4.2.2. The research hypothesis

This hypothesis aims to clarify the specific objectives proposed by this study so as clarify the relationship between the implementation of Circular Economy and the overall organisational performance of the hotel industry, i.e. Hypothesis 1:

Hypothesis 1. There is a relationship between the implementation of CE and the organizational performance of hotels (overall performance).

Research on the organisational performance of companies is based on general management literature, and contemporary investigation on Circular Economy and its impact on the organisational performance of companies is scarce and even scarcer when it comes to the hotel industry. However, scientific analysis regarding the implementation of environmentally sustainable strategies has been the object of numerous approaches. These indicate that the hotel industry has higher levels of performance financially (decrease costs) and environmentally (decrease their dependence on natural resources), strengthen

their brand identity, which allows them to increase their brand value. All these together with adequate marketing strategies brings customer reliance and strengthens companies' performance (Goodall, 1995; Álvarez et al., 2001; Ayuso, 2006; Bohdanowicz, 2006; Kasim, 2007; Chan, 2009; Chen, 2009; Tarí at al., 2010; Kapiki, 2012; Chen and Chen, 2012; Fukey and Issac, 2014; Rosa et al., 2017; Duric and Topler, 2021).

4.3. Conclusions

The present chapter displays the conceptual framework developed which includes various elements that were withdrawn from the literature analysed so that the Circular Economy concept and all the related topics would be clarified and addressed.

From the conceptual framework precise research questions and one hypothesis were developed to explore the Portuguese hotel industry awareness relatively to the CE concept and its R-Principles, along with the attitude that this industry has been having towards this concept; the benefits that a CE implementation would bring to the aforementioned sector; the enablers and challenges of such implementation; and this dimensions impact on the organisational performance of Portuguese hotels. The conceptual framework was applied to configurate the research empirical phase and a basis for the research design. The framework determines the key elements which required to be collected so that the research could be operationalised and implemented. The conceptual framework structure clarified the questionnaire structure and the overall evidence collection process.

The next chapter discusses the methodological outcomes that the operationalisation of the conceptual framework, and the research questions and the hypothesis put forward. It depicts the research philosophy as well as the research design. It discusses the different methods of data collection used to gather.

Chapter 5 - Research Methodology

5.0. Introduction

The aim of this section is to characterise the research methodology utilised – i.e. the research philosophy, the research strategy, and the purpose, as well as the research design comprising the methods and techniques which were used in the data collection process. The chapter is divided into three sections. The first section introduces the research philosophy, and the second outlines the research strategy and purpose that was adopted and applied in this research study. Concise considerations on the research strategy and the research purpose are going to be displayed, in order to delineate the methods used and how these allowed the research questions and the research hypothesis to be addressed and the research goals to be achieved.

The adoption and selection of the research strategy and purpose of each stage of this study is also validated, and a flow chart illustrates the chronological and methodological processes followed. The third section displays the research design, namely the data collection method and techniques, and is divided into two different stages. The first stage presents a description of the critical literature review, and the second stage, which is descriptive and explanatory, and comprises quantitative data collection by means of a questionnaire. Section four displays the conclusions section.

5.1. Research philosophy

This research aimed to explore the concept of Circular Economy relatively to the Portuguese hotel industry, as well as this industry's awareness concerning this concept, their attitude towards the transition and/ or its implementation, the benefits, the enablers, and the challenges that such an implementation would provide. All of these were also examined in correlation with the organisational performance and with the accommodation profile of hotels. The homogeneity of organisational performance hotels was also analysed relatively to the profile of the Portuguese hotel industry.

According to Rodrigues (2002), quoting Easterby-Smith et al. (1996), the research philosophy assists researchers in developing knowledge in the area of investigation by clarifying the research design and the structure of the research. Selecting an approach to perform the research is of major importance, as in the due course it will enable the researcher to thoroughly understand the research design, particularly the data collection procedures and analysis; the data to collect, wherefrom the data is going to be collected, and how the set of data collected needs to be processed in order to ensure adequate answers to the research questions and allow testing the research hypotheses. Furthermore, it will facilitate the selection of the approach that best suits the researcher's interests and goals. Finally, acknowledging the various approaches, will enable the development and implementation of the best research design, which will allow each phase of the of the research process to be developed and completed accurately. There is one philosophical school of thought – positivism that was chosen as it serves the purposes of this research, and it is going to be introduced in the following section.

5.1.1. The positivism approach

According to Saunders and Bristow (2015) the positivism approach concerns the methodological philosophy in quantitative research which relies on the scientific method in order to carry out research or to determine research in social science (Crotty, 1998). In this regard, recognising and interpreting the phenomena ought to be assessed and supported by evidence (Hammersley, 2013). It implies working with an observable reality and following a process of creating essential laws and deducing through observation by resorting to empirical tests and methods, namely questionnaires, sampling, focus group discussions which allows the theory to further develop, and ultimately put to the test by additional research. This demonstrates that perceptions and observations brought about by positivist researchers are likely to have high validity and reliability quality, and might be generalised to a larger scale of the population (Johnson and Onwuegbuzie, 2004).

However, this does not imply that by applying the positivism theory, one has to necessarily begin research by using existing theory, as natural sciences evolved from the commitment with the natural world in which data were gathered and the observations were made before the hypotheses were formulated and tested. These would allow facts to be assembled, which would become the basis for future hypotheses testing (Saunders and Bristow, 2015).

As a positivist, the researcher remains neutral and independent from the research and also data so that results are not influenced, which means that the value-freedom of the observer is emphasised, as researchers are external to the data collection process (Crotty, 1998).

Positivism considers that an exceptionally structured methodology ought to be developed so that replication can be supported, and the emphasis ought to be placed on quantifiable observations that will later be considered for statistical purposes (Gill and Johnson, 2010; Saunders and Bristow, 2015).

For the purpose of explaining and demonstrating generalisations of the Portuguese hotel industry and Circular Economy, this study has followed the aforementioned positivist approach. After the critical literature review, and in accordance with the theory, research questions and hypothesis were inferred and formulated to describe Circular Economy relatively to the Portuguese hotel industry, and to explore relationships between CE implementation and hotels performance. The research questions explored CE R-Principles, CE awareness, hotels attitude towards CE, benefits, enablers, and challenges regarding CE implementation, and the overall implications on the companies' performance. Circular Economy and its R-Principles were thoroughly defined. By means of a questionnaire, the research questions and the hypothesis were investigated, and structured methodology was utilised. Finally, data were analysed, and the results were assembled so that theory could be assessed.

5.2. Research strategy and research purpose

According to Williams (2007:65), quoting Leedy and Ormrod (2001), research concerns 'the process of collecting, analysing, and interpreting data in order to understand a phenomenon'. This is a process that defines its goals, manages data, and conveys the findings in a systematic manner, as these take place within conventional frameworks and in conformity with pre-established guidelines. These entrust researchers what to consider in the research, how to best execute it, and what probable assumptions can be withdrawn from the data collected.

Three research purposes should be considered, namely exploratory, descriptive, and explanatory. Exploratory research allows researchers to scrutinise events; to explore new insights; to question and assess events (phenomena) from a different perspective. According to Rodrigues (2002) three ways of conducting exploratory research can be found. They are: resorting to literature analysis; b) interviewing experts on the subject under consideration; and c) performing focus groups interviews. One of the greatest advantages of resorting to exploratory research is that it is easily adaptable to change, and it is quite flexible, which means that the research focus narrows gradually along the research.

Descriptive studies allow the description of situations or sets of events in detail. One of the requirements when using this type of study is that the researcher has great understanding of the event under study prior to the data collection.

Explanatory studies seek to explain the events (phenomena), by assessing correlations between variables. It allows the investigation of circumstances or problems so that the relationship between two or more variables is addressed, the determinants of a certain phenomenon.

Surveys are often considered suitable when conducting descriptive studies, whereas experiments are appropriate for explanatory studies, and case studies are proper to exploratory research. Nevertheless, Robson (1995) believes that these different strategies

suits any of the three research purposes, as choosing the best strategy for the research project depends on the research goals and the research questions formulated for each phase of the investigation. The research strategy delineated as well as the purpose of the research may can vary over time.

Robson (1995) identifies three traditional research strategies: experiment, survey, and case study. Experiment, research type commonly adopted by the natural sciences, scales the impact of manipulating variables over variables. It implies the selection of a sample of a determined population; the development and implementation of a pilot study; the planning regarding the adjustment of variables if necessary; the assessment and control of other variables, by answering the 'why' and 'how' questions.

Survey strategy pertains the standardised collection of data from a group chosen out of a larger population with the aim of collecting samples from this target population, commonly in the form of a questionnaire. It answers the 'who', 'where', 'what', 'how many', and 'how much' questions (Rodrigues, 2002).

A case study, in accordance with Robson (1995) is used when there is the necessity of obtaining and in-depth and detailed understanding of a certain issue, event, or case of interest, in its authentic context. For this reason, it is often alluded to as 'naturalistic' design as opposed 'experimental' design, in which the researcher controls and manipulates relevant variables.

Saunders et al. (2000) identify two different approaches to perform research, 'cross-sectional' and 'longitudinal'. 'Cross-sectional' studies are described as the compilation of a collection of relevant data, collected at a given period of time. The timeframe is not of major importance in this type of studies, as the overall data collected refer to a particular period of the time or around this time of the collection of data, and make use of survey strategies. It also offers the possibility of comparing different population groups in a determined period of time, as a 'snapshot'. Nevertheless, this type of studies may make definite information

available concerning cause-and-effect correlations. They do not take into account what happens before or after the study is implemented

'Longitudinal' studies examine the research subject (phenomena) over a certain period of time by monitoring change, they are observational. The major benefit of such a study is that researchers are able to observe developments or changes in the features of the target population both at an individual or at a group level. The advantage in implementing such studies is that they can be extended over a specific period of time, thus, a sequence of events can be established. A 'longitudinal' study may establish cause-and-effect relationships more accurately than 'cross-sectional' ones because of their scope.

In general terms, the research should guide the design. However, the development of the research determines which design is the most appropriate. 'Cross-sectional' studies can be performed at a faster pace than 'longitudinal studies. For this reason, researchers often start their investigation by resorting to a 'cross-sectional' study in order to establish links or associations among the variables considered, and thereafter consider a 'longitudinal' study to analyse cause and effect (Kesmodel, 2018).

As demonstrated by chapter 2, research on Circular Economy, its R-Principles and the hotel industry awareness, attitude, benefits, enablers, challenges and their correlation with companies organisational performance is scarce. Therefore, investigating CE in the tourism sector in general and in the hotel industry in particular can be considered to have an exploratory purpose. The aim was to examine and attain a deeper understanding relatively to the context of the Portuguese hotel industry, it was of major importance to understand if this industry was aware of CE and its R-Principles and what already in progress in the country so far. The exploratory research made use of data, through research on literature on this subject.

The next stage of this research study resorted to a more descriptive and explanatory strategy and purpose. After comprehending the strategy purpose, the goal was to validate

the literature analysed within the context of CE. With the descriptive and explanatory purpose, a survey strategy in the form of a questionnaire was used. By resorting to a survey strategy a large amount of information from a large group of population can be collected, enabling comparisons and future replication, the data collection process is easily understood by the target population, and the researcher is in full control of the entire research process.

As demonstrated, different methods and approaches have been used as the research was being conducted, so that the various research questions and hypothesis could be explored. Throughout its first stage the research purpose was exploratory, and the research made use of existing literature. In the second stage, its purpose was descriptive and explanatory by making use of a survey strategy by means of a questionnaire, in order to perform a cross-sectional study, as displayed by Figure 10.

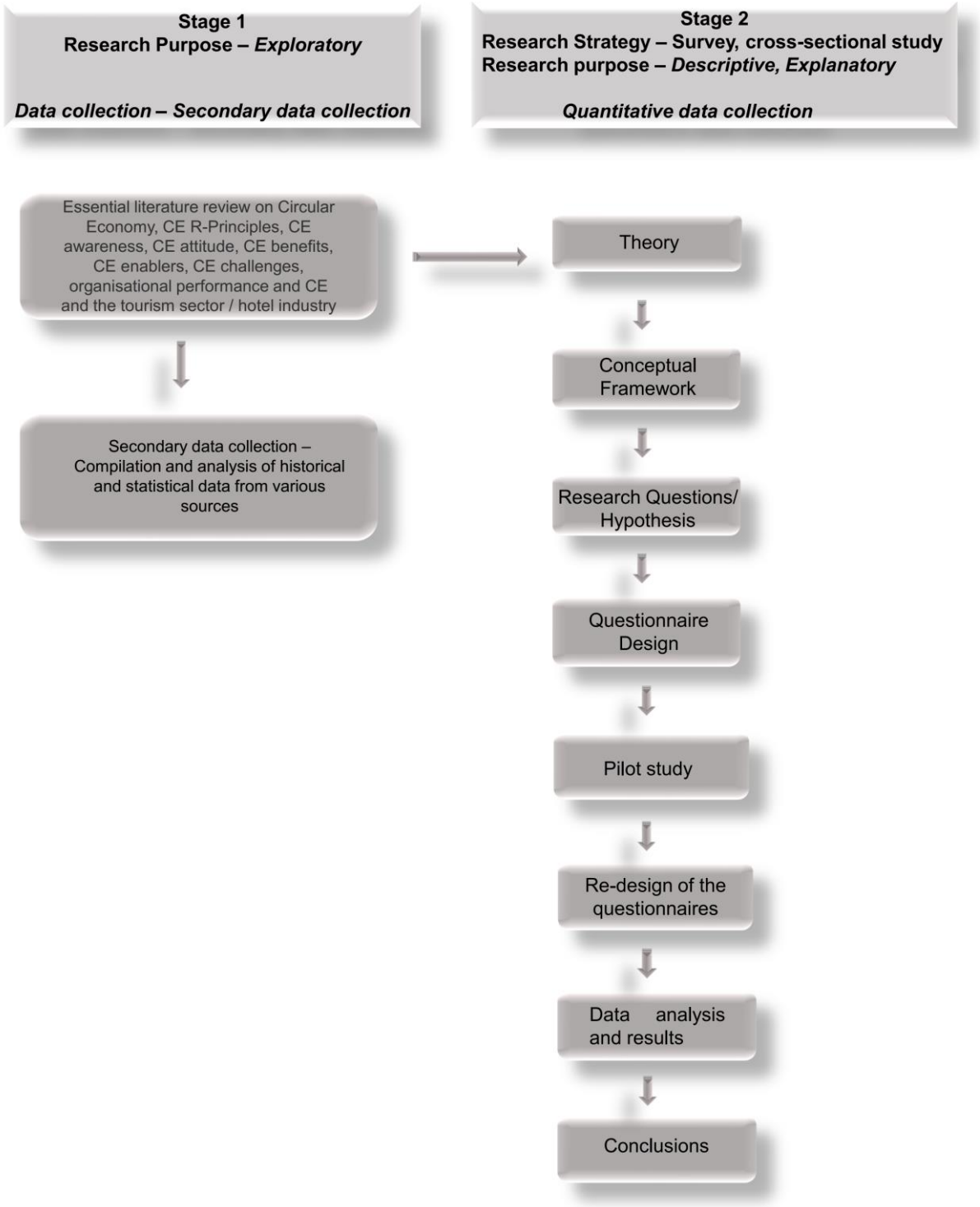


FIGURE 10. THE RESEARCH STRATEGY.

Source: Adapted from Rodrigues, 2002.

5.2.1. Summary on the research strategy and research purpose

This section presents the research methodology and the purpose of this research. On a first stage an exploratory research strategy was used and on a second stage a descriptive and explanatory was adopted to conduct the research design. The literature on Circular Economy in the hotel industry is scarce and scarcer when it comes to Portugal. Therefore, the secondary data collection of the first phase has assumed an exploratory purpose. Its goal was to promote a deeper understanding of the CE concept relatively to the Portuguese hotel industry. By performing a critical analysis of the literature, essential elements were identified so that the cross-sectional study, in the form of a survey, could be performed. Research questions and a hypothesis were determined and tested by resorting to a questionnaire.

In summary, the research comprised different data collection methods, i.e. it started with the literature analysis and review; it made use of secondary data and based on the theory and on this data collection, a questionnaire was created, tested, re-designed, and disseminated to the Portuguese hotel industry.

The next section introduces the different types of data collection methods used to perform this research.

5.3. Research methodology – Data collection methods and techniques

5.3.1. Literature review

The literature review conducted to perform this study allowed the research not only to be focused on Circular Economy construct and related topics, but also to conceptualise the research questions and the hypothesis. Thus, the literature analysed enabled the identification of valuable and recognised research as well as the research gap. The reviewed literature established the guidelines for the present study, highlighting the

importance of examining Circular Economy in the Portuguese hotel industry. As in the last decades the CE concept has been comprehensively studied and promoted worldwide as an alternative economic model to the predominant one based on a linear production and consumption model, literature on the subject is easily available on various databases, nevertheless, literature on this concept relatively to the tourism industry is not abundant, and is even scarcer when it comes to the hotel industry, and particularly the Portuguese hotel industry.

The sources of information considered were mainly the scientific databases *Scopus* and *Web of Science*, along with books and complementary academic papers. Additional sources were accessed, namely *Turismo de Portugal* and *INE* official websites, UNWTO OECD, World Economic Forum, Eurostat Statistics websites were also examined, and reports from the following organisations were also considered as reliable sources of reports, and statistical and historical data, so that this literature review would be accomplished, namely: UNWTO World Tourism Barometer reports, Travel and Tourism Competitiveness Report, OECD reports, and Hotel Market reports.

5.3.2. Secondary data collection strengths and limitations

5.3.2.1. Secondary data collection strengths

Currently large amounts of data in every field of knowledge is being collected and archived by researchers around the globe, its usefulness regarding research purposes is becoming increasingly common. Secondary data analysis has already been collected by other researchers for another key purpose, and is an empirical method that implements the same basic research principles as research which employs primary data (Smith, 2008; Smith et al., 2011; Andrews et al., 2012; Johnston, 2014).

Saunders et al. (2000) consider that secondary data can be classified into three different subgroups, namely: a) documentary data; b) data based on surveys; and c) data assembled from various sources.

Accessing secondary data is cost-effective and convenient, allows comparisons between groups, countries, and timeframes; it enables replication of data, and new and high quality research investigation topics can be addressed as there is access to large databases and datasets, such as those supported by funded studies or organisations that have collected larger samples and broader scope. Resorting to these datasets can speed up the research pace as some of the most demanding and time consuming steps of a common research project, including development assessment and data collection in essence are eliminated (Doolan and Froelicher, 2009; Johnston, 2014).

The broader the samples are, the most representative of the population will the results be, which allows greater validity and more generalised findings (Smith, 2008; Smith et al., 2011; Johnston, 2014). Accessing these type of datasets represents opportunities for building empirical research (Hakim, 1982).

5.3.2.2. Secondary data collection limitations

The most significant limitations of secondary data collection is that the information collected may not correspond to the one necessary to answer the research questions and to support the research hypotheses as it was collected for another purpose, and found to be completely inadequate for the research project. The data necessary to the research project may not have been collected in different regions from those of interest, during a different time span, or on the target population that is not relevant. These circumstances can be contoured if the researcher participates in the primary research design plan and by guaranteeing there is a correspondence between the research questions and the existing data.

Another major limitation of using secondary data is when researchers do not have the opportunity of participating in the data collection process and do not know accurately how the data collection process was carried out, are not aware if the collection process was the most adequate, or even if the data collected was affected by difficulties as low response rate or respondent misinterpretation of questions. In that case, the information needed will have to be obtained by other means such as documentation of the information collection methods, by using technical reports, and literature (Kiecolt and Nathan,1985; Dale et al., 1988; Boslaugh, 2007; Johnston, 2014).

Secondary data analysis brings methodological benefits, allows the development of new and scientific knowledge by providing an alternative perspective.

In this study, secondary data were assembled to assist the development and testing of the research questions and the hypothesis, and to achieve the research goals. The data collected granted the perception of the contextual circumstances in which the Portuguese tourism sector, in general and, the hotel industry in particular, operate. These data also allowed to enhance the validity of the questionnaire survey instrument.

With the secondary data collected and analysed, the basis for the development of the questionnaire was established. The next section outlines the questionnaire method of data collection, as well as the advantages and disadvantages of this method, the sample selection process, the questionnaire design, the pilot study, the questionnaire application, the strategy of data analysis, and the questionnaire validity and reliability.

5.3.3. The questionnaire method of data collection

Traditionally, the questionnaire survey instrument has been the first choice among researchers for data collection in research processes, as it is a simple and tangible way of establishing communication between population and researchers. Although it is a popular research instrument, designing a questionnaire that collects high quality and feasible data

with a high level of response is a difficult task. Undoubtedly, it needs careful planning and design, along with an efficient distribution method. Questionnaires can be used independently as a unique research instrument or combined with other research tools (Boyton and Greenhalgh, 2004). It is an inexpensive way of collecting data from a population group (Jack, 1998). However, before selecting the questionnaire as a method of data collection, the research needs to be carefully planned, literature must be examined, and a pilot study considered in order to appraise the research questions and hypotheses. Only after considering all this steps, the decision of selecting the questionnaire as the most appropriate method should be taken.

According to Cohen et al. (2017), questionnaires can be administered in various ways, these can be:

- self-administered (the ones completed with the researcher present, or the ones with the researcher absent);
- post (questionnaire sent by postal services);
- face-to-face interview;
- telephone;
- internet.

The current research combines the use of self-administered questionnaires, that were completed without the presence of the researcher, with internet, as they were disseminated to the Portuguese hotel industry via email, by means of an online link.

