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Circular Economy Practices in the Hotel Industry: An Urban Destination Versus a Sun and Beach Island Destination

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ABSTRACT

The hotel industry is characterized by a linear consumption–production model that significantly impacts the environment through high energy and water usage, biodiversity loss, waste generation, road congestion, CO_2 emissions, and pollution. Existing circular economy literature predominantly addresses the manufacturing sector, with a notable lack of focus on its application within tourism. This study investigates circular practices, based on the 3R principle, in the hotel sector concerning water, energy, waste management, human resources, and corporate social responsibility across two distinct destinations: a sun-and-beach destination and an urban destination. It formulates five hypotheses to examine the extent to which hotel characteristics—specifically age, size, category, chain affiliation, and type—significantly influence the adoption of circular economy measures. The research reveals that hotel size, category, age, and type play significant roles in the adoption of circular practices. The findings contribute to a deeper understanding of how the hotel industry can transition toward a more circular model, highlighting the necessity for tailored strategies based on specific characteristics of each hotel and destination.

1 | Introduction

Current literature on circular economy (CE) predominantly emphasizes the manufacturing sector, with limited attention given to tourism. However, tourism operates within a linear consumption–production framework that entails significant energy and water consumption, biodiversity loss, substantial waste generation, traffic congestion, CO_2 emissions, and both noise and air pollution (Rodríguez et al. 2020). Within the tourism industry, the hotel sector is particularly resource-intensive, primarily in terms of energy and water use, and contributes to considerable waste production, including plastic, paper, and organic waste, alongside notable carbon dioxide emissions (Bohdanowicz 2006).

Despite recognizing the scarcity and limitations of resources and the unsustainability of the linear model, the tourism sector has yet to demonstrate a clear and crucial shift toward a circular tourism model (Manniche et al. 2017). The adoption of CE models and solutions is particularly crucial in coastal regions, such as the Balearics, where tourism has significantly impacted the environment, contributing to the degradation of flora and fauna, reduced water quality, sand erosion, ecosystem destruction, high consumption of limited resources (e.g., water and

energy), substantial waste generation, and environmental pollution. Similarly, inland areas, like Seville, with limited resources (notably water) and comparable environmental impacts, face the need for CE practices. In both types of destinations, sustainable and efficient resource management is essential for present and future tourism policies.

Tourism enterprises and destinations have the potential to leverage various CE initiatives to decrease the utilization of natural resources, reduce organic and plastic waste, and lower carbon dioxide emissions. These initiatives encompass reuse, recycling, and recovery of products, services, waste, materials, water, and energy, which can lead to increased profitability and revenue within the hotel sector. Given the predominant reliance on a linear production model, the shift to a CE provides an opportunity to optimize financial management and environmental outcomes, advancing sustainable development and enhancing the long-term resilience of the entire industry. As Lüdeke-Freund et al. (2018) state, "CE requires companies to rethink their supply chains and business models"; in the tourism sector, this transition will necessitate a re-evaluation of value creation and delivery mechanisms.

The transition to a CE strategy in any destination requires the involvement of all relevant stakeholders: Destination Management Organizations (DMOs), key policymakers, residents, tourism enterprises (private tourism sector), and tourists (Florido et al. 2019). As Sørensen and Bærenholdt (2020) further emphasize, tourism's shift toward a CE "requires initiatives by all actors: tourists, companies, and public actors," and necessitates symbiotic relationships among all stakeholders to drive the required changes.

This study focuses on one of these primary stakeholders: the private tourism sector, specifically the hotel industry. It seeks to address several key research questions: What factors or characteristics prompt hotels to engage more proactively in environmental practices and adopt CE principles? Which types of hotels exhibit stronger circular practices? Additionally, is there a difference in circular engagement between urban hotels and sun-and-beach hotels?

Accordingly, this paper has two primary objectives. The first objective is to examine circular practices within the hotel industry, grounded in the 3R principle (Reduce, Reuse, and Recycle), with a focus on water and energy management, waste management, human resources (HR), and corporate social responsibility (CSR) across two distinct Spanish destinations: Majorca, a coastal destination in the Balearic Islands, and Seville, an urban destination in Andalusia. The second objective is to identify the main factors influencing the adoption of circular policies in these hotels and to determine whether these factors vary based on hotel type (holiday/resort versus urban). Therefore, this study examines four hypotheses assessing whether hotel age, category, chain affiliation, and size are significant factors influencing the adoption of circular practices. Additionally, a fifth hypothesis is proposed to determine whether significant differences exist in the adoption of circular practices between urban hotels and sun–beach hotels.