In conformity with Rodrigues et al. (2002), questionnaires are a method of collecting attitudinal, behavioural, convictions, and attributive data. Behavioural variables comprise information on respondents' factual past, present, or even future circumstances. The present study comprises behavioural data since the research goals were to examine Circular Economy awareness, CE attitude, benefits, enablers, challenges, and their impact on the organisational performance of hotels.

5.3.3.1. Advantages of questionnaires

Questionnaires are a quantitative method of collecting data, that when carefully planned and designed, can provide high and usable quality data, obtain high response levels by providing anonymity, which allows respondents to answer questions more honestly and truthfully, as opposed to interviews. Using questionnaire allows the collection of data from a large sample, because the same series of questions is addressed to each respondent. They are more advantageous than other methods on account of the type and quantity of data that they may gather. They also support data input used for computer analysis, and are comparatively simple to analyse (Wilson and McLean, 1994).

A questionnaire is an advantageous data collection method whenever the following requirements are considered:

- the target population is geographically identified and defined;
- the respondents are aware of what is expected from them;
- the analysis emphasis is numerical once the questionnaire generates quantitative data.

5.3.3.2. Disadvantages of questionnaires

Undoubtedly, questionnaires as any other collection tool, have certain limitations. Questionnaires are research methods that take some time to be properly developed; the data collected may have a limited and unrefined scope; they do not allow response unlimited flexibility, which in some situations can be seen as an advantage. Applying a questionnaire can be time consuming as delays may occur throughout the data collection process, especially if researchers are subjected to the work of other researchers; questionnaires should not be too long as extensive length usually means unsuccessful filling, so only a limited number of questions ought to be contemplated; the researcher cannot know if the questionnaire was filled in by the person it was addressed to; and if there are any

misunderstandings throughout the questionnaire filling phase, these cannot be clarified by the researcher, or elucidate the questions, neither encourage respondents to get involved in the completion; there is limited flexibility for respondents to put forward their own perspective on the questions asked, unless on open-ended questions (Marshall, 2005; Cohen et al., 2017).

5.3.4. The questionnaire method for the current research design

For the purpose of achieving the research goals, answering the research questions, and testing the hypothesis, a questionnaire method was used in the data collection process. This method was chosen as it is an appropriate method to generalise information and to test the theory. This questionnaire allowed to collect descriptive and explanatory data on Circular Economy in the Portuguese hotel industry and its impact on the organisational performance of hotels. To accomplish this, the respondents sample had to be identified. The following section displays the process of sample selection.

5.3.4.1. Sample selection

Choosing a sampling approach is always correlated with the viability of collecting data to achieve the research goals, answer the research questions and test the research hypothesis from the overall population. This study aimed for statistically present the concept of Circular Economy relatively to the Portuguese hotel industry. In this respect, characterising the target population is required and presented in the following section. An analysis of the Portuguese tourism sector and of the Portuguese hotel industry can be found in chapter 3.

The target group of this study was the one under the categorization ‘Hotels’, the classification chosen to accomplish this study, within the categorizations ‘tourist village’, ‘local lodging establishments’, ‘touristic apartments’, ‘camping parks’, ‘youth hostels’, ‘guest

houses', and 'rural tourism', found on the *visitportugal.com* site, platform of the *Turismo de Portugal IP* (hereafter referred to as *Turismo de Portugal*).

Turismo de Portugal is the Portuguese organisation with a central administrative board that operates under the supervision of the Portuguese Ministry of the Economy, and accounts for the design and implementation of tourism policies in Portugal. At a regional level there are five continental tourism boards (Entidades Regionais do Turismo) and two other delegations in Madeira and in the Azores (Secretaria Regional do Turismo). This Portuguese regional tourism boards are designated NUTS (Nomenclature of Territorial Units for statistical purposes), and this hierarchical system divides the territory into regions. According to the PORDATA[2] (Base de Dados Portugal Contemporâneo), this nomenclature divides the country into three, NUTS I, NUT III, and NUTS III, in accordance with population, administrative and geographical criteria. Figure 11 presents the Portuguese hierarchical system designated by NUTS.

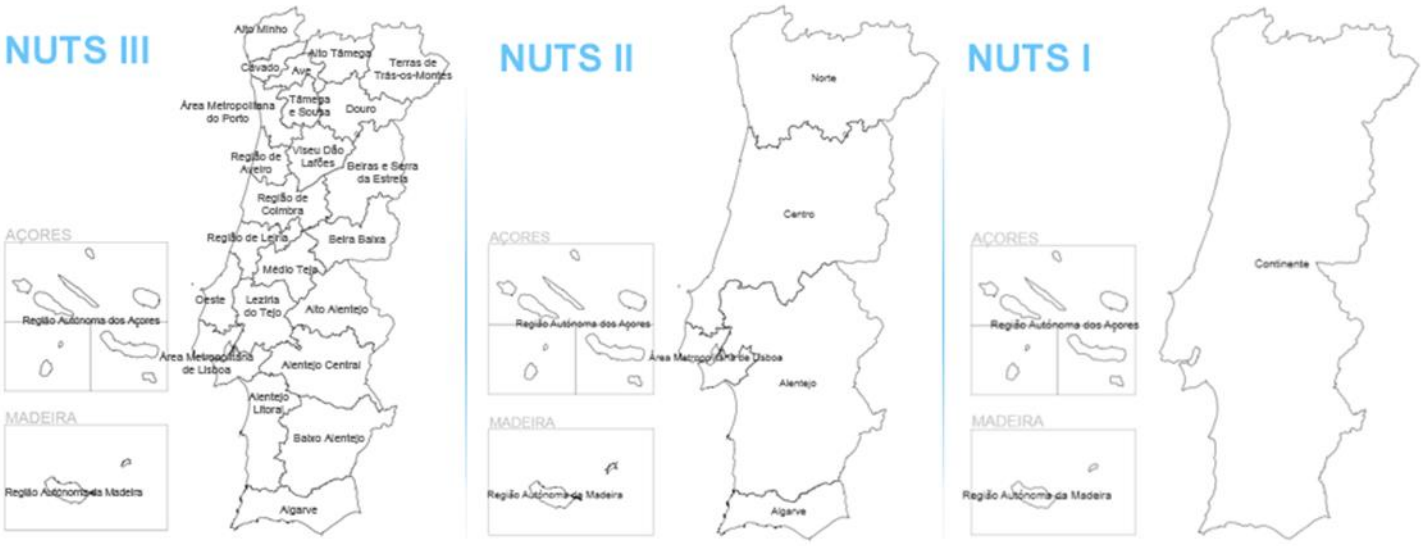


FIGURE 11. NUTS I, NUTS II, NUTS III. SOURCE PORDATA

[2] https://www.pordata.pt/en/What+are+NUTS

The target population of hotels considered was that under the designation NUTS II, which comprises Porto and North Region, Centre of Portugal, Lisbon Region, Alentejo, Algarve, Madeira, and Azores.

The current study has selected the 'Hotels' characterization to be examined as it was considered that the benefits of choosing just one characterization were more consistent with the testing validity goals of this study. Analysing a single characterization allows a higher degree of control of the specification of each categorization as well as uniformity and consistency.

The Portuguese hotel industry has undergone massive changes, improvements, and development in the last decades, namely increasing competition and technological progress, along with political, economic, and social changes, which enabled this research to answer the research questions and test the hypotheses considered.

The sample selected for the present research comprises the entire Portuguese hotel industry. *Turismo de Portugal* is responsible for an online register of all the Tourist Establishments of Portugal, which was accessed for the purpose of this research.

From Turismo de Portugal website the full list of 'Hotels' was downloaded. This list included 1558 hotels distributed by the aforementioned Portuguese regions, specifically Porto and North Region (383 hotels), Centre of Portugal (361), Lisbon Region (293), Alentejo (114), Algarve (235), Madeira (125), and Azores (47).

5.3.4.2. Sample representativeness

A representative sample means that there is a representation of the exact population from which it is obtained. The aforementioned questionnaire was sent to 1558 companies, nevertheless, it was not possible to contact 151 hotels, as some units were not reachable due to invalid email addresses or simply because there was not an available contact, others were just closed (permanently or temporarily which was not possible to verify), and others

were closed as the country was in total lockdown due to the Covid-19 pandemic, so the number of hotels successfully reached ended up in 1407.

Of the 1407 questionnaires sent, as 151 correspond to invalid or inactive contact details, or even business closure, only 103 were returned, and of these only 78 were viable, as the other were unusable considering that respondents left several questions unanswered. Even though the level of participation may be considered as relatively low, it is still considered valid. Hardigan et al. (2012), affirms that responses gathered online are usually lower than those collected by other means. Nevertheless, the sample was acceptable to benchmark the research questions and the hypotheses, even though the empirical analysis results cannot be generalised to the Portuguese hotel industry.

5.3.4.3. Questionnaire design

The questionnaire was designed to answer the research questions and to test the research hypotheses. In the opinion of Saunders et al. (2000), there are three possibilities of designing the questions of the questionnaire, namely:

1) using the questions that have already been used in other questionnaires;
2) adapting the questions formerly used in other questionnaires;
3) conceive a new questionnaire.

Using or adapting questions from previously studies allows the comparison of the results obtained.

The existence of valid questionnaires on Circular Economy and the hotel sector was verified. As these were not to be found, articles applied in other different areas (construction, fashion, industry) that referred to quantitative studies were examined. As these articles did not provide the questionnaire itself, nor necessary data to be used, some authors were asked to spare valid questionnaires, if possible. Nevertheless, this proved to be a delicate task, as none of the requests made were assisted. Therefore, conceiving a new

questionnaire was the option considered. The initial steps concerning the development of the questionnaire were taken and considered, particularly to determine the dimensionality of the construct; formulate the questionnaire format; establish the items format; develop the items; determine its length; consider the initial items pool (Tsang et al., 2017).

The questions were designed following a certain sequence, so as to enable flow and progression regarding the completion and to present themselves as logical to the respondent. The questionnaire begins with an introduction on the aim of the questionnaire, conveying respondents its importance, assuring confidentiality, and encouraging their replies by associating the questionnaire compliance with a social cause, i.e. the authors of the study engaged in offering an item (food, hygiene product, etc.) per questionnaire to a social solidarity association. The association chosen was *InPulsar*, which is an association for the community development, whose mission is to aid social and economic inclusion of populations in unprotected and in exclusion situations.

With the purpose of mitigating the mistrust concerning the questionnaire fulfilling, the authors of the study committed not to disclose information concerning the organizations' details, in particular the name of the hotel, and the hotel respondents' position, procedure that would not affect the validity of the additional data.

The questionnaire was structured as detailed in Table 5 and the full version is displayed the Appendix section.

TABLE 5. STRUCTURE OF THE FINAL VERSION OF THE QUESTIONNAIRE.

Sections of the questionnaire	**Topics covered / Questions subject**
Introduction	Brief description and explanation on: - The scope of this questionnaire and the purpose of the data collecting; - The guarantee of confidentiality and anonymity in completing it; - A reference to the social cause.
Section 1	- Hotel name

Accommodation profile / Organization details	- Hotel email - Respondents' hotel position - Accommodation stars - Scope (national company or international company) - Type of company (independent accommodation or part of a hotel chain) - Numbers of rooms offered - Numbers of employees - Company categorization (hotel, resort, …)
Section 2 Circular Economy awareness	- The Circular Economy principles that the hotel respondent is aware of. - Identification of some measures concerning Circular Economy.
Section 3 Challenges / obstacles to implement Circular Economy	- Challenges / obstacles to implement Circular Economy in the hotel industry.
Section 4 Enablers to a CE implementation	- Enablers to a CE implementation
Section 5 Important measures which would encourage the implementation of Circular Economy	- Measures that would allow the implementation of Circular Economy.
Section 6 The Circular Economy attitude	- CE – Principles that the hotel sector is implementing. - Initiatives the hotel sector is taking into account when considering Circular Economy.
Section 7 The Circular Economy benefits	- The perceived benefits of the implementation of Circular Economy.
Section 8 The Circular Economy and the organizational performance of the hotel sector	- The positive predictive impact on the organizational performance of the hotel sector.

The questionnaire included 20 questions, divided by eight sections displayed in Table 3. Single-item as well as multiple-item scale were used to measure awareness, attitude, benefits, enablers, challenges, and organisational performance of the CE construct within the participant group, rated from low to high, presenting the negative pole on the left and the positive one on the right. The present study aims to examine and evaluate the level of awareness and attitude, assess the challenges, the benefits and enablers regarding the implementation of Circular Economy in the Portuguese hotel industry and its impact on the organisational performance of companies by answering the aforementioned research questions and the research hypothesis.

To guarantee the reliability and validity of the aforementioned questionnaire, a pilot study was performed, and is outlined in the following section.

5.3.4.4. Pilot study

The pilot study was carried out to improve the quality of and efficiency of the main study, and was conducted in different steps.

The initial steps concerning the implementation of the questionnaire as a pilot study were taken and considered, namely the identification of a group of hoteliers who would be willing to analyse and comment on the first version of the questionnaire. With this group of hoteliers, with different accommodation profiles, already identified, and with the aim of testing and confirming the accuracy of the technical jargon utilised, an exploratory version of the questionnaire was disclosed by email and/ or delivered personally. The initial objective was to implement this exploratory study in 6-10 hotels. Nevertheless, the final exploratory study included only 5 hotels as the process of discovering hotel Chief Executive Officers (CEOs) or managers willing and available to participate revealed itself as a very difficult and time consuming task, as the country was in lockdown during this period. Initially 10 hotels were contacted with the aim of obtaining the hotel manager or CEO contact, which ended up being unproductive as the information received was that the request would be

attended later on or that someone from the hotel board would get in touch, which never happened. For this reason, some personal contacts were made, which resulted in 5 participants in the exploratory study.

This group of hoteliers analysed the questionnaire for the period of time between the 22nd and the 31st of March 2021, and was asked to fill in a copy of the questionnaire and making observations on the questions and answers provided. Most of the respondents completed the questionnaire in full while others focused their analysis on making remarks on the questions. The pilot study also allowed to assess how long the questionnaire took to be completed, as well as the accuracy of the instructions.

Additionally, this pilot study guaranteed that the questions provided all the information necessary so that the research goal would be achieved, the research questions could be answered, and the research hypothesis tested.

Their analysis indicated the need to adjust some scale items, to clarify others, and to review the length of some of the items, as well as very important inputs regarding the improvement of the questions and answers were given, which the authors of the study took into consideration.

Finally, the questionnaire was again analysed regarding the considerations made by the aforementioned group, redefined and refined, and the final version was finalised and prepared to be applied.

The next section describes the questionnaire application.

5.3.4.5. Questionnaire application

During the period from the 16th of April and the 7th of July 2021, the questionnaire was emailed to all the 1558 hotels. All the emails were sent for the attention of hotel managers. These were chosen as they are the ones that run the hotel's operations, they have a full

understanding of the organisation, and they have at their disposal all the information necessary to answer the research instrument.

A copy of the email is also included in the Appendices (Appendix A). During this first phase, the number of hotels successfully reached ended up in 1407 companies on account of invalid or inactive contact details, or business closure. In this situation, the contacts were always confirmed through Internet search.

From the very first moments it was evident that leading hoteliers to fill in a questionnaire was going to be a challenging task. Firstly, because the hotel sector was in lockdown due to the Covid-19 pandemic, with the vast majority of hotels closed or with minimum services while others were mobilized to accommodate health professionals who were at the forefront of this pandemic. Secondly, it was also perceivable that people were more concerned with public health matters, rather than with any other issue. Thirdly, it was obvious a certain lack of availability and/or of motivation, interest, and even time from hoteliers relatively to questionnaire completion. Perhaps, hoteliers also feel uncomfortable while sharing private information on their companies while filling questionnaires. Fourthly, nowadays it is difficult to have questionnaires fulfilled, because some kind of survey fatigue has settled as the trend of companies applying customer feedback surveys has been increasing in recent years. Inundated with growing numbers of questionnaire, respondents are less disposed to participate. Fifthly, perhaps this questionnaire was long, and with many items per question, which may have led to some respondents' dropout.

In a first moment, by evaluating the response rate, it was verifiable that only a small number of questionnaires were being fulfilled, and so, another action was considered and necessary, and so a follow-up email reminding of the first email (May 2021) was sent, and some exceptional follow-up emails were sent as a polite reminder to those who didn't fill the questionnaire entirely.

Nevertheless, as the response rate continued to be really low and sending emails to an industry that was going through a process of lockdown was not proving to be successful, groups of hoteliers and hotel CEOs were contacted via social media, namely *LinkedIn*, and the link as well as a description regarding this study were provided. At the same time, some telephone contacts were also made, and the link resent to the email address indicated by the respondents, and some questionnaires were even handed out personally and filled in manually by the respondents. These responses were then inserted in the database.

Additionally, an email was also sent to the Portuguese regional tourism boards of the seven NUTS II, which includes the seven regions considered as the target public of this study, namely, Porto and North Region, Centre of Portugal, Lisbon Region, Alentejo, Algarve, Madeira, and Azores. This same email was also sent to the executive board of the *Turismo de Portugal*, to the Portuguese Association of Hotels (Associação de Hotelaria de Portugal), to the Portuguese Association for Hotels and Restaurants (Associação da Hotelaria e Restauração e Similares de Portugal), however, none of these associations confirmed the email upon receipt, neither requested any other information regarding this study.

Due to the various situations described above, the sample collected turned out to be a convenience sample.

5.3.4.6. Questionnaire data preparation

Of the overall number of questionnaires received, 78 were usable. Each of the items of the questionnaire were coded so that they could be easily identified. Open-ended questions were categorised, which was feasible because there were only two open-ended questions. All statistical analyses were performed using IBM SPSS (Statistical Package for the Social Sciences) version 26.

5.3.4.7. Questionnaire analysis method

Descriptive statistics were used to examine response variability and missing data in the questionnaires. A reliability analysis (internal consistency) was performed using Cronbach's alpha (α), as it indicates the extent to which surveys items can be treated as a single latent construct. Values >0.7 reliability is considered adequate for a survey instrument (Bland and Altman, 1997), although some authors consider >0.6 adequate (Field, 2000). For the entire survey, Cronbach's alpha (α) should be at least 0.9 (Bland and Altman, 1997). Nevertheless, the validity of this measure has been called into question, and some researchers have proposed additional initiatives. In the present study, the average inter-item correlation (AIIC) was also used, which is independent of the number of items and sample size. This measure assesses how items within a composite correlate, i.e., it has been proved that the items are assessing the same inherent composite. A rule-of-thumb is that AIIC should be between 0.15 and 0.5 (Clark and Watson, 1995), as displayed by Table 6.

TABLE 6. INTERNAL CONSISTENCY STATISTICS.

Dimension (ID*[1])	Total	α	AIIC
Circular Economy Awareness (CE-A)	13	0.994	0.529
CE Measures Awareness (CE-M)	6	0.910	0.641
CE Attitude (CE-At)	13	0.946	0.540
CE Initiatives (CE-I)	8	0.905	0.547
CE Challenges (CE-C)	17	0.914	0.378
CE Enablers (CE-E)	11	0.904	0.462
CE Benefits (CE-B)	5	0.823	0.487

Construct item response-proportions were presented as positive responses, where in the constructs Circular Economy *Awareness;* Circular Economy *Attitude*; Circular Economy *Benefits*; Circular Economy *Enablers*; and Circular Economy and the *Organizational Performance*, it was considered positive who answered 3 or higher in the 5-point Likert

scale. In the constructs Circular Economy *Initiatives,* and CE *Challenges* it was considered positive who answered 4 or higher in the 5-point Likert scale. Table 7 presents the questionnaire constructs related to Circular Economy and its corresponding items.

TABLE 7. QUESTIONNAIRE CONSTRUCTS RELATED TO CE AND ITS CORRESPONDING ITEMS.

Dimension (ID*)	Items	Total	Score ID
Circular Economy Awareness (CE-A)	Reduce Reuse Recycle Redesign Rethink Refurbish Remanufacture Repair Repurpose Recover Refuse Return Re-Educate	13	Score_CE-A
Measures Awareness (CE-M)	Reduce gas emissions Clean energies Water management Waste management Responsible materials CE measures not financed	6	Score_CE-M
CE Challenges (CE-C)	Lack of knowledge on the CE Lack of interest on the CE Lack of investment Lack of time to implement Lack of human resources Lack of governmental support Lack of infrastructures support The low value of products at end of life Policies focused on waste treatment in detriment of the R – Principles Lack of incentive to design circular products Lack of market mechanisms to promote waste recovery Lack of CE specific legislation Price-quality ratio of the outcomes It is expensive to implement CE's principles Resistance to the adoption of new business models The use of secondary materials (reuse of residues) Perceived benefits (the positive outcomes of the implementation of Circular Economy)	17	Score_CE-C

CE Enablers (CE-E)	Governmental initiatives to support the implementation of CE Principles Governmental financial support Governmental training courses support Governmental CE's ecosystems support Tax reduction National awareness strategy National Educational and Research strategy Intense collaboration practices between companies CE ecosystems Stronger support from consumers implement CE principles Technology to successfully adopt CE	11	Score_CE-E
CE Attitude (CE-At)	Reduce Reuse Recycle Redesign (Cradle-to-Cradle; Long Lasting Products) Rethink Refurbish Remanufacture Repair Repurpose Recover Refuse Return Re-Educate	13	Score_CE-At
CE Initiatives (CE-I)	The emissions generated The consumption of renewable or clean energies Energy efficiency improvements Water management Waste management The purchase of products designed according to Circular Economy principles The use of environmentally sustainable materials Environmental conservation	8	Score_CE-I
CE Benefits (CE-B)	A sustainable environment Innovation stimulation Improve performance The creation of new jobs Saving costs in the long term Establishing your brand and reputation on environmental preservation	5	Score_CE-B
CE and Organisational Performance (CE-OP)	More customers The reduction of carbon Improve profitability Acquire new competencies Access to new markets and consumers	8	Score_CE-OP

	To have better access to raw materials Increases customer satisfaction Increases overall performance in the long term		

The data were examined in accordance with the research questions formulated and goals. The analysis ranged from descriptive statistics to correlation analysis in order to examine correlations between pairs of the dimension using Kendal's tau-b correlation coefficient (ranging between -1 and 1, values less than + or - 0.10: very weak; + or -0.10 to 0.19: weak; + or - 0.20 to 0.29: moderate; + or - 0.30 or above: strong).

The next section discusses the questionnaire validity.

5.3.4.8. Questionnaire validity

A factor validity and convergent validity analysis was conducted.

Factor validity indicates whether the items reflect the construct that is intended to be measured and is generally evaluated by standardized factor loadings (Marôco, 2014). The composite reliability (CR) for each of the factors were obtained to measure the factor validity. Composite reliability estimates the internal consistency of factor-related items, indicating the degree to which these items are consistently manifestations of the factor. In general, it is considered that an CR ≥ 0.70 is an indicator of a reliability of appropriate construct, although lower values may be acceptable for exploratory investigations (Child, 2006).

Convergent validity was measured by the average extracted variance (AEV), which allows to assess the convergent validity that materialises when items that reflect a factor strongly saturate it, that is, the behaviour of these items is basically explained by this factor. As reference values, it is usual to consider as indicators of proper convergent validity (Marôco, 2014).

5.3.4.9. Questionnaire validity results

Table 6 shows the internal consistency and validity coefficients. The Cronbach's alpha (α) obtained very good values for all composites (>0.8) and the AIIC presented a value for the *Circular Economy Measures* construct of 0.641, meaning that this construct needs an individual item analysis. An Item-Deleted analysis for the items that compose the construct was performed, and removing the item *Assist the implementation of measures to enable Circular Economy that are not financed by the government* improve the Cronbach's alpha (α) but it's a meaningless increase. The total values of both indices showed a very good overall internal consistency.

Considering the factor validity analysis, values of composite reliability higher than 0.88 for all constructs were obtained, meaning that the instrument has a very good factor validity. Analysing the AEV, all constructs obtained values higher than 0.5 meaning that the instrument has a good convergent validity.

In a global analysis the instrument obtained very good values for internal consistency and validity.

5.3.4.10. Summary of the questionnaire method

In this section, the questionnaire method of data collection, was addressed. It brought forward advantages and disadvantages of using a questionnaire as a data collection method; the questionnaire method for the current research; the sample selection and representativeness; the questionnaire design; the pilot study; the questionnaire application, data preparation, and analysis method; the questionnaire validity and validity results.

This questionnaire data collection method stands out as an attempt to examine the Portuguese hotel industry CE awareness, CE attitude, CE benefits, CE enablers, CE challenges and impact on the organisational performance of Portuguese hotels.

The subsequent section displays a summary of the research methodology adopted in this study.

5.4. Conclusion

The methodology chapter provided a comprehensive overview of the methodology followed throughout the research in order to answer the research questions and the research hypothesis and meet the objectives. It displays the research philosophy, the research strategy and purpose, as well as the different methods of data collection. These have varied from secondary data collection, on a first stage, to descriptive and explanatory survey collection, on a second stage. These different methods were introduced with detail, along with their advantages and disadvantages, how they were performed, their analysis method; and their validity.

The questionnaire research method was conceived by the authors and validated through a pilot study phase. It was successfully sent to 1407 hotels through email. 78 questionnaires comprise the sample size. Although this number does not allow the generalization of the results to the Portuguese hotel industry, it is admissible, but the sample does not represent the Portuguese hotel industry.

The next chapter outlines and analises the results of the present research.

Chapter 6 - Results and data analysis

6.0. Introduction

The goal of this chapter is to analyse the data collected and to address the findings within the context of the conceptual framework and the research questions and the research hypothesis formulated previously. This chapter is composed by ten sections. The first section outlines the hotel profile, namely the region where it is located, the number of stars, the scope (if it a national or an international company), the type of company (independent accommodation or part of a hotel chain). The second section explores Circular Economy *Awareness* relatively to this concept and its R-Principles; the following section, the third, analyses and discusses the *Attitude* of the hoteliers regarding the CE; the fourth section presents the *Challenges* of a CE implementation; the fifth the Circular Economy *Benefits*; the sixth the CE *Enablers*; the seventh section explores the organisational performance of hotels and Circular Economy; and the eight section analyses the organisational performance distribution homogeneity relatively to the hotel industry profile. The nineth section introduces a correlation analysis of these dimensions with the organisational performance of companies; the tenth section displays a summary of the findings and considers the research results in order to improve the conceptual framework.

The data analysis was based on a quantitative method, by resorting to descriptive and correlation analysis. Descriptive statistics was utilised to analyse and describe the data with the purpose of conveying an accurate understanding and an overall overview of the profile of the hotel sample. Additionally, the correlation analysis was to perform the correlation analysis between the implementation of circular Economy and the organisational performance of the hotel industry. Through the coefficients of the correlation analysis and their level of significance, the research hypothesis is addressed.

6.1. Hotels profile

The questionnaire included various questions regarding the hotel profile, with the goal of allowing a good overview of the organisational characteristics of the hotel sample. Before examining the main constructs and exploring the research questions and the research hypotheses, it is essential to understand and examine the hotel profile.

6.1.1. Hotels localization

Of the 78 questionnaires that comprise the sample, 3.9% of the hotels were from the Azores region, 5.8% from Madeira, 8.7% from the Algarve, 9.7% from Alentejo, 16.5% were from Porto and North region, 25.2% were from the Lisbon region, and 30.1% from the Centre of Portugal, as indicated by Table 8.

TABLE 8. 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%

6.1.2. Hotels stars classification

Relatively to the hotels stars classification, the results show that 1.1% were one-star hotels, 11.5% referred to two-star hotels, 29.9% were three star-hotels, 51.7% four-star hotels, and 5.7% corresponded to five-star hotels. Table 9 presents the results.

TABLE 9. PERCENTAGE OF QUESTIONNAIRE RESPONDENTS CONCERNING NUMBER OF HOTEL STARS.

Number of Stars	% of questionnaire respondents
One-star hotels	1.1%
Two-star hotels	11.5%
Three-star hotels	29.9%
Four-star hotels	51.7%
Five-star hotels	5.7%

6.1.3. Hotels scope and type

Concerning the hotel scope, the results show that 96.7% correspond to national companies, and 3.3% to international companies. With respect to the hotels type, 66.3% are independent accommodations, and 33.7% are part of a hotel chain, as displayed by Table 10.

TABLE 10. PERCENTAGE OF QUESTIONNAIRE RESPONDENTS REGARDING HOTELS SCOPE AND TYPE.

Hotel scope			Hotel type	
National company	96.7%		Independent accommodation	66.3%
International company	3.3%		Part of a hotel chain	33.7%

6.2. Circular Economy Awareness

This section examines awareness of the hotel industry relatively to Circular Economy and its principles.

Based on the theoretical framework, the following research question was examined:

Research Question 1. *Is the Portuguese hotel industry aware of CE?*

In order to investigate this question, the questionnaire respondents were asked to identify all the CE R-Principles they are aware of, using the Likert scale, from 1-Not at all aware, to 5-Extremely aware. In this analysis only the positive distribution (3-Moderately aware, 4-Very aware, and 5-Extremely aware) was considered.

The results are summarised and presented in Figure 12. The respondents are broadly aware of the Circular Economy R-Principles, highlighting Recycle (98.72%), Reuse (97.44%), Reduce (97.44%), and Repair (96.15%), and aware of the remaining R-Principles considered as they were also highly emphasised: Rethink (57.69%), Redesign (56.41%), Refurbish (56.41%), Remanufacture (55.13%), and Refurbish (52.56%). These results show that the group of respondents is aware of the Circular Economy R-Principles, particularly Recycle, Reuse, Reduce and Repair. Even though these results indicate a considerable level of awareness relatively to the other R-Principles their practical implementation has been reduced up to now. Research indicates that this is explained by the fact that the Circular Economy concept has mostly been investigated from a conceptual or theoretical point of view, and scarcely ever from an empirical point of view, and lack evidence on its tangible and effective implementation (Linder and Williander, 2017; Ormazabal et al., 2018).

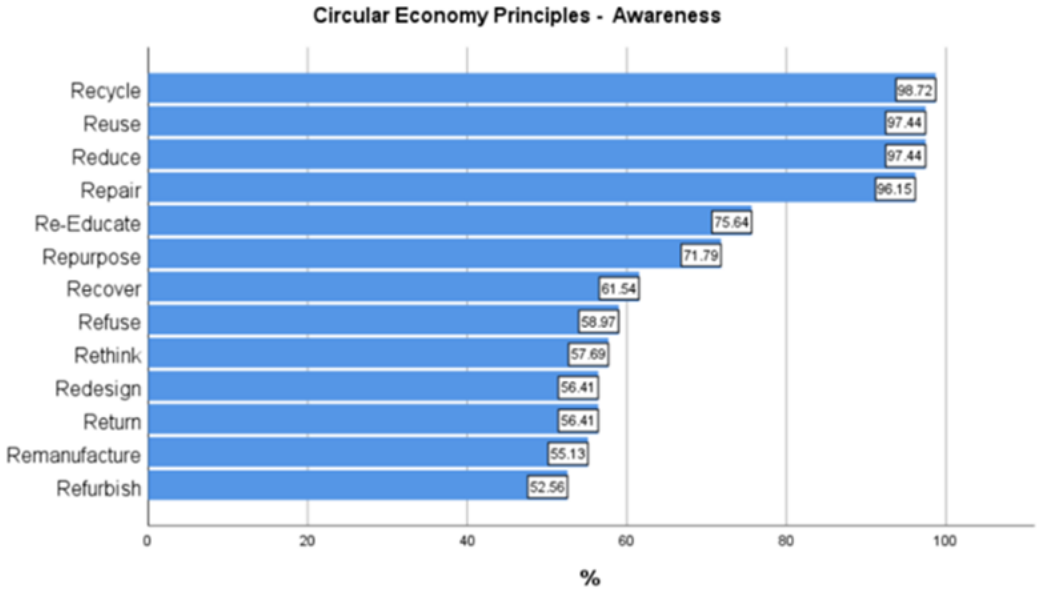


FIGURE 12. AWARENESS LEVELS CONCERNING THE CE R-PRINCIPLES IN THE PORTUGUESE HOTEL INDUSTRY.

The questionnaire participants were also asked to assess their level of awareness regarding the measures that would enhance the use of environmentally responsible materials, waste and water management, as well as proceedings that would allow the reduction of carbon footprint/ CO_2 emissions/ greenhouse gas emissions, and those that may enable the implementation of CE that are not financed by the government. A Likert scale was used, from 1-Not at all aware, to 5-Extremely aware. Figure 13 displays the results obtained from the analysis of the positive distribution (3-Moderately aware, 4-Very aware, and 5-Extremely aware).

The results demonstrate that the participants recognise the aforementioned measures and particularly the ones which involve the utilisation of environmentally responsible materials, waste management, and water management (97.44%). Uniformely, the remaining measures are all familiar to respondents as figured vary from 94.87% (measures that promote the use of renewable or clean energies) and 87.18% (assist the implementation of measures that enable Circular Economy and that are not financed by the government). The aforementioned strategies/measures are predominantly implemented as a vehicle to reduce costs and also because consumers are progressively aware of and

demand for environmentally friendly materials and strategies, as shown by previous research (European Environmental Agency, 2016; Masi et al., 2017; Rizos et al., 2017).

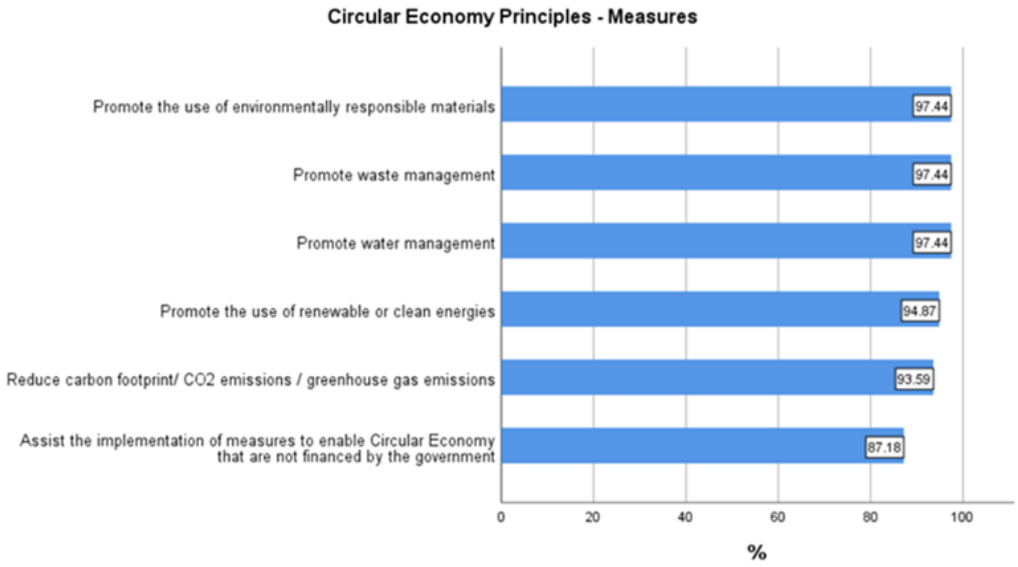


FIGURE 13. MEASURES THAT ENHANCE THE IMPLEMENTATION OF A CE MODEL.

6.3. Circular Economy Attitude

This section outlines the hotels attitude towards Circular Economy. Considering the theoretical framework, the next research question was examined:

Research Question 2. *Is the Portuguese hotel industry implementing circular economy?*

The questionnaire participants were asked to rank the following R-Principles their businesses are implementing using a Likert scale, from 1-Without implementation, to 5-Fully implemented. The results exhibited in Figure 14 portray the positive distribution (3-Moderately aware, 4-Very aware, and 5-Extremely aware).

The findings indicate that Repair (100%), Recycle (98.65%), Reduce (97.30%), and Reuse (90.50%) are being actively implemented, whereas, Remanufacture (50%), Return

(51.35%), Refuse (52.70%), Redesign and Rethink (54.05%), and Refurbish (55.41%) are the least put into practice. The 3R-Principle (Reduce, Reuse, Recycle) along with Repair are ranked as R-Principles related to natural environment and resources protection, those that allow the improvement relatively to their utilization, and finally those that promote sustainability. They also enable the potential of extending the life span of products by repairing or maintaining a faulty product so it can be utilised in performing its original task. It is also acknowledged that they also assist the transition from a linear economic model to a circular one, and that the introduction of Reuse was significant so that a closed loop within the circular economy business model can be achieved (Yang et al., 2014; Ramos et al., 2021). Geng et al. (2019) consider that goods ought to be projected and designed to be recyclable and reusable, produced by resorting to clean manufacturing methods and distributed by green supply chains, so that value is created.

This 3R approach is commonly utilised in the context of the travel and tourism sector and its applicability is centered in the energy, water and waste efficiency areas, by reducing their emissions, for this reason, leads to the improvement of the environmental performance, which is in line with the survey results (Ioannidis et al., 2011). These findings also show that Circular Economy is often comprehended as the Reduce, Reuse and Recycle R-Principles, as pointed out in previous research (Kirchherr, 2017). Nevertheless, the reuse of products and/or their parts along with life-cycle perspectives are gaining momentum (Fonseca et al., 2018).

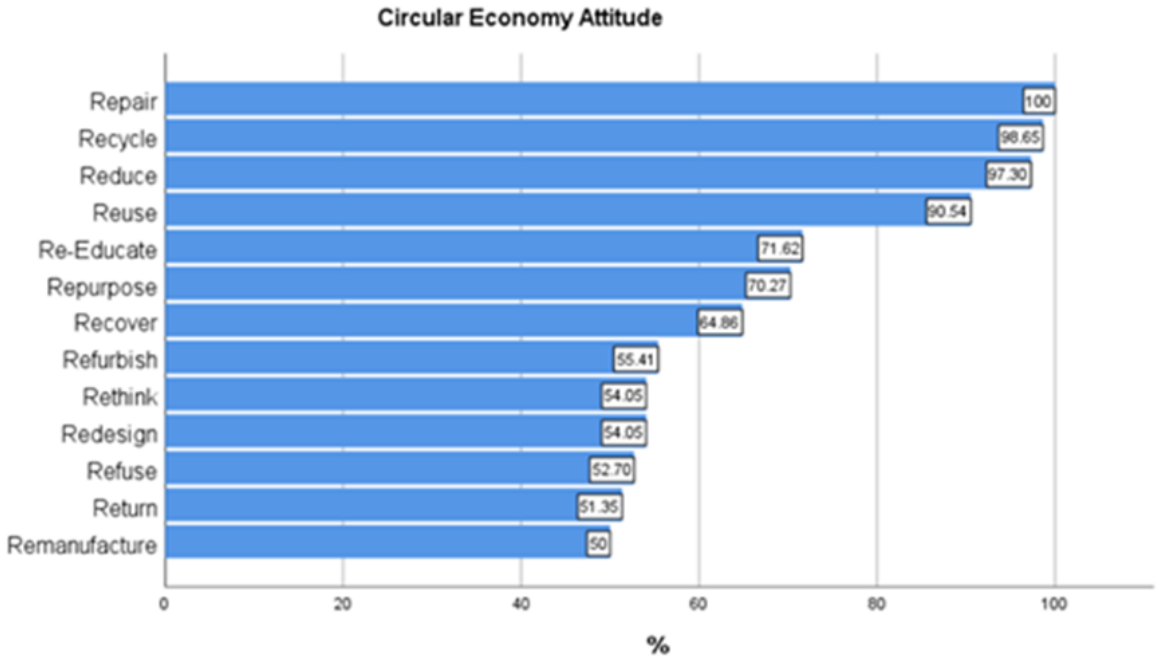


FIGURE 14. CE R-PRINCIPLES IMPLEMENTED BY THE PARTICIPANT HOTELS.

The questionnaire respondents were also inquired, in an open-ended question, to clarify how they are implementing Circular Economy R-Principles in their firms if the question above was ranked 3-Moderately implemented or above. The results were analysed and gave rise to Figure 15. This indicates that 58.6% of the participants categorised water management and recycling as the most significant measures embraced; followed by energy management (55.1%), and cleaning management (37.9%). These were succeeded by 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%). These findings demonstrate that it is mandatory to use resources rationally, by recycling waste, reducing water and energy consumption, and producing the minimum waste possible. This strategies will not only allow companies to reduce costs at the operating level, as water and energy consumption levels are high, but also to be in accordance with the European Green Deal agreement which determines carbon neutrality by 2050 (Costa, 2021; Dani et al., 2021). The hotel industry may as well profit from the opportunities offered by recycling, as it allows to decrease the quantity of waste that has to be managed, which reduces environmental

impact (Manniche et al., 2021). Programmes that involve cleaning, and towel and bed linen management are also being implemented and enforced by a growing number number of customers that seek for sustainable alternatives (Manniche et al., 2021).

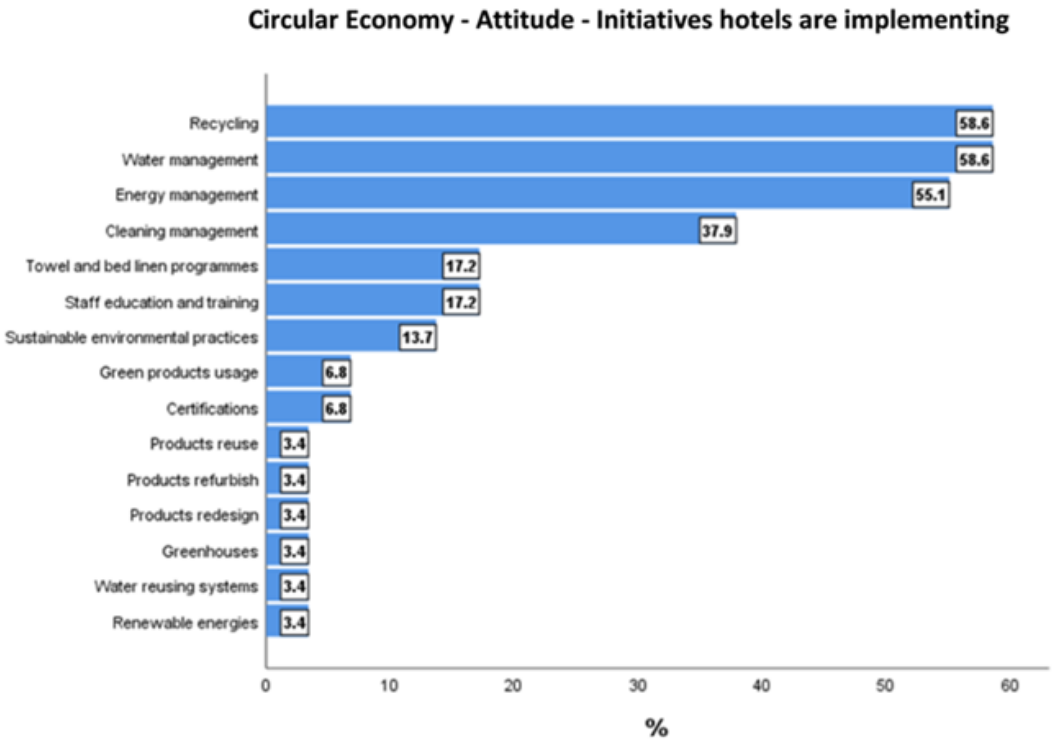


FIGURE 15. INITIATIVES HOTELS ARE IMPLEMENTING.