The structure of this paper is organized into six sections. Section 2 provides the theoretical framework on CE within the tourism sector, beginning with an overview of the European Union's regulatory framework and followed by a review of existing research on environmental and CE practices specifically within the hotel industry. This section also includes a literature review on hotel characteristics and factors that are more commonly associated with the adoption of CE practices, culminating in the research hypotheses to be tested. Section 3 details the data and research methodology employed in the study. Section 4 presents the results obtained from hypothesis testing. Section 5 discusses the key findings, while Section 6 outlines the main conclusions of the study.

2 | Theoretical Framework

2.1 | CE and Tourism: EU Regulatory Framework

In contrast to other economic sectors, the tourism value chain is notably cross-cutting and interdisciplinary. The tourism experience encompasses multiple interactions with various service providers across the value chain throughout each stage of a tourist's journey. This experience is facilitated by a substantial network of intermediaries and suppliers (e.g., hotels, tour operators, travel agencies, airlines), resulting in a high degree of interdependence that drives and supports tourism innovations (Hall and Williams 2008).

Given its cross-cutting and interdisciplinary nature, the tourism sector holds substantial potential to contribute to the achievement of the 2030 Agenda and the 17 Sustainable Development Goals (SDGs) established by the United Nations in 2015. As the World Tourism Organization (UNWTO 2018) indicated, the tourism industry can first contribute to attaining almost all goals (directly or indirectly) and second is included as an explicit target in goals 8 (inclusive and sustainable growth), 12 (sustainable consumption and production) and 14 (sustainable use of oceans and marine resources). Tourism can contribute to green growth and all three dimensions of sustainable development (social, economic, and environmental). Moreover, due to links to other sectors within its value chain, it can contribute to creating decent jobs and trade opportunities. The tourism sector can also contribute to goal 13 (combat climate change and its impacts).

The CE has garnered significant attention over the past decade among policymakers, emerging as a policy priority in numerous countries. The European Union, for example, has developed targeted regulations and actions promoting resource efficiency, encapsulated in the 'Resource Efficiency Roadmap', as well as a comprehensive CE strategy outlined in the "Circular Economy Action Plan" (Domenech and Bahn-Walkowiak 2019). Published in March 2020, this plan aims to expedite the transition mandated by the European Green Deal and to achieve "a cleaner and more competitive Europe in co-creation with economic actors, consumers, citizens, and civil society organizations" (European Commission 2020a). Beyond its policy importance, CE has become an increasingly prominent subject in scientific research, driven by its prioritization in European and national public funding agendas, and garnering heightened interest from the private and public sectors, citizens, and the media (Salminen et al. 2022).

Two key focus areas within the European Union's new Circular Economy Action Plan are plastics and food waste (Rodríguez et al. 2020); in this context, the EU has established the Circular Plastics Alliance (European Commission 2019). Consequently, waste generation and management have become central issues in the EU's Circular Strategy. For tourism-driven economies and sectors across European regions, this focus presents a substantial challenge, as tourism is a significant contributor to waste generation—primarily plastic, paper, and organic (food) waste—representing 6.8% of total waste in Europe (EEA 2019). According to Arbulú et al. (2015), the tourism sector produces higher levels of municipal solid waste compared to other economic sectors. Multiple studies demonstrate that municipal solid waste generation increases markedly during peak tourist seasons, including findings from Menorca (Mateu-Sbert et al. 2013), Havana, Cuba (Espinosa Lloréns et al. 2008), a tourist region in Malaysia (Teh and Cabanban 2007), 10 pilot EU tourist regions (Obersteiner and Gruber 2017), and EU tourist cities (Ramusch et al. 2016). Ramusch et al. (2016) further found that the median daily waste generated per tourist was 1.10 kg, with an average of 1.67 kg per tourist per day.