Participants were also asked to rank the initiatives their businesses are considering, using a Likert scale from 1-Strongly disagree, to 5-Strongly agree. Figure 16 exhibits the results collected from the positive distribution (4-Agree, and 5-Strongly agree). Of the aforementioned results 97.22% of the participants considered that their firms are implementing water management policies; 94.44% considered energy efficiency improvements, and 72.22% prioritised waste management strategies.

Nevertheless, only 31.94% of the participants accounted for the purchase of products designed according to CE principles.

These findings denote that firms are implementing CE management strategies, as recycling, water and energy management as well as cleaning management practices, education and training of their workers towards more sustainable approaches, and towel and bed linen programmes, as outlined in previous literature (Manniche et al., 2017; Ioannidis, et al.,2021). These procedures will basically lead to a reduction of their consumption and emissions, improve their environmental performance, and most importantly, it enables them to reduce the operating costs by reducing water and energy consumption and correspondent costs (Dani et al., 2021). As indicated by prior research, these findings are a comprehensible strategic approach implemented by companies, once it enables them to save costs (economic outcome) and to pollute less and with a minor impact (environmental outcome) (European Environmental Agency, 2016; Masi et al., 2017; Rizos et al., 2017).

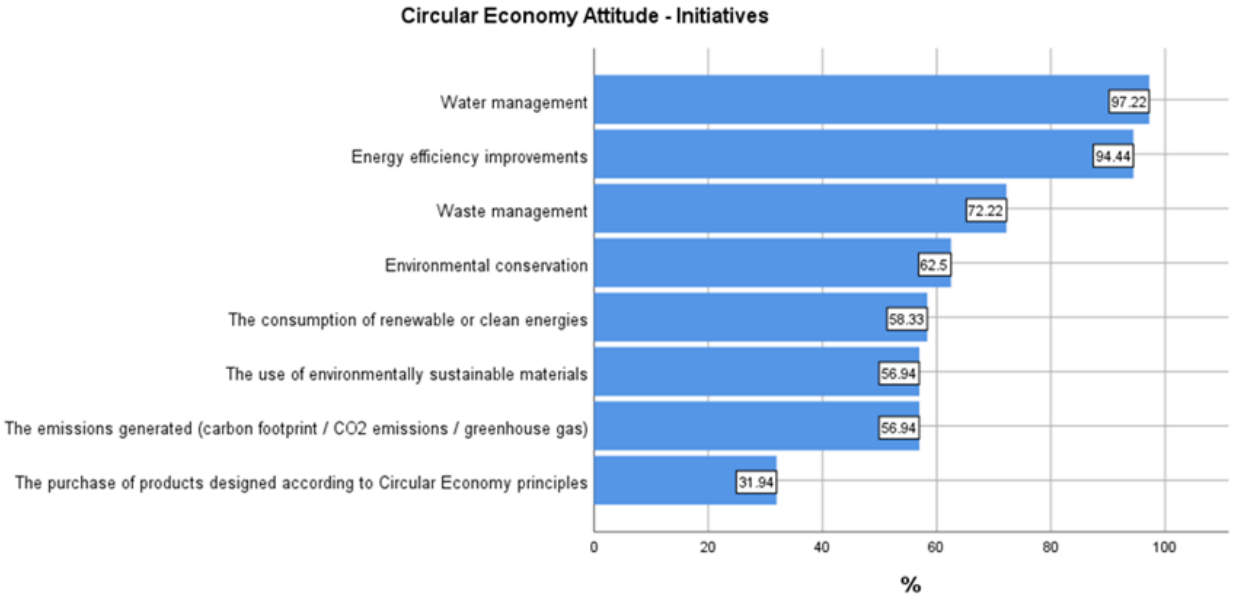


FIGURE 16. HOTEL INDUSTRY INITIATIVES.

6.4. Circular Economy Challenges

This section displays the challenges hoteliers consider that their companies would face if a CE model would be implemented. Taking into account the theoretical framework, this research question was assessed:

Research Question 3. *What are the challenges that the hotel industry addresses to implement CE?*

Although a growing number of hotels are already implementing circular initiatives, a more comprehensive implementation of circular approaches is required. To promote such a transition, it is essential to identify the key challenges that companies may face. So, respondents were asked to rank the challenges to a CE implementation, using a Likert scale, ranging from 1-Strongly disagree, to 5-trongly agree. The results are summarised in Figure 17.

Respondents considered the lack of investment in CE approaches the most significative challenge (88%), 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%).

These results indicate that there is little investment in the CE implementation which may be a result of the cost of the initial investment, poor access to funding along with incompatible policies, and a low level of cooperation across the supply chain (Grafström and Aasma, 2021). Additionally, policies focused on waste treatment were also identified as a challenge, nevertheless they should be considered a strategy to improve sustainability by valuing products that have reached their life expectancy and by turning them into useful resources for other businesses (Stahel, 2016; Ferronato et al, 2018).

Regarding the lack of incentive to design circular products, research indicates that the current product design principles mainly focus on the consumers' needs rather than on the products' lifespan options (Bocken et al., 2016). The customer oriented design has led to intentional obsolescence, a common design strategy to limit products' life expectancy, a strategy which allows companies to promote sales (Moreno et al., 2016; Wang et al, 2022).

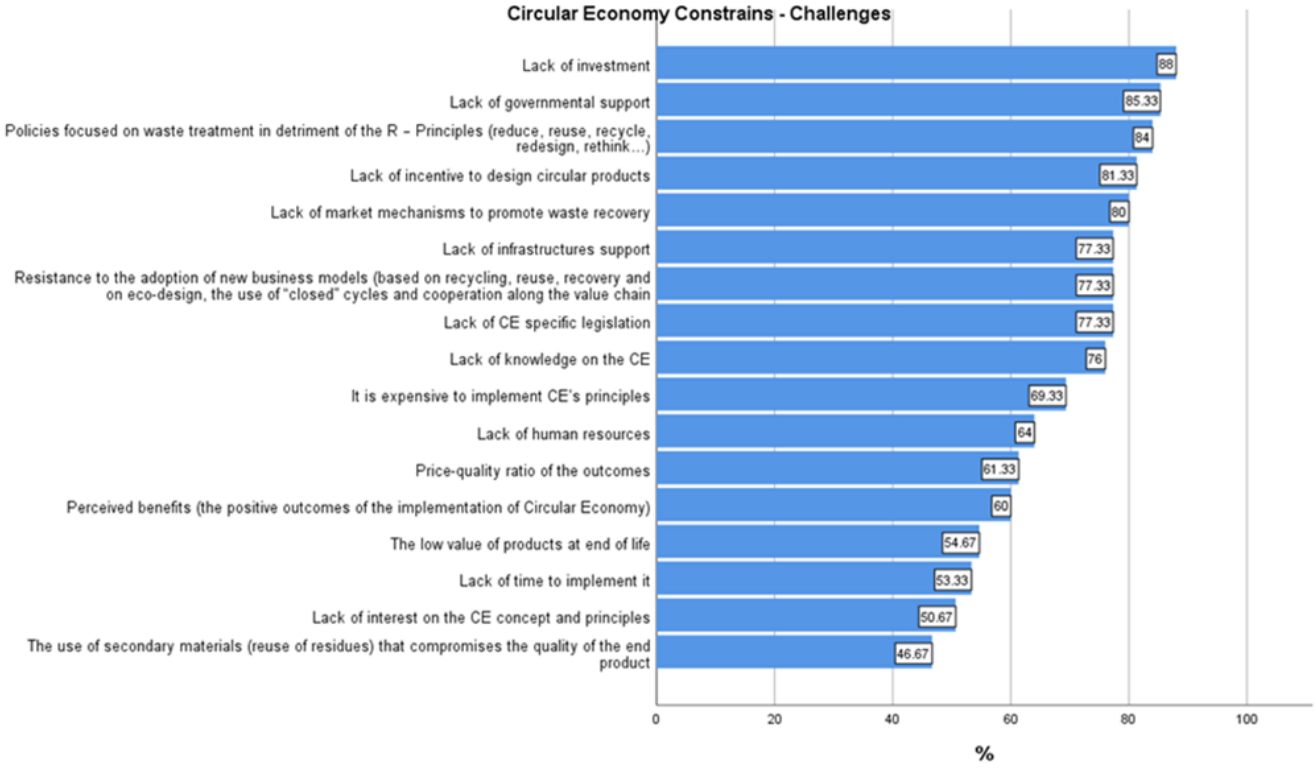


FIGURE 17. MEASURES TO ENCOURAGE THE IMPLEMENTATION OF CIRCULAR ECONOMY.

The respondents were also asked, by means of an open-ended question, to identify the challenges their businesses encounter when implementing Circular Economy if the challenges mentioned in the previous question did not represent barriers. 35.7% of the respondents pointed out as the most significant challenge the lack of knowledge on the concept of CE; 21.6% indicated the mindset of the organisation; 21.4% identified lack of knowledge on how to implement it; 21.4% also considered that the investment is costly, as indicated by Figure 18. These findings are in line with research evidence which shows that

the challenges frequently identified are awareness regarding the CE concept and lack of knowledge on how to implement it (Kirchherr et al., 2018; Paletta et al., 2019; Grafstrom and Asama, 2021). According to research, the mindset of companies and lack of governmental support can also be major challenges regarding the CE implementation (Droege, 2021).

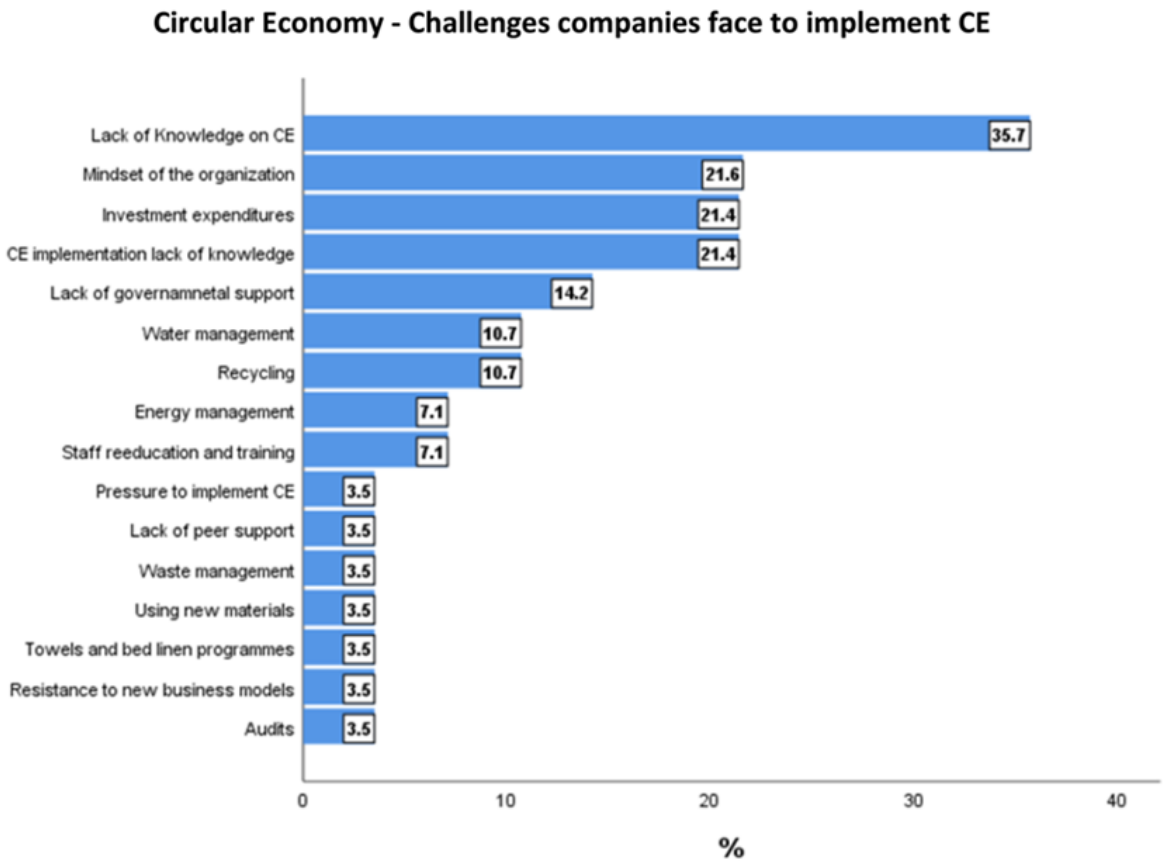


FIGURE 18. CHALLENGES THAT COMPANIES FACE TO IMPLEMENT A CE PARADIGM.

6.5. Circular Economy Benefits

This section introduces the *benefits* hoteliers consider that their companies are going obtain with the implementation of Circular Economy. Considering the theoretical framework, the next research question was considered:

Research Question 4. *What are the benefits of a Circular Economy implementation?*

Regarding the *benefits* of a CE implementation in the Portuguese hotel sector, the questionnaire respondents were asked to rank the frequency that the stated measures/ actions that the implementation of CE in their firms would promote, using a Likert scale, ranging from 1-Never, to 5-Always. The results are summarised in Figure 19.

They indicate that an economic approach based on circularity would allow them to establish their brand and reputation on environmental preservation (100%); it would allow the enhancement of a sustainable environment (98.63%); it would also permit hotels to save costs in the long term (97.26%); it would stimulate innovation (97.26%); and it would stimulate the creation of new jobs.

Meeting sustainability and environmental preservation goals is no longer just a compliance requirement, it is a business opportunity and requisite that gives companies a competitive advantage, as environmental preservation has become progressively important to customers. Setting up a solid relationship with customers will enhance environmental cooperation, which will ultimately determine the companies environmental commitments (Jahanshahi and Brem, 2018; Wang et al., 2018). According to previous research this cooperation between companies and customers give businesses the opportunity to offer products and services that are in conformity with environmental expectations. Improving environmental performance along with innovation stimulation (employee training and

environmental auditing) allows companies to reduce costs in the future and ultimately stimulate job creation (Chen, 2008; Wang et al., 2018).

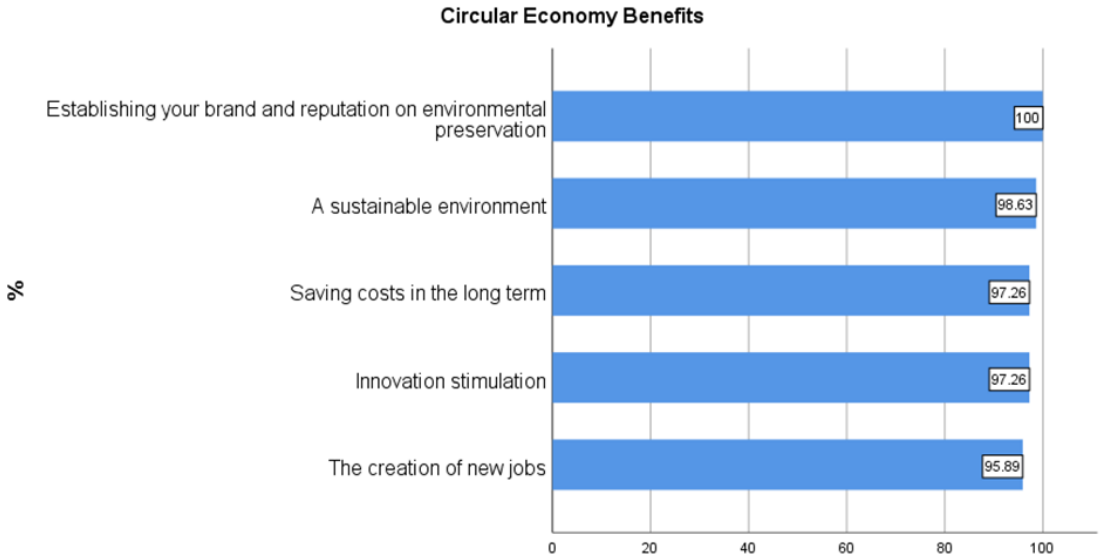


FIGURE 19. BENEFITS OF A CIRCULAR ECONOMY IMPLEMENTATION.

6.6. Circular Economy Enablers

Throughout this section the enablers of a CE implementation are explored. Thus, the following research question was tested:

Research Question 5. *Which initiatives would enable CE implementation?*

With the purpose of analysing the enablers of a CE implementation, the survey respondents ranked the key measures that would allow hotels to implement the CE principles, using a Likert scale, ranging from 1-Not at all important, to 5-Extremely important. The results, presented in Figure 20, indicate that 98.68% of respondents pointed out stronger support from supply chain agents to implement CE principles; specialised 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; and governmental financial support as the major enablers.

Hoteliers consider that stakeholders, including supply agents, ought to get involved in the CE implementation, with research pointing out the imperativeness of such cooperation between all stakeholders (van Buren, 2016; Mishra et al., 2018). The necessity of specialised CE consultancy, education and training as well as a national level strategy were also recognised as enablers that would enhance the dissemination of CE and its practices, which is in accordance with literature (Circular Economy Action Plan, 2020). Implementing CE is a complex process which requires a layered engagement of all stakeholders, which could be facilitated by adequate polices as tax reduction to support the implementation along with governmental financial support as supported by previous research (Calogirou et al., 2010; Kok et al., 2013; Rizos et al., 2016; European Commission, 2020, Zorpas et al., 2021).

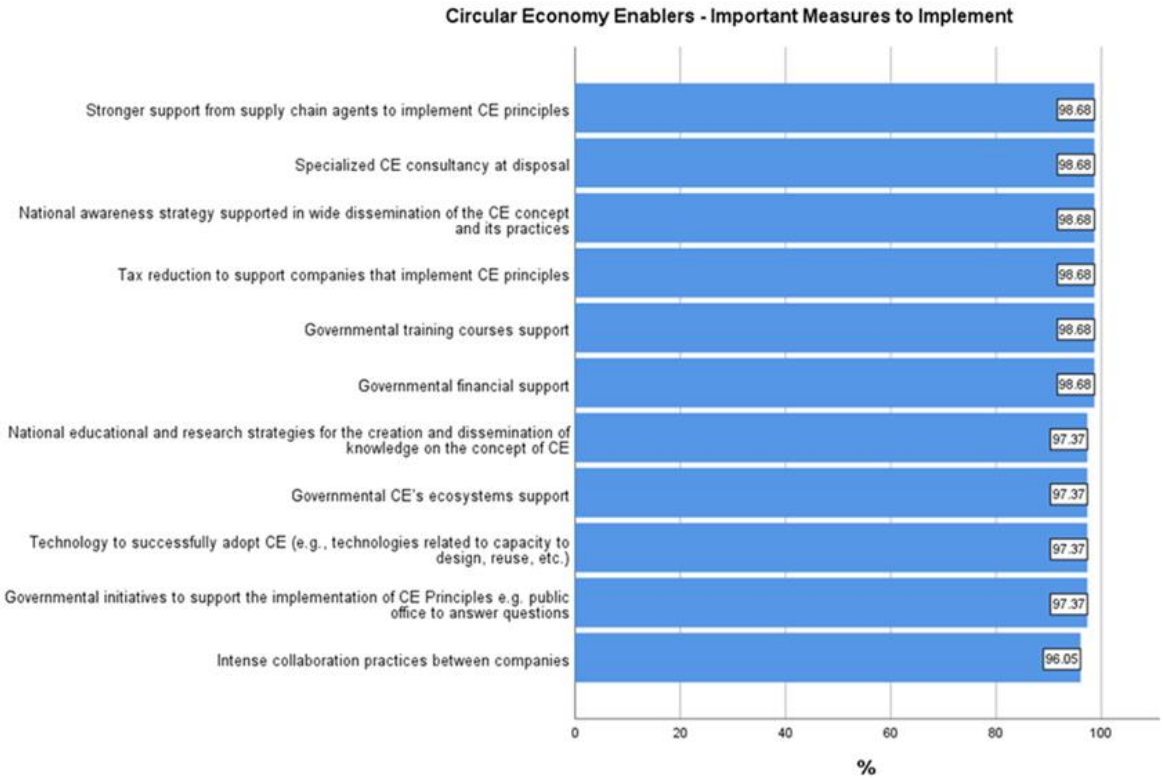


FIGURE 20. MEASURES TO ENCOURAGE THE IMPLEMENTATION OF CIRCULAR ECONOMY.

6.7. Circular Economy and the Organisational Performance

This section presents the relationship hoteliers foresee that their companies would face if a CE model would be implemented.

This questionnaire respondents were invited to state the predictive positive impact of the implementation of CE on the organisational performance of their companies, using a Likert scale, from 1-Strongly disagree, to 5-Strongly agree. The results displayed in Figure 21 were obtained from the positive distribution (3-Neither agree or disagree, 4-Agree, and 5-Strongly agree).

The participants considered that acquire new competencies (96.61%), the reduction of carbon footprint/ greenhouse gas effects (90.28%) are top predictive positive impacts on the performance of hotels, followed by an increase in the overall performance of the companies (84.72%), an increase in customer satisfaction (84.72%), and access to new markets and consumers (84.72%), as indicated by Figure 21. These results show that the responses are in harmony with the following key premises established by the Roadmap for Carbon Neutrality 2050 (RNC 2050)-the long-term strategy for carbon neutrality of the Portuguese economy by 2050. These premisses may allow the increasing number of visitors searching for sustainable alternatives in the hotel industry to see their demands accomplished, allowing access to new markets and consumers (Circular Economy Action Plan, 2020; Dani et al., 2021). These results are also consistent with the conclusions from previous studies (European Environment Agency, 2016; Rizos et al., 2017; Masi, 2017).

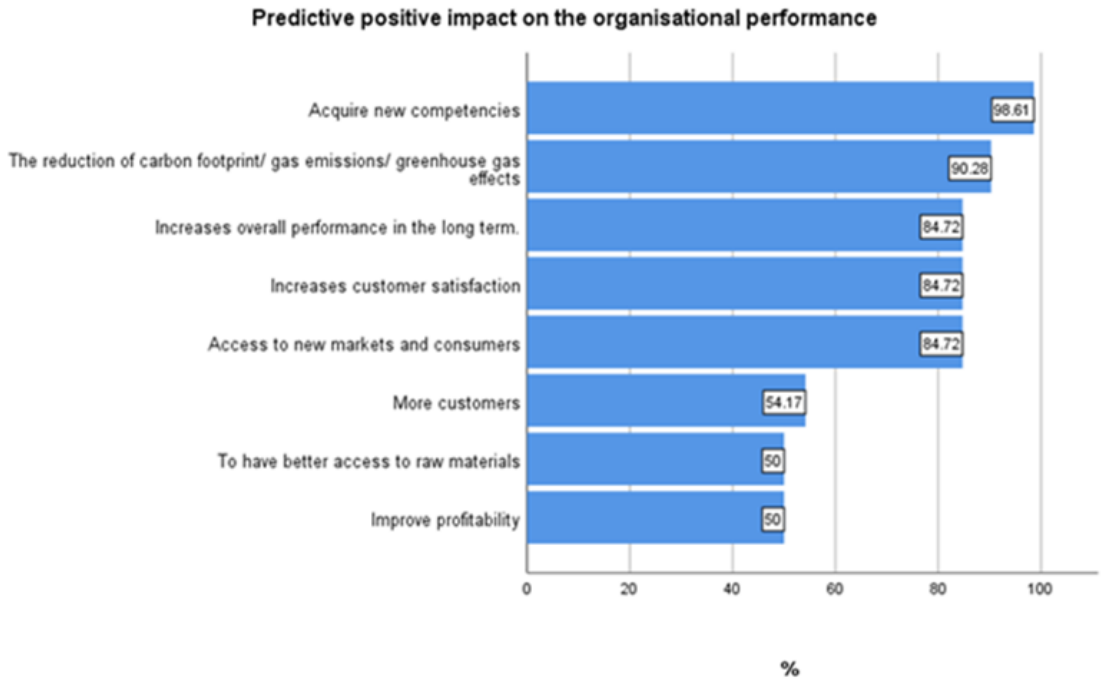


FIGURE 21. CE PREDICTIVE POSITIVE IMPACT ON THE ORGANISATIONAL PERFORMANCE.

6.8. The organisational performance and the hotel industry profile

Throughout this section it is going to be determined if the organisational performance distribution is homogeneous by considering the profile (region where hotels are located, number of stars, hotel scope, and hotel type) of the Portuguese hotel industry. In the light of the theoretical framework, the following research question was examined.

Research Question 6. *Is there a homogeneous organisational performance distribution of the CE hotels profile?*

6.8.1. Hotels Organisational Performance by Region

Concerning the hotels organisational performance relatively to the region, the results obtained indicate a certain homogeneity, except for the regions of the Algarve and the centre of Portugal. The Lisbon Region along with Alentejo can be considered the Portuguese regions where organisational performance of hotels would be enhanced by the implementation of a Circular Economy model, as displayed by Figure 22.

In recent decades there has been an increasing volume of research regarding the impact of companies localisation on their economic performance, however, divergent conclusions have been found. Camisón et al. (2020) considers that there are two poles, researchers who believe there is a positive connection between companies location and performance (Chung and Kalnins, 2001; Marco-Lajara et al., 2018), and others who found that this relationship is negative and unfavourable (Baum and Ingram, 1998; and Marco-Lajara et al. , 2016).

According to Lim and Weaver (2014) and Marco-Lajara et al. (2017) location plays a major role in the economic performance of hotels, given that tourist destinations rely on all the resources they are surrounded by (natural resources, transportation, tourists attractions and landmarks), which are usually attractive to tourists. It also impacts the level of customer demand, and even market structure, as it allows hotels to enhance competitive advantage over their competitors (Bull, 1994; Lundberg et al., 1995; Lado-Sestayo, 2016). It also may attract more customers with consistent preferences, which leads hotels to customise and adapt management strategies to the surrounding environment by emphasising the existence of neighbouring natural resources and tourist attractions, which, combined, positively impact customer loyalty, enhances companies market competitiveness and as a consequence business performance (Lim and Weaver, 2014; Cuervo-Cazurra et al., 2014; Lee and Jang, 2015; Zaragoza-Sáez et al., 2020; Maté-Sanchez-Val and Teruel-Gutierrez, 2022). Consequently, hotels rely on the surrounding features to see their economic

efficiency enhanced, which is essential in setting hotels potential performance, as external factors that may impact one company will not affect other located elsewhere (Bonetti et al., 2006; Yang et al., 2011; Lim and Weaver, 2014).

In recent decades, Lisbon has become a trendy and popular city destination, a place with mild weather to visit throughout the entire year. Embraced by seven hills, this walkable city offers a fascinating alternative to Europe's most captivating capitals, mainly due to its unmatching conditions to create value proposition. These indicates that this region has exceptional and unique conditions that allow the creation and development of value proposition. Lisbon presents attractive tourism core products (nature tourism, water-sports tourism, religious tourism, health and well-being, along with other diverse factors) that promote regional development and also a specific aptitude to create wealth and jobs, which strives a domino effect on the Portuguese economy (Entidade Regional do Turismo de Lisboa [ERT], 2015).

Recently, tourism promotional strategies and policies have allowed this sector to grow at an unprecedented pace, positioning itself as one of the fastest growing destination cities in Europe, with several World Travel Awards attributed since 2009. It also proposes tourism oriented products that promote regional development, allowing the creation of jobs and wealth, which has a domino effect on the Portuguese economy (ERT, Lisboa, 2015).

Alentejo is vast and rich concerning its historical, cultural (architectural and archaeological) and intangible heritage (gastronomy, wine, music, and folklore), which have allowed to reinforce its visibility nationally and internationally (Costa, 2021). It represents the real Portuguese authenticity. Tourists find uncrowded tourists attractions and a lifestyle that has barely changed in decades. Tourism in the Alentejo region has expanded in the last decades, reflecting an increasing awareness regarding its natural resources as tourists' destination.

Hoteliers recognise that this region has a great potential, inpsite of having to deal with increasing human and physical desertification and climate change, to see its endogenous natural resources appreciated and to be able to handle the possible environmental hazards and social risks. Enhancing the transition to a Circular Economy may assist Alentejo achieving one of its major goals which is to restore natural ecosystems, reduce CO_2 emissions, and reduce natural capital and biodiversity loss. Circular Economy initiatives and projects which involve a large number of regional and national stakeholders are already in progress, in order to discuss and delineate the guidelines in which the implementation of Circular Economy will rely (CCDR Alentejo, 2020).

The hotel industry is strongly rooted in local regional conditions, as available resources are a major input not only for those regions but also for businesses that seek tourism related development.

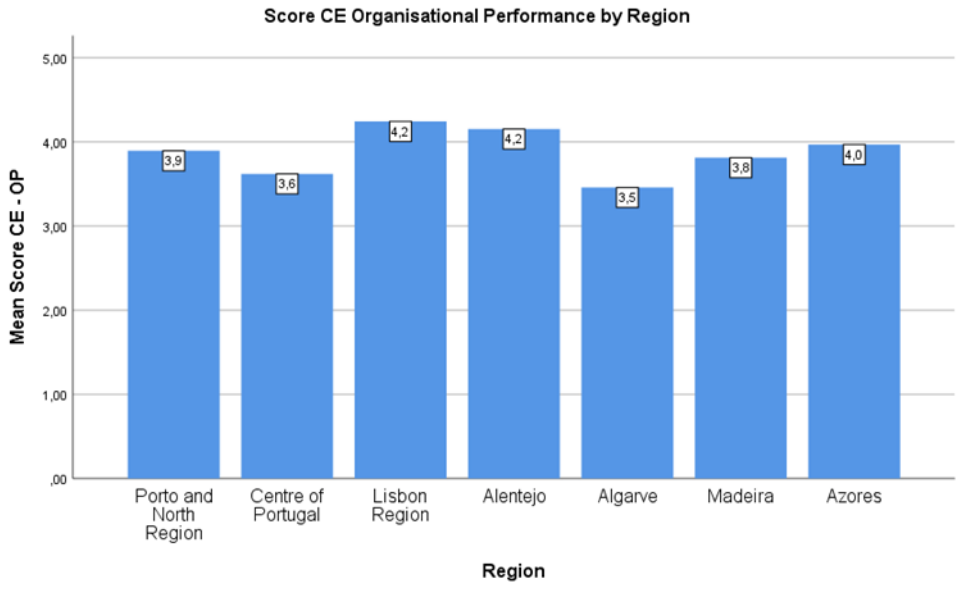


FIGURE 22. CE BENEFITS BY REGION.

6.8.2. Organisational Performance and the Hotels Star categorization

With respect to the organisational performance and the hotels star categorization, the present study's findings show a that there is homogeneity, except for the one-star and two-star hotels, whereas five-star hotels would have the best performance considering the implementation of a Circular Economy model (mean score of 4.2) as displayed by Figure 23. This demonstrates that companies rated with higher star categories are expected to be better performers, which clearly results from the fact that these companies are linked to foreign partners, who provide more qualified and more modern management policies as well as technology, along with foreign guests with high purchasing capacities, as indicated by previous research (Mohsin et al., 2019).

Star rating in the hotel industry are used worldwide and certify service and quality of the accommodation companies. The unique increase in tourism demand for accommodation in the last decades has been putting pressure on companies as regards service and product quality, mainly by competing booking platforms.

In this sense, star ratings stand out as benchmarks used to measure the quality of services provided by hotels, which have a direct impact on hotels business, management, and also on guests (Huang et al., 2018; Mohsin, 2019).

Historically, the prime indicator of the quality of a hotel and scope of services is star rating, which, along with hotel rates, allow guests to assess the quality of the services provided (Huang et al., 2018; World Tourism Organization, 2018; Mohsin, 2019).

Nevertheless, the star rating system is more than ever under constrain due to lack of relevance relatively to the needs of contemporary travellers. With the intention of assisting travellers track down the best hotel that suits their purposes, this star system is progressively getting dissociated from how individuals and business customers assess hotels. These no longer prioritise star ratings when looking for a hotel but commonly

examine the available options based on criteria as price or better rate, online reviews, location, trip type, and even particular amenities (Pine and Philips, 2005; Mohsin et al., 2019).

Commonly hotels are classified by a rating system that ranges from 1 to 5 stars, with 1-star hotels offering a very elementary quality of services, whereas a 5-star hotel supplies a significantly high service quality (Ariffin and Maghzi, 2012).

According to evidence, the Portuguese hotels with higher star category demonstrate a higher level of innovation, just like the implementation of a Circular Economy model. These hotels also have to be in agreement with specific technical requirements, they are commonly bigger and frequently part of international hotel chains, which grants access to different kinds of resources, knowledge, and to profit from economies of scales that promote the implementation of innovative approaches, which is in line with previous research (Orfila-Sintes and Mattsson, 2009).

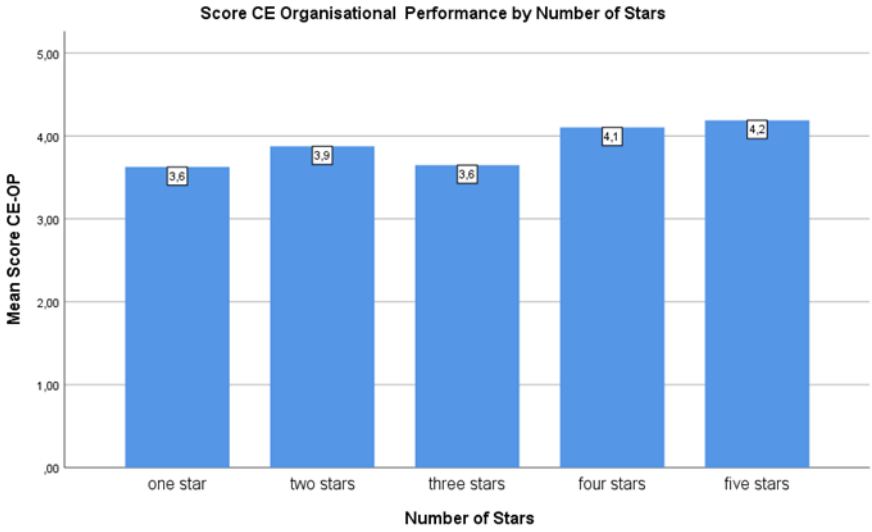


FIGURE 23. ORGANISATIONAL PERFORMANCE OF HOTELS BY NUMBER OF STARS.

6.8.3. Organisational Performance and the Hotels Scope

Concerning the *Hotel Scope*, findings demonstrate homogeneity, with *International Companies* standing out with a mean score of 4.3. This may indicate that the implementation of a circular approach will definitely impact the organisational performance of their companies, as displayed by Figure 24.

Although, there is limited research on this correlation within the hotel industry, it is possible to conclude that companies which operate within the hotel industry are established in different contexts globally, thus they are susceptible to meaningful cultural differences, which may also be translated into a unique management culture (Beydilli and Kurt, 2020).

Additionally, consumers are increasingly aware and more conscious relatively to a more sustainable environment, and they believe companies also have the responsibility for enhancing positive development, and that brands and also governments ought to promote the transition. Consumers are also predisposed to paying more when protecting nature and the environment is a provided commitment, and so, they expect that services and strategies implemented by hotels are replicated by those that are part of the same chain or brand worldwide. The results obtained show consistency with the ones obtained by previous studies which indicate that environmental conscious consumers are more willing to experience and buy eco-friendly products and services in spite of their higher costs (Laroche et al., 2001; Martinez et al., 2019). It is also a fact that environmental approaches considered by companies are playing a growing role in the tourism industry, with innumerable business implementing environmental certification programmes (Lee at al., 2017; Chung, 2020).

Portugal has witnessed an accelerated development of the tourism industry and consequently of the hotel offer, in the last decades. This exponential and dynamic growth has hurried the brand development of national companies, which allows these hotels to profit to a considerable extent. Nevertheless, national brands face increasingly competition

from international brands (Schuckert et al., 2019). International companies benefit from great reputation and commonly apply assertive marketing strategies and sales techniques (Ye et al., 2009; Chon et al., 2013; Goh et al., 2013).

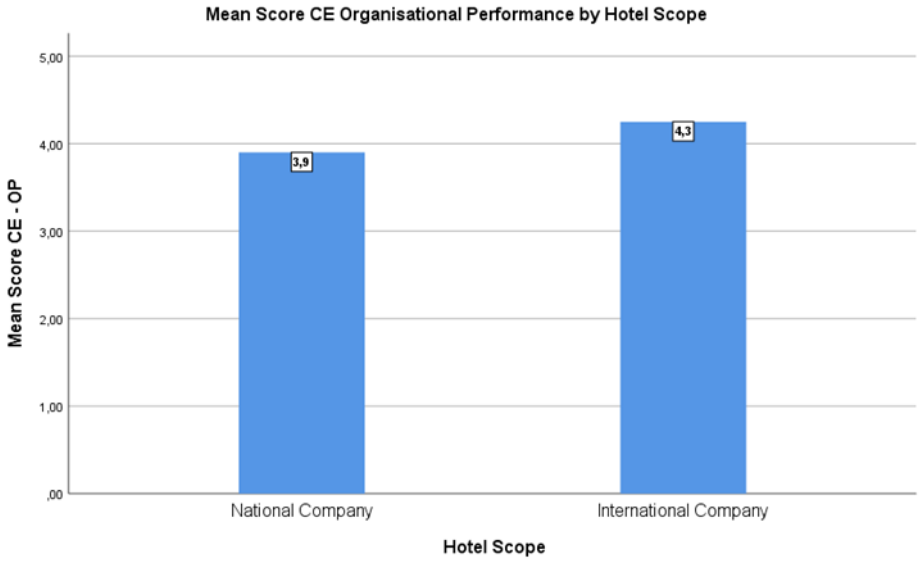


FIGURE 24. ORGANISATIONAL PERFORMANCE OF HOTELS BY *HOTEL SCOPE*.

The results displayed above also indicate that international companies rated with a higher star categorization consider financial performance as one of the advantages of implementing measures and practices that allow them to be more sustainable environmentally. Bigger companies are more willing to adopt environmental practices and to investing in communicating these same practices to their customers, who are increasingly aware concerning sustainable environmental practices and also more demanding to put them into practice (Calisto et al., 2021).

6.8.4. Organisational Performance and the Hotel Type

Hotels performance measurement is presented as a process that allows businesses to assess their attainment of goals and objectives, it assists companies in obtaining customer satisfaction, it allows progress monitoring, to measure procedures and activities, and encourages change (Enoma and Allen, 2007; Pit and Trucker, 2008; kavrakov, 2015).

The performance of hotels that are already on the path to implement Circular Economy has been poorly researched, and theoretical studies referring to the hotel performance are scarce. The vast majority of the research conducted is based on empirical analysis supported on general management literature (Bozic and Cvelbar, 2018).

Relatively to the results of the aforementioned questionnaire regarding the *Hotel Type*, it is visible that there is homogeneity as the organisational performance of hotels that are part of hotel chains is strengthened due to the implementation of a CE approach, as they obtained the highest mean score (4.0), as indicated by Figure 25.

Hotels which are part of hotel chains generally comply with specialised regulations required by brands, mainly by the parent company, and also apply international standard business and management techniques. These allow hotels to have a legitimate access to expertise, information, and advantages that enables them to put into practice alternative approaches, and strategies that allow them to succeed and increase the overall resilience and at the same time achieve best performance levels (Pine and Philips, 2005; Orfila-Sintes and Mattsson, 2009).

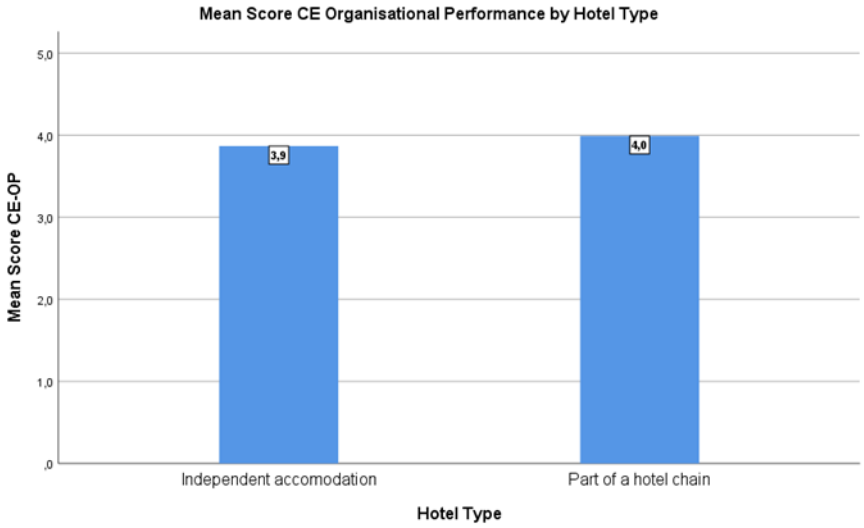


FIGURE 25. ORGANISATIONAL PERFORMANCE OF HOTELS BY *HOTEL TYPE*.

6.9. CE implementation and the Organisational Performance – Correlation analysis

Throughout this section a correlation analysis between each pair of items of the dimension (*Organisational Performance* and CE *Awareness*, CE *Attitude [*CE *Measures* and CE *Initiatives]*, CE *Benefits*, CE *Enablers*, and CE *Challenges*) is presented. Kendal's tau-b correlation coefficient was used (ranging between -1 and 1, values less than + or - 0.10: very weak; + or -0.10 to 0.19: weak; + or - 0.20 to 0.29: moderate; + or - 0.30 or above: strong). To assist this analysis, as there were several coefficients gathered, a Heatmap plot, which is a graphical representation of data that employs a system of dark-to-light colour scale to represent different values, is displayed. Considering the conceptual framework, the following hypothesis was tested.

Hypothesis 1. *There is a relationship between the implementation of CE and the organizational performance of hotels (overall performance).*

Supported

6.9.1. CE Awareness and CE Organisational Performance

A correlation analysis between dimension *CE Awareness* (CE-A) and the *CE Organisational Performance* (CE-OP) is displayed by Figure 26. It shows that the Kendal's tau-b coefficients ranged between 0.001 and 0.466. The highest values were obtained between *Refurbish* (CE-A) and *To have better access to raw materials* (CE-OP) (Tau-b = 0.466); and *Reuse* (CE-A) and *The reduction of carbon footprint* (CE-OP) (Tau-b = 0.463). The items *The reduction of carbon footprint* (CE-OP) and *To have better access to raw materials* (CE-OP) obtained moderate to strong values between all items of CE-*Awareness.* These results indicate that hotels are aware of the Refurbish R-Principle (CE *Awareness* dimension) and its correlation with the performance of the business. The results also indicate that Refurbish distinguishes itself as a new approach to have access to raw materials (CE *Organisational Performance*), to materials that already exist which are salvaged and reused, and would be part of a final product which is equivalent to the a new one. Refurbishing an item is a process that allows that a product to be restored and updated. It implies upgrading and/or modernising its purpose. Commonly, it does not comprise disassembly of the entire item, but replacing the parts of a multi-component are replaced or even repaired whereas the entire structure is maintained. This means that products and/or their parts are retained across economy for extended periods of time, and their value is preserved or even enhanced, which ultimately enables firms to reduce costs, preserve resources, and manage waste (Reike et al., 2018; Morseletto, 2020).