The EU Circular Economy Action Plan establishes a regulatory framework to guide the implementation and transferability of water-related initiatives, including water reuse, efficiency, closed water cycles, wastewater treatment and sewage sludge management, as well as energy and nutrient recovery from wastewater (European Research Executive Agency 2021; European Commission 2020a). Consequently, water management, reuse, and efficiency are essential focus areas within this plan. The tourism sector is particularly significant in advancing the CE transition due to its high-water consumption levels; daily water use per tourist is three to four times higher than that of residents, typically ranging between 100 and 200 L per person per day in Europe (EEA 2009). In Palma (Majorca), for instance, Deyà-Tortella et al. (2016) found that hotel tourists require an average of 440 L per day.

The European Green Deal (European Commission 2020b), closely aligned with the CE agenda, is a key component of the EU's strategy to fulfill the 2030 Agenda for Sustainable Development (UNEP 2016). This deal seeks to enhance resource efficiency by promoting a "clean, circular economy," addressing climate change, reversing biodiversity loss, and reducing pollution; the plan specifically emphasizes "mobilization of the industry for a clean and circular economy" (European Commission 2019). Energy efficiency, renewable energy adoption, and energy management are pivotal within this framework, especially for the tourism sector as it progresses toward CE. Hotels, in particular, are high energy consumers, relying primarily on fossil fuels and electricity as their main energy sources (e.g., Deng and Burnett 2000 for Hong Kong; Filimonau et al. 2011 for the United Kingdom; Karagiorgas et al. 2007 for Greece; Rossello-Batle et al. 2010 for the Balearic Islands). Bohdanowicz et al. (2011) have reported that hotels have higher average energy consumption rates than other commercial buildings.

In Spain, empirical data indicates that 35% of total energy demand within the tertiary sector originates from the hotel sector (Dascalaki and Balaras 2004), while in France, this figure is approximately 18% within the service sector (Zografakis et al. 2011). Similar research on Hong Kong hotels by Deng and Burnett (2000) found average energy consumption to be 564 kWh/m^2 annually, primarily from electricity. In Europe, Hotel Energy Solutions (2011) reported that hotels consumed 39 TWh in 2000, half of which was electricity, with energy consumption ranging between 200 and 400 kWh/m^2 annually, averaging 305–330 kWh/m^2 per year.

Furthermore, carbon dioxide (CO_2) emissions resulting from energy consumption in hotels and other accommodation establishments represent a critical challenge in advancing the transition to a CE and combating climate change. Lenzen et al. (2018) reported that the tourism sector accounts for 8% of total global CO_2 emissions. According to the UNWTO and UNEP (2008), the accommodation sector alone is responsible for 21% of tourism-related carbon dioxide emissions, a figure projected to increase to 25% by 2035 (De Grosbois and Fennell 2015). Tsai et al. (2014) demonstrated that CO_2 emissions varied by accommodation category, ranging from 6.3 to 28.9 kg CO_2 per person per night. Similarly, Filimonau et al. (2011) found that the annual electricity consumption for two 3-star hotels in the United Kingdom was 25.5 and 20.9 kWh per guest night, resulting in greenhouse gas emissions of 11.65 kg CO_2 and 8.25 kg CO_2 per guest night, respectively. According to Hotel Energy Solutions (2011), the majority of energy consumed by hotels is derived from fossil fuels, leading to an estimated annual emission of over 10 Mt of CO_2 from the 39 TWh of energy consumed by European hotels. As Gössling et al. (2023) highlight, a key challenge for the tourism industry in the transition to a CE and the pursuit of net-zero emissions is the management of carbon dioxide and other greenhouse gases. Effective climate change adaptation requires the active involvement of multiple stakeholders, necessitating the sector's commitment to decarbonization efforts. To achieve net-zero goals, the tourism industry must undergo significant transformations and align with the broader political agenda addressing the climate crisis (Lopes et al. 2022).

In terms of renewable energy utilization, data from the European SETCOM project (Hotel Energy Solutions 2011) indicate that the adoption of renewable energy technologies (RETs) in hotels varies by region within Europe. In Spain, Portugal, France, and Finland, the use of RETs ranges from 40% to 60%. In contrast, Germany, Austria, and Slovenia exhibit lower adoption rates of 20%–25%, while Italy and Crete report even lower levels, between 8% and 10%.