Reuse is introduced as products, that are still in good conditions and still fulfil their primary function by a different user or owner, second or additional utilisation, which indicates that a reused product maintains its function and singularity (Jayaraman, 2006). The Reuse R-Principle also proposes a strategy that enables the hotels industry to decrease their carbon footprint (CE *Organisational Performance*), to close production loops, and at the same time promote the efficient use of natural resources, along with products value retention. Ultimately it will allow companies to reduce production costs, which is in line with prior research (Reike et al., 2018; Fonseca et al., 2018; Morseletto, 2020).

		CE and organisational performance							
		More customers	The reduction of carbon footprint/ gas emissions/ greenhouse gas effects	Improve profitability	Acquire new competencies	Access to new markets and consumers	To have better access to raw materials	Increases customer satisfaction	Increases overall performance in the long term.
Awareness	Reduce	0,308	0,376	0,354	0,397	0,404	0,320	0,370	0,330
	Reuse	0,254	0,463	0,272	0,308	0,231	0,260	0,267	0,235
	Recycle	0,370	0,380	0,221	0,255	0,401	0,001	0,325	0,197
	Redesign	0,260	0,336	0,308	0,255	0,226	0,346	0,258	0,276
	Rethink	0,282	0,328	0,380	0,255	0,260	0,440	0,287	0,325
	Refurbish	0,305	0,339	0,384	0,314	0,337	0,466	0,264	0,307
	Remanufacture	0,288	0,272	0,318	0,294	0,262	0,437	0,243	0,339
	Repair	0,237	0,388	0,211	0,153	0,173	0,169	0,197	0,162
	Repurpose	0,163	0,417	0,312	0,273	0,272	0,396	0,227	0,309
	Recover	0,276	0,354	0,372	0,237	0,239	0,368	0,242	0,308
	Refuse	0,258	0,355	0,308	0,250	0,215	0,377	0,320	0,301
	Return	0,281	0,360	0,265	0,245	0,267	0,336	0,283	0,239
	Re-Educate	0,127	0,258	0,276	0,199	0,037	0,298	0,130	0,246

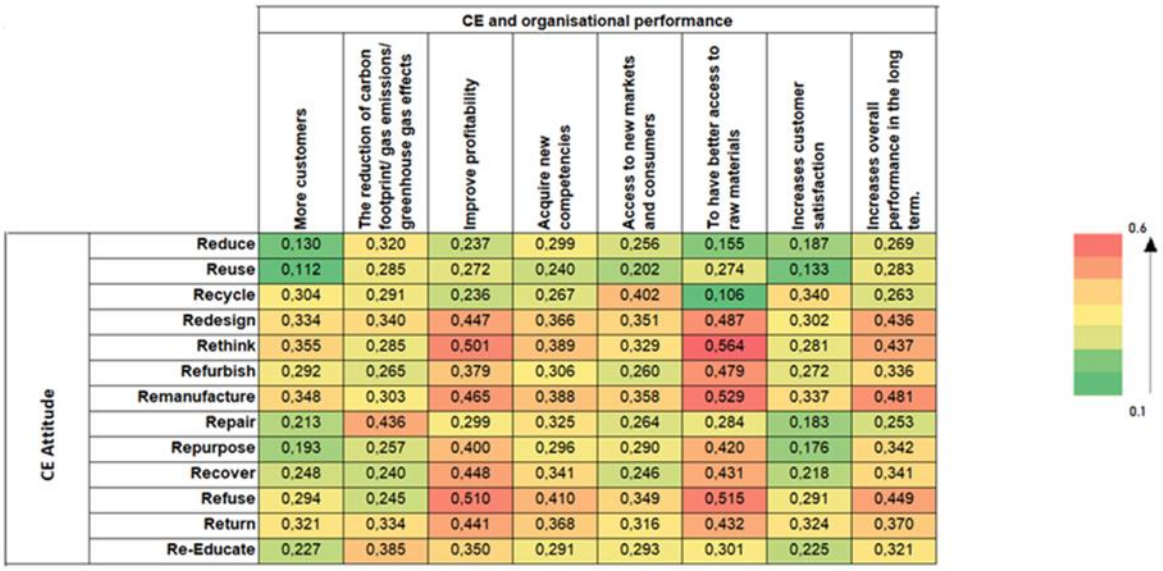
FIGURE 26. HEATMAP PLOT OF KENDAL'S TAU-B CORRELATION COEFFICIENTS BETWEEN THE AWARENESS DIMENSION AND THE ORGANISATIONAL PERFORMANCE OF COMPANIES WHEN CONSIDERING A CE IMPLEMENTATION.

6.9.2. CE Attitude (CE Measures, and CE Initiatives) and CE Organisational Performance

6.9.2.1. CE Attitude and the Organisational Performance

A correlation analysis between the dimension CE *Attitude* (CE-At) and the CE *Organisational Performance* (CE-OP) is provided by Figure 27. Kendal's tau-b coefficients ranged between 0.106 and 0.564. The highest correlation coefficients were recorded between the item *Rethink* (CE-At) and *To have better access to raw materials* (CE-OP) (Tau-b = 0.564); and *Remanufacture* (CE-At) and *To have better access to raw materials* (CE-OP) (Tau-b = 0.529). The items *Refuse* (CE-At) and *To have better access to raw materials* (CE-OP); and *Refuse* (CE-At) and *Improve profitability* (Tau-b = 0.515) and (Tau-b = 510), respectively, gathered moderate to strong values.

The implementation of the Rethink, Remanufacture, and Refuse (*CE Attitude* dimension) R-Principles allows companies to re-examine their necessities and to place the focus on how to decrease the environmental impact of their activities and on how to better access raw materials (*CE Organisational Performance*). Strengthening these R-Principles, may in the long term, decrease the reliance on the use of natural resources and the demand for new materials, by alleviating the pressure on natural environment, conclusions that are consistent with previous research (Masi et al., 2017; Rizos et al., 2017; Velenturf and Purnel, 2021).



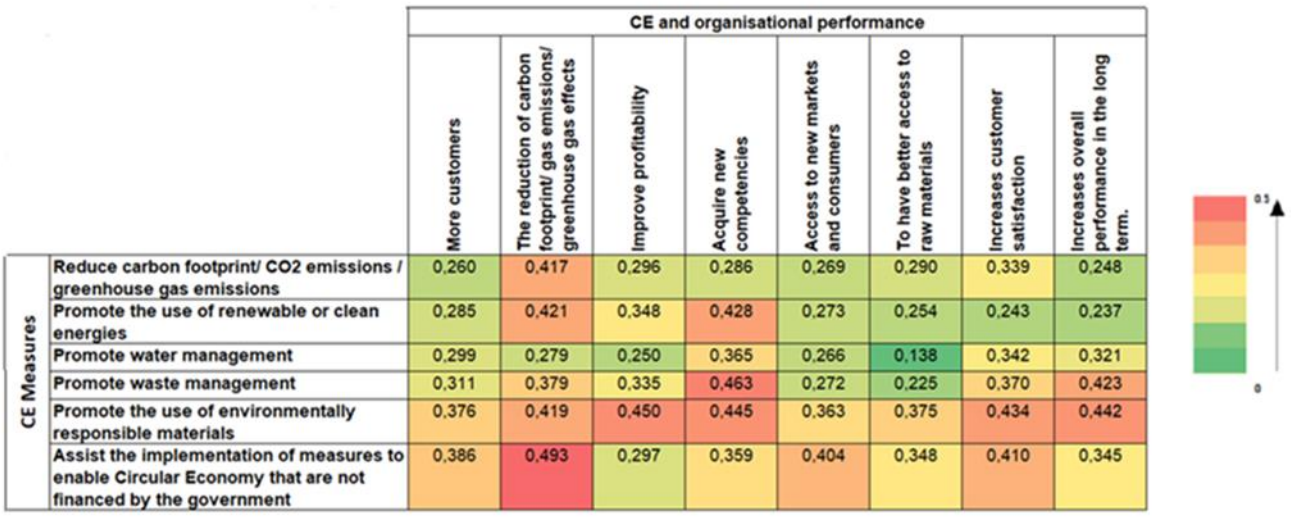
CE Attitude	CE and organisational performance: More customers	The reduction of carbon footprint/ gas emissions/ greenhouse gas effects	Improve profitability	Acquire new competencies	Access to new markets and consumers	To have better access to raw materials	Increases customer satisfaction	Increases overall performance in the long term.
Reduce	0,130	0,320	0,237	0,299	0,256	0,155	0,187	0,269
Reuse	0,112	0,285	0,272	0,240	0,202	0,274	0,133	0,283
Recycle	0,304	0,291	0,236	0,267	0,402	0,106	0,340	0,263
Redesign	0,334	0,340	0,447	0,366	0,351	0,487	0,302	0,436
Rethink	0,355	0,285	0,501	0,389	0,329	0,564	0,281	0,437
Refurbish	0,292	0,265	0,379	0,306	0,260	0,479	0,272	0,336
Remanufacture	0,348	0,303	0,465	0,388	0,358	0,529	0,337	0,481
Repair	0,213	0,436	0,299	0,325	0,264	0,284	0,183	0,253
Repurpose	0,193	0,257	0,400	0,296	0,290	0,420	0,176	0,342
Recover	0,248	0,240	0,448	0,341	0,246	0,431	0,218	0,341
Refuse	0,294	0,245	0,510	0,410	0,349	0,515	0,291	0,449
Return	0,321	0,334	0,441	0,368	0,316	0,432	0,324	0,370
Re-Educate	0,227	0,385	0,350	0,291	0,293	0,301	0,225	0,321

FIGURE 27. HEATMAP PLOT OF KENDAL'S TAU-B CORRELATION COEFFICIENTS BETWEEN THE ATTITUDE DIMENSION AND THE ORGANISATIONAL PERFORMANCE OF THE PARTICIPANT PORTUGUESE HOTELS.

6.9.2.2. CE Measures and CE organisational Performance

Additionally, a correlation analysis between the CE *Measures* (CE-M) and the CE *Organisational Performance* dimension (CE-OP) that promote the implementation of that circular paradigm is considered and displayed by Figure 28. It indicates that Kendal's tau-b coefficients varied between 0.138 and 0.493. The highest values were attained between *Assist the implementation of measures to enable Circular Economy that are not financed by the government (*CE-M) and *The reduction of carbon footprint/ gas emissions/ greenhouse gas effects* (CE-OP) (Tau-b = 0.493), and *Promote waste management* (CE-M) and *Acquire new competencies* (CE-OP) (Tau-b = 0.463); and *Promote the use of environmentally responsible materials* (CE-M) and *Improve profitability* (CE-OP) (Tau-b = 0.450). The pair *Promote the use of environmentally responsible materials* (CE-M) and *Acquire new competencies* (CE-OP); and *Promote the use of environmentally responsible materials* (CE-M) and *Increases overall performance in the long term* (CE-OP) (Tau-b = 0.445) and (Tau-b = 0.442), respectively, obtained moderate to strong values.

Of the analysis of Figure 28, it is concluded that the questionnaire respondents are aware of the measures that enhance the implementation Circular Economy strategies that are not financed by the government (CE Measures dimension), particularly the ones that enable the reduction of the companies' carbon footprint (CE Organisational Performance). Firms are not willing to wait for governments support to implement measures that enhance the reduction of CO_2 emissions, or to properly manage waste, they commonly are proactive and make investments in new competencies. The results obtained also indicate that promoting the utilisation of sustainable materials and the efficient management of waste presupposes acquiring new skills and competencies, and at some point in the future consider "waste as a resource" (Hollins et al., 2017:3), as examined by previous research (Kirchherr, 2017; Fonseca et al, 2018).



		CE and organisational performance							
		More customers	The reduction of carbon footprint/ gas emissions/ greenhouse gas effects	Improve profitability	Acquire new competencies	Access to new markets and consumers	To have better access to raw materials	Increases customer satisfaction	Increases overall performance in the long term.
CE Measures	Reduce carbon footprint/ CO2 emissions / greenhouse gas emissions	0,260	0,417	0,296	0,286	0,269	0,290	0,339	0,248
	Promote the use of renewable or clean energies	0,285	0,421	0,348	0,428	0,273	0,254	0,243	0,237
	Promote water management	0,299	0,279	0,250	0,365	0,266	0,138	0,342	0,321
	Promote waste management	0,311	0,379	0,335	0,463	0,272	0,225	0,370	0,423
	Promote the use of environmentally responsible materials	0,376	0,419	0,450	0,445	0,363	0,375	0,434	0,442
	Assist the implementation of measures to enable Circular Economy that are not financed by the government	0,386	0,493	0,297	0,359	0,404	0,348	0,410	0,345

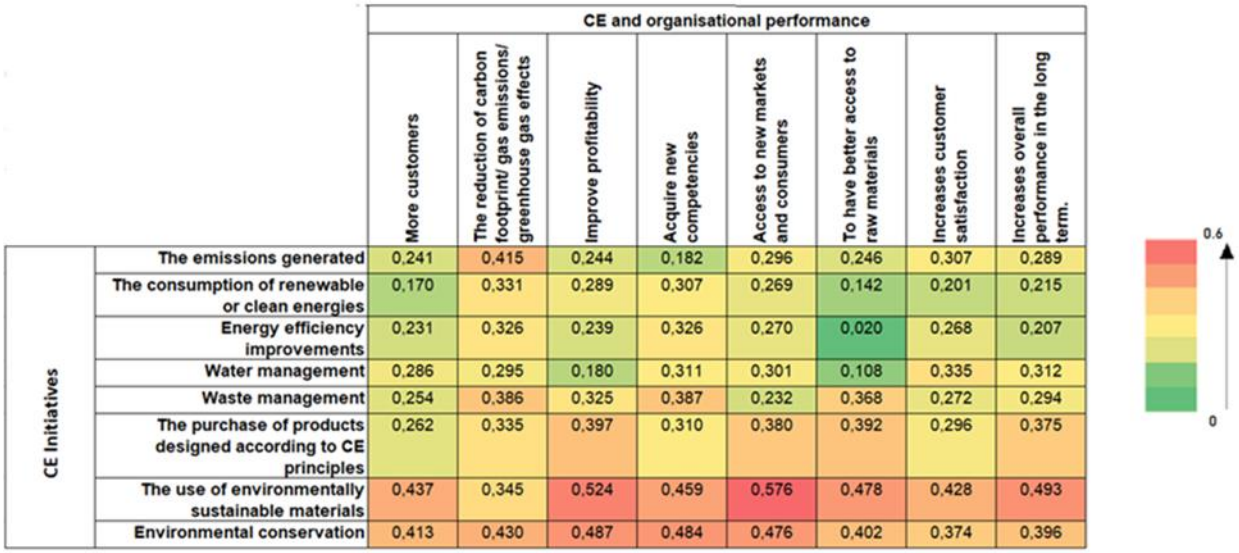
FIGURE 28. HEATMAP PLOT OF KENDAL'S TAU-B CORRELATION COEFFICIENTS BETWEEN THE MEASURES DIMENSION AND THE ORGANISATIONAL PERFORMANCE OF COMPANIES WHEN CONSIDERING A CE IMPLEMENTATION.

6.9.2.3. CE Initiatives and CE Organisational Performance

A correlation analysis between the CE *Initiatives* (CE-I) and the CE *Organisational Performance* (CE-OP) is provided by Figure 29. The results show that Kendal's tau-b

coefficients ranged between 0.020 and 0.576. The highest correlation coefficients were between the item *The use of environmentally sustainable materials* (CE-I) and *Access to new markets and consumers* (CE-OP) (Tau-b = 0.576); and the item *The use of environmentally sustainable materials* (CE-I) and *Improve profitability* (CE-OP) (Tau-b = 0.524). The items *The use of environmentally sustainable materials* (CE-I) and *Increases overall performance in the long term* (CE-OP) (Tau-b = 0.493); and *Environmental conservation* (CE-I) and *Improve profitability* (CE-OP) (Tau-b = 0.487) obtained moderate to strong coefficient values.

The results displayed by this figure show that the questionnaire participants believe that the use of environmentally sustainable materials (CE *Initiative*s dimension) will allow them to access and conquer new markets and consumers (*Organisational Performance*). Contemporary consumers are aware that their consumption model is negatively impacting the environment and that an innovative transformation and transition is mandatory. However, the quest for sustainability, and the environmental effects of the contemporary production and consumption model are no longer the driving force regarding consumption patterns, but are beginning to materialise among those which are generally associated with consumption drivers alongside with products' prices, usefulness, availability, traditions, values, conventions and also peer pressure.



CE Initiatives	CE and organisational performance: More customers	The reduction of carbon footprint/ gas emissions/ greenhouse gas effects	Improve profitability	Acquire new competencies	Access to new markets and consumers	To have better access to raw materials	Increases customer satisfaction	Increases overall performance in the long term.
The emissions generated	0,241	0,415	0,244	0,182	0,296	0,246	0,307	0,289
The consumption of renewable or clean energies	0,170	0,331	0,289	0,307	0,269	0,142	0,201	0,215
Energy efficiency improvements	0,231	0,326	0,239	0,326	0,270	0,020	0,268	0,207
Water management	0,286	0,295	0,180	0,311	0,301	0,108	0,335	0,312
Waste management	0,254	0,386	0,325	0,387	0,232	0,368	0,272	0,294
The purchase of products designed according to CE principles	0,262	0,335	0,397	0,310	0,380	0,392	0,296	0,375
The use of environmentally sustainable materials	0,437	0,345	0,524	0,459	0,576	0,478	0,428	0,493
Environmental conservation	0,413	0,430	0,487	0,484	0,476	0,402	0,374	0,396

FIGURE 29. HEATMAP PLOT OF KENDAL'S TAU-B CORRELATION COEFFICIENTS BETWEEN THE *INITIATIVES* DIMENSION AND THE *ORGANISATIONAL PERFORMANCE* OF PORTUGUESE HOTELS.

6.9.3. CE Benefits and CE Organisational Performance

A correlation analysis between dimension *CE Benefits* (CE-B) and the *CE Organisational Performance* (CE-OP) is displayed by Figure 30. The Kendal's tau-b coefficients ranged between 0.198 and 0.552. The highest values were obtained between *Saving costs in the long term* (CE-B) and *Increase overall performance in the long term* (CE-OP) (Tau-b=0.552). These results indicate that companies consider that a CE implementation and its R-Principles will allow them to save costs and create value in the long term through the use and reuse of natural resources as efficiently as possible (McKinsey, 2017). The expected benefits of such actions are to improve overall performance and a favorable reputation among customers. Which will ultimately allow the access to new markets, which is in accordance with previous research (Kok et al., 2013; van Buren et al., 206; EEA, 2016; Rizos et al., 2016; Masi et al., 2017; Rizos et al., 2017).

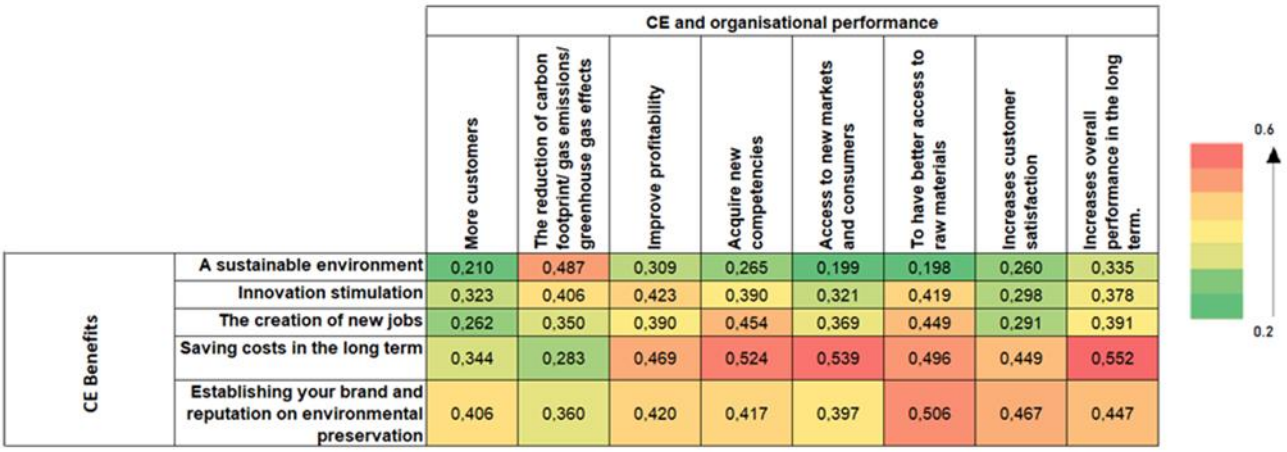


FIGURE 30. HEATMAP PLOT OF KENDAL'S TAU-B CORRELATION COEFFICIENTS BETWEEN THE BENEFITS DIMENSION AND THE ORGANISATIONAL PERFORMANCE OF COMPANIES WHEN CONSIDERING A CE IMPLEMENTATION.

6.9.4. CE Enablers and CE Organisational Performance

In addition, a correlation scrutiny regarding the CE *Enablers* (CE-E) and the CE *Organisational Performance* dimension (CE-OP) is displayed by Figure 31. The Kendal's tau-b coefficients range between -0.019 and 0.479. The highest values are considered between *Governmental CE's ecosystems support* (CE-E) and *Acquire new competencies* (CE-OP) (Tau-be=0.479).

A CE paradigm is an alternative to the current economic system, in which governments are considered the major stakeholders that have the capacity to encourage sustainable development by promoting awareness strategies along with training, educational and research strategies, as indicated by previous research (Mathiyazhagan et al, 2013; van Buren et al., 2016). Governmental policies, actions, legislation, regulations play a significant role as they are crucial to the development of CE strategies. According to Lewandowski (2016), governments should support companies' financial initiatives, provide technical support, develop and promote motivating policies, develop collaboration platforms, and also monitor and audit the supply chain so as to enhance transparency.

Due to these actions, businesses would have the opportunity to acquire new competencies that would lead them to improve their overall performance.

		CE and organisational performance							
		More customers	The reduction of carbon footprint/ gas emissions/ greenhouse gas effects	Improve profitability	Acquire new competencies	Access to new markets and consumers	To have better access to raw materials	Increases customer satisfaction	Increases overall performance in the long term.
CE Enablers	Governmental initiatives to support the implementation of CE Principles	0,328	0,317	0,275	0,351	0,392	0,113	0,331	0,188
	Governmental financial support	0,186	0,261	0,113	0,258	0,215	-0,019	0,321	0,165
	Governmental training courses support	0,187	0,270	0,096	0,270	0,270	0,047	0,227	0,126
	Governmental CE's ecosystems support	0,290	0,290	0,255	0,479	0,332	0,326	0,301	0,377
	Tax reduction to support companies that implement CE principles	0,198	0,201	0,025	0,318	0,277	0,042	0,301	0,186
	National awareness strategy supported in wide dissemination of the CE concept and its practices	0,104	0,274	0,266	0,411	0,324	0,229	0,142	0,342
	National educational and research strategies for the creation and dissemination of knowledge on the concept of CE	0,170	0,246	0,279	0,398	0,308	0,254	0,169	0,429
	Specialized CE consultancy at disposal	0,314	0,166	0,161	0,299	0,322	0,026	0,351	0,193
	Intense collaboration practices between companies	0,348	0,336	0,304	0,356	0,399	0,216	0,349	0,355
	Stronger support from supply chain agents to implement CE principles	0,311	0,378	0,219	0,403	0,262	0,247	0,280	0,253
	Technology to successfully adopt CE	0,265	0,394	0,331	0,326	0,289	0,142	0,247	0,387

FIGURE 31. HEATMAP PLOT OF KENDAL'S TAU-B CORRELATION COEFFICIENTS BETWEEN THE *ENABLERS* DIMENSION AND THE *ORGANISATIONAL PERFORMANCE* IN IMPLEMENTING CIRCULAR ECONOMY.

6.9.5. CE Challenges and CE Organisational Performance

Regarding the CE *Challenges* (CE-C) dimension and its correlation to the CE *Organisational Performance* (CE-OP), Kendal's tau-b coefficients range between -0.008 and 0.412, as indicated by Figure 32. The highest values were obtained between *The Use of secondary materials* (CE-C) and *Increase customer satisfaction* (CE-OP) (Tau-b=0.412).

In the last decades climate change and environmental depletion have led hotels to rethink their environmental strategies and to adopt and implement sustainable policies and practices which will mitigate their impact on environment. Stakeholders (companies, customers, governments) are paying increasing attention to how companies are dealing with environmental externalities, and therefore there is an urgent need for this industry to address this type of environmental constrains, as their activities rely on the natural

environment to attract customers, who sustain companies' existence. So as to attract customers and enhance growth, profit, and overall performance hotels are implementing stronger measures in order to increase customers and stakeholders' awareness, and also satisfaction (Fonseca et al., 2018; Khatter et al., 2019).

		CE and organisational performance							
		More customers	The reduction of carbon footprint/ gas emissions/ greenhouse gas effects	Improve profitability	Acquire new competencies	Access to new markets and consumers	To have better access to raw materials	Increases customer satisfaction	Increases overall performance in the long term.
CE Challenges	Lack of knowledge on the CE	0,203	0,198	0,138	0,261	0,281	0,029	0,234	0,216
	Lack of interest on the CE concept and principles	0,115	0,190	0,127	0,191	0,072	0,035	0,213	0,205
	Lack of investment	0,117	0,090	0,113	0,172	0,223	0,053	0,261	0,010
	Lack of time to implement it	0,080	0,180	0,115	0,187	0,248	-0,014	0,190	0,075
	Lack of human resources	0,131	0,031	0,098	0,176	0,207	0,061	0,194	0,054
	Lack of governmental support	0,157	0,114	-0,065	0,127	0,210	-0,161	0,339	0,092
	Lack of infrastructures support	0,136	0,029	-0,012	0,171	0,156	-0,139	0,201	0,094
	The low value of products at end of life	0,149	0,151	0,123	0,355	0,221	0,126	0,188	0,214
	Policies focused on waste treatment in detriment of the R – Principles	0,254	0,086	-0,025	0,245	0,190	-0,014	0,337	0,112
	Lack of incentive to design circular products	0,095	0,110	-0,008	0,243	0,147	-0,060	0,086	0,056
	Lack of market mechanisms to promote waste recovery	0,112	0,072	0,051	0,193	0,169	-0,072	0,143	0,074
	Lack of CE specific legislation	0,190	0,056	0,073	0,236	0,244	-0,016	0,211	0,129
	Price-quality ratio of the outcomes	0,101	0,190	0,080	0,224	0,158	0,165	0,163	0,183
	It is expensive to implement CE's principles	0,206	0,175	0,032	0,177	0,142	0,068	0,324	0,158
	Resistance to the adoption of new business models	0,191	0,044	0,122	0,283	0,257	0,155	0,293	0,133
	The use of secondary materials	0,231	0,106	0,246	0,348	0,315	0,319	0,412	0,363
	Perceived benefits	0,186	0,239	0,158	0,349	0,268	0,044	0,308	0,132

FIGURE 32. HEATMAP PLOT OF KENDAL'S TAU-B CORRELATION COEFFICIENTS BETWEEN THE CHALLENGES DIMENSION AND THE ORGANISATIONAL PERFORMANCE WHEN CONSIDERING A CE PARADIGM IMPLEMENTATION.

6.10. Conclusions from the results and data analysis

The main goal of this chapter was to analyse the data collected and to examine the findings in accordance with the conceptual framework and the research questions and hypotheses developed previously. In this regard, this section displays an analysis of the aforementioned findings.

Concerning the first research question, RQ1 – *Is the Portuguese hotel industry aware of Circular Economy?*, the results of this research demonstrate that there is awareness

among the companies that participated in the study, regarding the Circular Economy concept and its R-Principles, with particular significance on the Reduce, Reuse, Recycle, and Repair R-Principles, which are the centre of attention of this industry's environmental strategy holistic approach (Kirchherr, 2017; Fonseca et al., 2018; Ioannidis, et al., 2021).

The results also indicate that currently businesses emphasise the Reuse R-Principle as a strategy to allow to counterbalance natural resources demand and supply. The lifetime of an item can be extended by resorting to Reuse, which means that its value can be maintained prolonged periods of time and their environmental impact mitigated (EMF, 2015; Korhonen et al., 2018). However, currently the focus has also been placed on the other R-Principles, with shorter loop options which permit the highest retention value of natural resources through several life cycles (Reike et al., 2018). Additionally, the promotion of the use of environmentally responsible materials, as well as waste, energy, and water management, recycling, along with cleaning management practices, the education and training of staff concerning more sustainable strategies, and towel and bed linen programmes, are being contemplated.

Regarding research question two, RQ2 – *Is the Portuguese hotel industry implementing Circular Economy*?, the results indicate that hotel managers are conscious of strategies that enable the implementation of a Circular Economy model by implementing strategies/ measures that allow the hotel industry to reduce its carbon footprint is not an easy task, and the lack of awareness, along with the lack of initiative and support, and also the risks of the investment may put that implementation at risk (Chan, 2021). Hoteliers acknowledge that they are part of the solution to decarbonisation, and that it can generate benefits by reducing the operational costs. Increased awareness regarding environmental issues is modifying companies' corporate responsibility and also customers' expectations and accelerating companies response to climate emergency. The HOSPES programme is

a good example of circular strategies of a particular business model, the Portuguese hotel industry.

Relatively to research question three, RQ3 – *What are the challenges that the hotel industry addresses to implement Circular Economy*?, the findings show that the most significant challenges identified by the participants relate to the lack of investment in the implementation of CE approaches, on policies mainly focused and directed to waste treatment instead of waste prevention and the strategies involving CE R-Principles, and finally, it was also stressed out the lack of incentives to design circular products.

With respect to research question four, RQ4 – *What are the benefits of a Circular Economy implementation*?, the results confirmed that a Circular Economy approach is beneficial allowing companies to pursue environmental sustainability, save costs, stimulate innovation and job creation. Respondents consider that supply agents ought to provide stronger support throughout CE transition and implementation, specialised consultancy and training, a CE national awareness strategy, tax reduction, and governmental support. The lack of investment in CE implementation, the investment in waste policies, and the lack of incentives to design circular products were also highlighted. The predictive positive impacts of CE were acquiring new competencies, companies' CO_2 reduction, companies' performance improvement, customer satisfaction and new markets and consumers access.

Furthermore, the participant Portuguese hoteliers considered extremely beneficial an economic approach based on circularity as it would allow to establish their brands as those that are making progress concerning environmental sustainability, and the creation of the HOPES programme is a conclusive evidence that this industry is taking the first steps towards circularity. The findings also highlight the fact that the transition to a circular paradigm will save costs in the long term and also stimulate innovation, which will ultimately enable job creation.

Reducing the exhaustion of raw materials by refurbishing products and production and consumption systems is a key strategy to a more circular economy, and that the decoupling of economic growth from resource use, may allow companies to benefit from a sustainable supply of these materials.

In addition to the environmental benefits of transitioning to a Circular Economy model, the potential to generate employment opportunities in local communities is also stressed out (Yuan et al., 2006; Park et al., 2010; Geng et al., 2012; EMF, 2013), which is in accordance with the predictable organisational changes in the economy, moving from resource-intensive economy to a labour-intensive one.

With regard to research question five, RQ5 – *Which initiatives would enable a Circular Economy Implementation*?, the findings indicate that the use of environmentally sustainable products is thought to be one of the initiatives that may enable companies to have access to new markets and consumers, and ultimately to increase profitability. Currently, numerous companies have started to label themselves as being environmentally friendly and to offer products and services that have a smaller impact on the environment and provide benefits to customers. Others have also adopted the concept of cleaner production, a new and preventive strategy that enables resources, product, services and processes efficiency, reducing the threats to environment and people (Bai et al., 2015), so that consumers' needs, and demands are met in an ecological manner by mitigating pollutants and preserving natural resources (Hojnik, et al., 2019). The companies within the hotel sector that seek to implement sustainability initiatives act in the first place on financial reasons, in order to achieve competitive benefits, therefore the emphasis is more on reducing the consumption of energy and water and waste treatment, whereas environmental and social challenges are often not taken into account (Girard and Nocca, 2017).

Respondents also consider a stronger support from supply agents in the transition and implementation phases, specialised consultancy at disposal, and the setting up of a national awareness strategy regarding the dissemination of CE concept, and already established practices as significant enablers in adopting CE in their companies. Additional significant enablers ranked by the respondents involved governmental policies, such as tax reduction to support companies that wish to make the transition, training provided by governmental entities, and also governmental financial support.

Concerning research question six, RQ6 – *Is there a homogeneous organisational performance distribution of the CE hotels profile?*, results indicate overall homogeneity. Five-star hotels that belong to international hotel chains situated in the Lisbon region are more aware of the concept of Circular Economy and also put into practice some CE R-Principles, pursuing a more proactive attitude.

Findings also indicate that four and five-star hotels that are part of international hotel chains located in the Lisbon region and Alentejo consider that there are more benefits in implementing Circular Economy and recognise the measures that would encourage companies to implement CE, they are also more willing to contemplate CE and its benefits as an alternative approach to the linear economic model, and they are more engaged in pursuing such a transition or are already taking the first steps towards the transition.

In relation to the research hypothesis one, H1 – *There is a relationship between the implementation of Circular Economy and the organisational performance of hotels (overall performance)?*, findings show that the participant companies consider that a CE implementation will allow to save costs in the future, and increase the overall performance of the company also in the long term. These companies regard governmental CE's ecosystem support as a strategy to acquire new competencies, i.e., governments, as stakeholders in the transition from a linear economic model to a circular one, ought to act as catalysts to a successful and sustainable implementation, finding the mechanisms to

enhance the integration of CE in supply chains management, so that companies are able to find an economic, social and environmental equilibrium (van Buren, 2016).

The results also indicate that the participant companies reckon that the use of secondary materials is a procedure that will definitely increase customer satisfaction. This suggests that the hoteliers are in accordance with the CE principle of resource efficiency "produce more with less" (Linder and Williander, 2017), that determines the reuse or recycling of resources, the effective use of derivatives, and the transformation of waste into new resources, thus reducing waste generation (Gusmerotti et al., 2019; Tura et al, 2019).

Participants also consider that acquiring new competencies and the reduction of carbon footprint/ greenhouse gas effects are the most important positive predictive repercussions of the implementation of Circular Economy in those companies, followed closely by an increase in the companies' overall performance, customer satisfaction as well as access to new markets and consumers. These are in compliance with the European Green Deal (2019) that impelled a concerted strategy so that climate neutrality can be achieved by 2050 by promoting a climate-neutral, resource efficient economic model. To accomplish such goals, it is mandatory that the transition to a more regenerative economic model is accelerated, the consumption of natural resources is kept within the planetary boundaries, and follow a circular production and consumption pattern in the next decades.

The implementation of a Circular Economy model would offer the hotel industry the opportunity to follow a path towards a sustainable and resilient future. This industry has a major role to play in the transition to a more circular paradigm, as the travel and tourism sector is profoundly correlated with and dependent of various and fundamental resource flows, commodity chains, and assets. Travel and tourism stakeholders can act as catalysts by enabling circularity and ultimately benefit from a stronger economic system that creates circular shared value, and also capture more value from important supply chains.

Chapter 7 - Conclusions

7.0. Introduction

The main goal of this chapter is concluding the outcomes of this research. The chapter is composed of six sections. The first section displays the purpose of the research, also presented in the introduction chapter, so as to demonstrate a relationship between the research objectives and the research results.

The second section outlines the originality of this research by indicating the features that have not yet been fully investigated and that the present study attempts to examine. The research results brought forth theoretical and managerial implications, which are going to be discussed in the third and fourth sections.

The third section presents the research results which support or challenge the results of previous researches. The main goal of this section is to present empirical evidence relatively to the research questions formulated.

The fourth section discusses the managerial implications, the fifth displays the limitations of the research are presented, and finally, in the sixth section, areas for further research are suggested.

7.1. The research purpose

The aim of this research was to examine the concept of Circular Economy and its R-Principles relatively to the Portuguese hotel industry. It also proposed to explore this industry's awareness and attitude relatively to the implementation of the aforementioned construct. Additionally, it discussed the benefits, the enablers, and the challenges regarding the implementation of Circular Economy in the referred industry and its profile, and the impact of such an implementation on the organisational performance of Portuguese hotels. These constructs were all identified and examined in detail in chapter 2 and 3, where a literature review was outlined. This section allowed the identification of the literature gap, which stands out as the originality of this research.

The conceptual model used for the current research was presented and discussed in chapter 4. The research methodology used to develop this study is displayed in chapter 5, which emphasised the research philosophy adopted, i.e. a positivist approach, and an exploratory and descriptive research design was performed by making use of a questionnaire survey as the data collection method. An online questionnaire was disseminated, via email, to the Portuguese hotel industry, enabling the collection of 78 usable questionnaires. Chapter 6 discussed the results obtained from the empirical research.

The following sections of this chapter focus on the originality of the study, its contribution to knowledge, limitations, and paths for future research.

7.2. The originality of the study

This section displays the gap in the literature and the originality of this study.

For the last decades, the concept of Circular Economy has become increasingly popular among governments and businesses, as an economic model that would allow the enhancement of sustainability, based on a restorative and regenerative production and consumption paradigm (Morseletto, 2020). This has happened particularly in countries such North America, China, Japan, and in some European countries, who are currently investing and promoting Circular Economy strategies and initiatives. So, the published research as increased at a very fast pace. Most of this literature focus on manufacturing and insdustry and is devoted to the development of Circular Economy solutions for products and their proper processes of production. Nevertheless, the service sector, responsible for putting a lot of pressure on the environment, seems to be lacking attention when it comes to the application of Circular Economy principles. CE relevance and implementation by the hotel industry, which is predominantly based on a linear economy, is scarcely researched, and scientific research regarding the implementation of CE and its R-Principles by the Portuguese hotel industry is still vaguely unexplored up to now.

Furthermore, it is apparent some struggling when it comes to the design of a framework explaining how companies can embrace circularity and on how to adapt their business model to this new economic system. Additionally, positioning CE in the strategic management sphere is quite an unexplored territory and additional theoretical and empirical research, which contributes to the development of a framework that allows sharing knowledge on how CE is being implemented in different levels by companies is imperative (Murray et al., 2017). Furthermore, this research fills a gap in literature as the impact of CE on the Portuguese hotel industry organisational performance is quite an unexplored topic, thus justifying the relevance of this investigation.

This research produced theoretical and managerial outcomes, that are going to be discussed in the following section.

7.3. The theoretical implications of this study

This study made a contribution to the body of literature on Circular Economy implementation by the hotel industry. It was the first Circular Economy study performed in the context of Portuguese hotels, thus, providing country-specific data that may be useful for cross-country analogy regarding Circular Economy, although the questionnaire response rate does may not allow generalisation to the Portuguese hotel industry.

The empirical data on awareness on Circular Economy among the respondents indicates that those are aware of this construct and its R-Principles, thus supporting the findings of previous studies. These were related to awareness of CE and/or the perception of different stakeholders groups (e.g. Liu et al., 2009; Lakatos et al., 2016; Adams et al, 2017; Guo et al., 2017; Noohosseini et al, 2017; Perdan et al., 2017; Masi et al., 2018; Fonseca et al., 2018; Ormazabal et al., 2018; Smol et al., 2018; Przywojska et al., 2019; Chang and Hsieh, 2019; Liakos et al., 2019; Benachio et al., 2020; Hossain et al., 2020; Langen et al., 2021), and of the following within the scope of the hotel industry (Julião et al.,

2018; Rodriguez et al., 2020; Cornejo-Ortega and Dagostino, 2020; Sorin and Sivarajah, 2020).

The 3R-Principles (Reduce, Reuse, Recycle) along with Repair, were also highlighted by the results of this study and of previous ones (Kirchherr, 2017; Fonseca et al., 2018; Rodriguez-Antón and Alonso-Almeida, 2019; Ioannidis, et al., 2021).

Furthermore, it also emphasises that this particular group of hotels (questionnaire respondents) already put into practice some initiatives that are in line with a Circular Economy paradigm, namely recycling, reducing water and energy consumption, and cleaning management policies, towel and bed linen programmes, staff and education programmes, green products, certifications, among others, which was also found in hotel context (Alonso-Almeida, 2012; Ghisellini et al., 2015; Vourdoubas, 2016; Alonso-Almeida et al., 2017; Alonso-Almeida et al., 2017; Girard and Nocca, 2017; Manniche et al., 2017; Deselnicu et al., 2018; Vargas-Sánchez, 2018; Fernández-Robin et al., 2019; Florido et al., 2019; Rodriguez-Antón and Alonso Almeida, 2019; Manniche et al., 2021; Costa, 2021; Dani et al, 2021; Ioannidis et al., 2021).

The empirical data also highlighted the benefits that the implementation of Circular Economy would bring to their companies, namely establishing the companies brand and reputation as one that enhances environmental preservation, promoting a sustainable environment, allowing to save cost in long-term, stimulating innovation, and finally the creation of employment, which are also in compliance with previous studies (Yuan et al., 2006; Park et al., 2010; Geng et al., 2012; EMF, 2013; Wijkman and Skanberg, 2015; Jahanshahi, 2018; Wang et al, 2018; Pamfilie et al., 2018; Julião et al., 2018; Berg et al., 2018)

Based on the empirical evidence, the findings confirmed that a stronger support from supply chains throughout the CE implementation process, specialised consultancy on CE at disposal, a national awareness strategy regarding CE and its principles dissemination,

tax reduction for companies that choose to implement CE, governmental training courses, along with governmental financial support, are considered the main enablers to a CE implementation, which are in line with other research (Vendrusculo et al., 2009; van Buren, 2016; Viani et al., 2016; Gnoni et al., 2017; Scur and Barbosa, 2017; De Angelis et al, 2018; Mishra et al., 2018; Farooque et al., 2019; Circular Economy Action Plan, 2020; European Commission, 2020; Morseletto, 2020).

This thesis also contributes to Circular Economy in the hotel industry literature by providing empirical evidence on the challenges that a CE implementation poses. Although a number of companies is already implementing CE strategies, a more comprehensive implementation of circular approaches is necessary. So as to promote the transition, being aware of the challenges is essential. Hoteliers considered the lack of investment in CE approaches, the lack of governmental support, policies focused on waste treatment instead of those focused on the R-Principles, and the lack of incentives to design circular products. These results are supported by previous studies (Geng and Doberstein, 2008; Preston, 2012; Ormazabal et al., 2016; Bocken et al., 2016; Moreno et al., 2016; Rizos, et al., 2016; Stahel, 2016; Ferronato et al., 2018; Grafström and Aasma, 2021; Wang et al, 2022).

The findings of this research have empirical implications at the level of organisational performance as it was possible to conclude that acquiring new competencies and the reduction of the carbon footprint of companies, along with an increase in the companies' overall performance, followed by customer satisfaction and access to new markets and consumers are the predictive positive impact on the organisational performance of hotels, as indicated by previous research (European Environment Agency, 2016; Rizos, 2017; Masi, 2017; Circular Economy Action Plan, 2020; Dani et al., 2021).

Relatively to the relationships between CE implementation and organisational performance, results also revealed some contributions to theory. Hoteliers recognise that the use of secondary materials is a strategy that will definitely increase customer

satisfaction, which is in line with the Circular Economy resource efficiency principle “produce more with less” which enhances the reuse of resources , the effective use of derivatives, the transformation of waste into new and valuable resources, thus reducing waste generation and. Companies have increasingly being focusing on the Reuse R-Principle which enables to balance the demand and supply of natural resources. Products life span can be prolonged through reuse, which means that their value is kept for longer periods of time and their ecological impact minimised disposal, as indicated by previous research (EMF, 2015; Korhonen et al., 2018; van Buren, 2016; Linder and Williander, 2017; Gusmerotti et al., 2019)

From the analysis of the relationship between the hotels profile (hotels’ region, star categorisation, type of company, and hotel scope) and the CE dimensions (awareness, attitude, benefits, enablers, challenges) empirical implications can also be withdrawn. The results indicate that hotels with higher star categorisation (four and five-star hotels), that are part of international hotel chains in the regions of Lisbon and Alentejo consider that a Circular Economy implementation would allow organisational performance of their companies to be strengthened, which is reinforced by previous literature (Orfila-Sintes and Matttson, 2009; Costa, 2021; EMF, 2015; Korhonen et al., 2018).

Finally, this thesis provides a contribution to the current research and literature on Circular Economy in the Portuguese hotel industry. As previously stated, there is no evidence that such study has been previously performed in Portugal, consequently the results of this thesis may be of complement to existing knowledge and provide a basis for future research in the Circular Economy in the hotel industry context.

7.4. The managerial implications of this study

The Portuguese tourism sector in general, which includes the hotel industry, contributes significantly to the Portuguese economy. Circular Economy on this industry is scarce, so literature and research studies on Circular Economy is essential to allow

stakeholders, policymakers, and also researchers who act in the travel and tourism sector, as well as the ones that operate in the hotel industry by assisting in better understanding the importance of Circular Economy and its principles, develop strategies for its implementation foreseeing the potential constrains and challenges, and simultaneously optimise not only the tangible benefits (profits and assets) but also the intangible ones (brand awareness, reputation, originality, synergy).

The findings of this research may assist hotel managers and hotel stakeholders, as it proved that the group of participants are aware of the concept of Circular Economy and its R-Principles and is currently putting into practice some Circular Economy strategies and initiatives.

This research has also highlighted the fact that hotel managers acknowledge that that they are part of the solution to decarbonatization, and that CE implementation can generate benefits (establish their brands and reputation as those that comply with environmental preservation, stimulate innovation, and job creation), which will enable the reduction of the operational costs, allowing companies to become more competitive. Increased awareness regarding environmental issues is modifying companies' corporate responsibility and also the customers' expectations, which has been driving companies response to climate emergency.

The use of environmentally sustainable products is thought to be one of the initiatives that may enable hotels to access new markets and consumers, and ultimately increase profitability. Currently, numerous companies have started to label themselves as being environmentally friendly and to offer products and services that have a smaller impact on the environment and that provide benefits to customers.

Meeting environmental preservation goals is no longer just a compliance requirement. It is considered a business opportunity and ultimately a business requisite that gives companies a competitive advantage, as they are implementing strategies and initiatives that

have progressively become important to customers: environmental preservation. By setting up a solid relationship with customers companies are establishing their own environmental commitments. These customers are willing to pay more when commitments to protect nature and environment are provided, and expect that services and practices adopted by certain hotels are replicated by those that are part of the same chain or brand worldwide.

Based on the empirical evidence, hotels with higher star categorisation (four and five-star hotels) that are part of international hotel chains, located in the regions of Lisbon and Alentejo showed that these hotels show a higher level of innovation, as they have to be consistent with the specific requirements of the parent company. They have access to other sort of resources and knowledge, and they ultimately profit from economies of scale that enhance the implementation of innovative measures, which is in accordance with previous research.

Having innovative Portuguese hotels that comply with environmental preservation and resource conservation is an advantage for a country and a great selling asset, especially because the tourism sector in Portugal has such a significant economic importance.

7.5. Study limitations

It is important to acknowledge that this study was subject of a number of limitations which need to be considered on related future research.

Firstly, the sample collection method, the questionnaire, was disseminated to the Portuguese hotel industry between the 16th of April to the 7th July 2021, referring back to the previous three years. This period referred to a Covid-19 lockdown that closed the country to every kind of tourism-related activities, compelling the temporary cessation of activities in the hotel industry, which, to some extent may have influenced the number of questionnaires returned, 103 surveys. Of these only 78 were usable, as the remaining were unusable as respondents left several questions unanswered. Although this response rate

can be considered as relatively low, it is still considered admissible. Due to the fact that the number of Portuguese hotels that participated in the quantitative approach was small, the generalization of the results to the Portuguese hotel industry is not straightforward. Nevertheless, the empirical evidence provided by these studies can be of use as basis for future research in this area.

Secondly, from the very first days of the dissemination of the questionnaire link it was perceived that it was going to be quite difficult to have a high questionnaire response rate. It can be assumed that there is some kind of survey response fatigue, as it is very common for companies to solicit customer feedback by resorting to questionnaires as a data collection method. Due to this fact, respondents are less disposed of participating.

Thirdly, the information on the Portuguese hotels used to perform this study was taken from platform the visitportugal.com site of the platform of *Turismo de Portugal*, which exhibited some signs of outdating throughout the data collection phase, as various hotel email addresses were duplicated, others had invalid or inactive contact details, and others were related to closed business operations.

Fourthly, from the operationalisation point of view of the data collection, the length of the questionnaire may also constitute a barrier to achieve a higher rate of responses.

Fifthly, the results presented were all based on a quantitative analysis, which can also limit the depth of the research and consequently, it could be beneficial to include a qualitative component composed by in-depth interviews, or even case-studies, for a better knowledge and understanding of the concept of Circular Economy relatively to the Portuguese hotel industry, the main topic under study.

Sixthly, another perceived limitation was the lack of performance indicators to measure the hotels organisational performance following a CE implementation, which stands out as a challenge to the CE implementation. Therefore, performance indicators and from different areas were examined and research was built upon those indicators.

7.6. Contributions

Literature indicates that stakeholders will definitely engage in the transition to a Circular Economy model if it brings them benefits or if it adds value to their companies, with regard to economic return of the investments made, processes development, and products advantages (Porter and Kramer, 2011, 2019; Camilleri, 2020). This will motivate them, and all the parties (creditors, investors, managers, owners) to transition from unsustainable practices to a circular and sustainable production and consumption model (Smol et al., 2015; Bocken et al., 2016; Kacprzak et al., 2017; Bocken et al., 2019). Stakeholders have witnessed that there are economic, social, and environmental benefits that can be withdrawn from the adoption of cleaner production processes and sustainable supply chains (EU, 2020a, 2020b; Ghisellini et al., 2016; Korhonen et al., 2018). For those who are willing and wish to attempt such a transition, some steps forward this new approach have to be considered. The transition phase ought to be considered by all the stakeholders, across the whole tourism chain, together with a vigorous commitment from all the parties involved. In this enterprise local authorities play an important role in promoting and providing adequate measures for hotels with significant environmental performance. These would include fiscal incentives, reduction of administrative obligations, permit validity prolongation, financial guarantees reduction, green public procurement, access to credit and ultimately to funding support. The implementation of such measures would allow companies to adopt the targets defined by CE, the European Union Green deal, the United States of America Green New Deal, and primarily the United Nations SGDs. It would also allow hotels to enhance their environmental performance as well as efficiency, increase profitability by decreasing resource consumption, and engaging in the transformation of destinations, by making them more customer attractive (Zorpas, 2021).

Furthermore, the environmental impact of the overall activities and products ought to be assessed, and regulations respected; environmental goals and targets ought to be

implemented, and an effectively shared with employees, local communities, and ultimately consumers.

Manniche et al. (2018) consider that there are also opportunities for innovation in the building of new and refurbished hotels by resorting to circular technologies; supply chains management ought to be expanded so that hotels would have access to all the materials and products used in the hotel, from hotel furniture to amenities; accessing leasing services instead of ownership-based solutions would also bring benefits; leasing or investing in different and smart energy and water supervising programmes; installing greywater systems will definitely enhance a demand reduction on public water supply, a decrease in the amount of water sent to sewers or treatment systems, and a reduction in fresh water consumption and in long run to cut costs with water supply. Furthermore, the development of feedback control systems staff and customer-oriented would also have a positive impact on the hotels' performance.

7.7. Future research

Based on this thesis, the main suggestion for future research on the Circular Economy domain it would be to develop a longitudinal study.

Additionally, this research has the potential to be applied in other countries so that cross-country comparisons can be made, and also extend it by considering the social, economic, and environmental pillars in a Circular Economy implementation.

Additionally, the assessment of hotels organisational performance after a CE and its R-Principles and practices implementation ought to be considered, and performance indicators established, as their impact on the companies' organisational performance is not yet examined or fully investigated. This would allow the margins of development to be identified and stimulate stakeholders decision-making process. Moreover, reliable and effective assessment models that identify Circular Economy performance and identify

companies as reference in the CE field should be developed so that case studies are available to companies operating in the same sector or subsector.

Future research may also include an evaluation of customers' satisfaction regarding the implementation of Circular Economy model.

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Appendices

Appendix A.

Email Template

Email inviting Hotel Managers to respond to the questionnaire (in Portuguese).

Exmo Sr. Diretor do ……,

o meu nome é Berta Costa e atualmente frequento o doutoramento em Turismo, na Universidade de Sevilha- Espanha, em colaboração com o Instituto Politécnico de Leiria, onde sou docente (Escola Superior de Turismo e Tecnologia do Mar). Neste âmbito, encontro-me a levar a cabo um estudo sobre a **Economia Circular e a sua aplicabilidade prática na indústria hoteleira em Portugal**.

Assim pedia, por favor, a sua colaboração no preenchimento de um questionário sobre este tema cuja duração não deverá ultrapassar os 15 minutos, e na partilha do link para o mesmo pelos seus contactos da área da hotelaria.
O questionário está disponível em:

https://pt.surveymonkey.com/r/NY9PPHZ

A confidencialidade das respostas está garantida e os dados serão apresentados em conjunto com o propósito da investigação. As questões foram formuladas em língua inglesa, uma vez que é a língua da investigação, no entanto poderá recorrer à língua portuguesa para responder às questões abertas.

O preenchimento deste questionário está associado a uma causa social. Ou seja, por cada questionário preenchido a autora desta investigação propõe-se a oferecer um bem alimentar, de higiene ou outro a uma entidade de cariz social. Para o efeito foi designada a instituição InPulsar (www.inpulsar.pt).
A InPulsar - Associação para o Desenvolvimento Comunitário, é uma Instituição Particular de Solidariedade Social, cuja missão é contribuir para a inclusão social e económica de populações em situação de vulnerabilidade e exclusão social, numa perspetiva de proximidade e envolvimento das populações, centrando a sua intervenção no cidadão e nas capacidades da própria comunidade.

Caso tenha alguma dúvida, por favor não hesite em contactar-me.
Grata pela atenção dispensada a este assunto.
Berta Costa

Appendix B. Questionnaire

Introdução

O presente trabalho de investigação insere-se o âmbito do Doutoramento em Turismo, da Universidade de Sevilha – Espanha, em colaboração com o Instituto Politécnico de Leiria. Este estudo tem como objetivo aferir a implementação do conceito de Economia Circular (a consciência, os desafios, os benefícios, os estímulos e as atitudes) na Indústria Hoteleira em Portugal.

A confidencialidade e anonimato das respostas está garantida e os dados serão apresentados em conjunto com o propósito da investigação, sendo respeitado e assegurado o cumprimento das regras decorrentes do Regulamento Geral de Proteção de Dados da União Europeia. Os dados recolhidos serão tratados informaticamente e armazenados numa base de dados específica para o efeito, não sendo partilhados por terceiros durante o período da investigação.

As questões estão formuladas em língua inglesa, uma vez que esta é a língua usada na investigação, podendo, no entanto, recorrer à língua portuguesa para responder às questões abertas.

Este questionário estará disponível por um período de 15 dias e o seu preenchimento terá uma duração máxima aproximada de 15 minutos.

O preenchimento deste questionário está associado a uma causa social. Ou seja, por cada questionário preenchido a autora desta investigação propõe-se a oferecer um bem alimentar, de higiene ou outro a uma entidade de cariz social. Para o efeito foi designada a instituição InPulsar (Leiria).

Agradeço, desde já a sua disponibilidade e colaboração neste trabalho de investigação, encontrando-me ao seu dispor para quaisquer esclarecimentos adicionais que considere necessários.

Berta Costa

Email: berta.costa@ipleiria.pt / berta.jose.costa@gmailcom

Accommodation Profile

Organisation Details

* 1. Hotel name:

* 2. Region

- ○ Alentejo
- ○ Algarve
- ○ Lisbon Region
- ○ Centre of Portugal
- ○ Porto and North Region
- ○ Madeira
- ○ Azores

* 3. Email:

* 4. Respondent's hotel position:

Cópia de Circular Economy and its applicability in the hotel industry

About the Business

* 5. Accommodation stars

- 1 star
- 2 stars
- 3 stars
- 4 stars
- 5 stars
- Not applicable

* 6. Scope

- National company
- International company

* 7. Type of company

- Independent accommodation
- Part of a hotel chain

* 8. Number of rooms offered:

* 9. Number of employees:

In 2018

In 2019

In 2020

* 10. Company categorisation (hotel, resort, ...)

Cópia de Circular Economy and its applicability in the hotel industry

The Circular Economy Awareness

* 11. Please identify which Circular Economy principles are you aware of: (please give your opinion bu using the scale from 1- Not at all aware, to 5- Extremely aware).

	1- Not at all aware	2- Slightly aware	3. Moderately aware	4. Very aware	5. Extremely aware
Reduce- minimise the amount of waste produced; reduce the use of unnecessary packaging, and avoid disposable items.	○	○	○	○	○
Reuse- use items and products as many times as possible.	○	○	○	○	○
Recycle- products are recycled by disassembling components and separating parts.	○	○	○	○	○
Redesign (cradle-to-cradle; long-lasting products)- products are designed and fabricated with a new purpose and with 'long-lasting' design through waste-free industrial processes.	○	○	○	○	○
Rethink- a new and design oriented technique known as 'eco-effectiveness', so as to minimize and dematerialize the material flow system.	○	○	○	○	○
Refurbish- the process that products undergo when upgraded, i.e. parts and components of a bigger framework have to be replaced so that the life cycle of the product is extended.	○	○	○	○	○

	1- Not at all aware	2- Slightly aware	3. Moderately aware	4. Very aware	5. Extremely aware
Remanufacture- the process of repairing a product, starting by setting up an inspection, followed by the product disassembling, cleaning, and repairing, through industrial processes in monitored atmospheres.	○	○	○	○	○
Repair- entend the lifetime of a product by replacing broken or damaged parts.	○	○	○	○	○
Repurpose- the strategy of utilizing discontinued or obsolete parts or components and providing them with a new purpose or another function, enabling these discarded equipments to re-enter a new life cycle.	○	○	○	○	○
Recover- retrieval of materials after landfilling phase.	○	○	○	○	○
Refuse- the refusal to approve packaging, bags or containers whenever they constitute waste; to accept or approve certain production processes; choose to purchase limited quantities of products or reduce its use.	○	○	○	○	○
Return- refers to the throw back of products or components but in an environmentally innocuous way, which may include appropriate treatment and handling or even containment.	○	○	○	○	○
Re-educate- train and educate consumers to change their behaviour towards consumption.	○	○	○	○	○

* 12. Are you aware of any of the following measures that: (Please give your opinion by using the scale from 1 – Not at all aware, to 5 – Extremely aware).

	1- Not at all aware	2- Slightly aware	3- Moderately aware	4- Very aware	5. Extremely aware
Reduce carbon footprint/ CO2 emissions / greenhouse gas emissions?	○	○	○	○	○
Promote the use of renewable or clean energies?	○	○	○	○	○
Promote water management?	○	○	○	○	○
Promote waste management?	○	○	○	○	○
Promote the use of environmentally responsible materials?	○	○	○	○	○
Assist the implementation of measures to enable Circular Economy that are not financed by the government?	○	○	○	○	○

Cópia de Circular Economy and its applicability in the hotel industry

* 13. What are the challenges / obstacles to implement Circular Economy in your company? (Please give your opinion by using the scale from 1 – Strongly Disagree, to 5 – Strongly Agree).

	1- Strongly disagree	2- Disagree	3- Neither agree or disagree	4- Agree	5- Strongly agree
Lack of knowledge on CE	○	○	○	○	○
Lack of interest on the CE concept and principles	○	○	○	○	○
Lack of investment	○	○	○	○	○
Lack of time to implement it	○	○	○	○	○
Lack of human resources	○	○	○	○	○

	1- Strongly disagree	2- Disagree	3- Neither agree or disagree	4- Agree	5- Strongly agree
Lack of governmental support	○	○	○	○	○
Lack of infrastructures support	○	○	○	○	○
The low value of products at the end of life	○	○	○	○	○
Policies focused on waste treatment in detriment of the R-principles (reduce, reuse, recycle, ...)	○	○	○	○	○
Lack of incentive to design circular products	○	○	○	○	○
Lack of market mechanisms to promote waste recovery	○	○	○	○	○
Lack of CE specific legislation	○	○	○	○	○
Price-quality ratio of the outcomes	○	○	○	○	○
It is expensive to implement CE's principles	○	○	○	○	○
Resistance to the adoption of new business models	○	○	○	○	○
The use of secondary materials (resuse of residues) that compromises the quality of the end product	○	○	○	○	○
Perceived benefits (the positive outcomes of the implementation of CE)	○	○	○	○	○

14. If the above do not represent challenges/ obstacles to implement CE in your company, please state which obstacles / challenges do you consider.

The Circular Economy Enablers

* 15. Which measures would you consider important to encourage you to implement the CE principles ? (Please give your opinion by using the scale from 1 – Not at all important, to 5 – Extremely important).

	Not at all important	Slightly important	Moderately important	Very important	Extremely important
Governmental initiatives to support the implementation of CE principles, e.g. public office to answer questions.					
Governmental financial support					
Governmental training courses support					
Governmental CE's ecosystems support					
Tax reduction to support companies that implement CE's principles					
National awareness strategy supported in wide dissemination of the CE concept and its practices					
National educational and research strategies for the creation and dissemination of knowledge on the concept of CE					
Specialized CE consultancy at disposal					
Intense collaboration practices between companies					
Stronger support from supply chain agents to implement CE principles					
Technology to successfully adopt CE (e.g. technologies related to capacity to design, reuse, etc.)					

The Circular Economy attitude

* 16. Which of the following CE R-principles is your company implementing? (Please give your opinion by using the scale from 1 – Without implementation, to 5 – Fully implemented).

	1- Without implementation	2- Slightly implemented	3- Moderately implemented	4- Implemented	5. Fully implemented
Reduce	○	○	○	○	○
Reuse	○	○	○	○	○
Recycle	○	○	○	○	○
Redesign (Cradle-to-Cradle, Long-lasting products)	○	○	○	○	○
Rethink	○	○	○	○	○
Refurbish	○	○	○	○	○
Remanufacture	○	○	○	○	○
Repair	○	○	○	○	○
Repurpose	○	○	○	○	○
Recover	○	○	○	○	○
Refuse	○	○	○	○	○
Return	○	○	○	○	○
Re-educate	○	○	○	○	○

17. If you stated 3 or plus in the question above, please explain how you are doing it.

* 18. Which of the following initiatives is your company taking into account? (Please give your opinion by using the scale from 1-Strongly disagree, to 5- Strongly agree).

	1- Strongly disagree	2- Disagree	3- Neither agree or disagree	4- Agree	5- Strongly agree
The emissions generated (carbon footprint/ CO2 emissions/ greenhouse gas)					
The consumption of renewable or clean energies					
Energy efficiency improvements					
Water management					
Waste management					
The purchase of products designed according to Circular Economy principles					
The use of environmental sustainable materials					
Environmental conservation					

The Circular Economy benefits (in general)

* 19. Will Circular Economy promote: (Please give your opinion by using the scale from 1 – Never, to 5 – Always).

	1- Never	2- Rarely	3- Sometimes	4- Often	5- Always
A sustainable environment	○	○	○	○	○
Innovation stimulation	○	○	○	○	○
The creation of new jobs	○	○	○	○	○
Saving costs in the long term	○	○	○	○	○
Establishing your brand and reputation on environmental preservation	○	○	○	○	○

The Circular Economy and the organisational performance (in your company)

* 20. What is the predictive positive impact on the organisational performance in your company? (Please give your opinion by using the scale from 1 – Strongly Disagree, to 5 – Strongly Agree).

	1- Strongly disagree	2- Disagree	3- Neither agree or disagree	4- Agree	5- Strongly agree
More customers	○	○	○	○	○
The reduction of carbon footprint/ gas emissions/ greenhouse gas effects	○	○	○	○	○
Improve profitability	○	○	○	○	○
Acquire new competencies	○	○	○	○	○
Acess to new markets and consumers	○	○	○	○	○
To have better acess to raw materials	○	○	○	○	○
Increases customer satisfaction	○	○	○	○	○
Increases overall performance in the long term	○	○	○	○	○