Lastly, innovation is a crucial element in the transition toward a CE within the hotel industry. Florido et al. (2019) assert that eco-innovations represent initial steps toward establishing more circular business practices. Additionally, Fraj et al. (2015) highlight that the implementation of proactive environmental strategies in hotels is contingent upon organizational capabilities related to learning and innovation. These authors conclude that hotels characterized by higher levels of innovation are also more likely to adopt proactive environmental measures. Additionally, Šreimikiene and Kačerauskas (2020) emphasize the critical role of creative industries in promoting economic sustainability and development through innovation.

2.2 | CE Practices in the Hotel Industry

The existing literature on the CE primarily concentrates on the manufacturing sector (Rodríguez et al. 2020). However, there is a growing interest in the tourism sector among academics, practitioners, and policymakers (Vargas-Sánchez 2018). Rodríguez et al. (2020) conducted a comprehensive literature review on CE and tourism from 2009 until January 2020, identifying eight distinct thematic streams based on the keywords and topics addressed. One notable stream pertains to the circular practices of hotels and tourists.

Some studies on circular practices in hotels emphasize the implementation of CE principles within the tourism sector, such as the work by Pamfilie et al. (2018) focusing on hotels in Romania. Other research investigates specific CE practices adopted by hotel chains or individual establishments (e.g., Rodríguez-Antón and Alonso-Almeida 2019; Menegaki 2018; Naydenov 2018). Jones and Wynn (2019) examined how the concept of CE, among other sustainability strategies, has been integrated into the business plans of tourism and hotel companies, noting that these organizations demonstrate a commitment to CE principles, natural capital, and resilience in their sustainability reports.

Several authors have categorized the initiatives aimed at enhancing sustainability and facilitating the transition to CE within the hotel industry into three primary domains: energy efficiency, water conservation, and waste management (e.g., Abdou et al. 2020; Berezan et al. 2013). Mensah (2006) highlighted various environmental challenges facing the hotel industry, including waste recycling and management, clean air, energy and water conservation, environmental health, compliance with building permits and legal regulations, and environmental training. Khatter et al. (2019) identified key areas of environmental practices among hotels in Melbourne, which included water and energy efficiency, waste management, environmental training for staff and tourists, and sustainable sourcing practices. Additionally, Hsieh (2012) investigated the environmental management policies and practices of the top 50 hotel companies listed by Hotels (2009)—all of which are multinational chains—and found that their efforts centered on 12 categories, with the top five being energy management, environmental education, water conservation, waste management, and green supply chain procurement.

Energy efficiency and management are critical areas within the hotel industry, as highlighted by Abdou et al. (2020). According to Girard and Nocca (2017), the majority of initiatives or measures implemented in this sector primarily focus on energy and water efficiency, as well as waste management and reduction. Rodríguez-Antón and Alonso-Almeida (2019) further identified the most prevalent CE practices adopted by hotels, categorizing them into energy and water efficiency, waste management, the reduction of environmentally hazardous cleaning agents, and environmental training for staff.

The literature identifies five principal categories of common CE practices in the hotel industry: energy efficiency, renewable energy utilization, water efficiency, waste management and reduction, and HR training and CSR (see Table S1). Among the most frequently employed energy efficiency practices are the installation of energy-efficient lighting systems (Rodríguez-Antón and Alonso-Almeida 2019; Mensah 2006; Nicholls and Kang 2012) and the management of room temperatures (Rodríguez-Antón and Alonso-Almeida 2019; Trung and Kumar 2005). Girard and Nocca (2017) documented specific CE measures aimed at enhancing energy efficiency in Italian hotels to mitigate CO_2 emissions, which included the adoption of natural gas and electric buses. Moreover, Nicholls and Kang (2012) noted that the implementation of keycard systems for controlling power usage in guest rooms represents one of the most common practices observed across European hotels.

Focusing on the adoption of RETs, Vourdoubas (2016) reported that hotels in Crete utilize a variety of RETs, with solar thermal energy being the most prevalent. Additionally, Karagiorgas et al. (2006) demonstrated that three specific RETs have been extensively implemented across 200 hotels in five European Union regions. Their findings indicated that 66% of these hotels employ solar thermal systems (including solar cooling), 24% utilize grid-connected photovoltaic (PV) systems, and 10% incorporate geothermal energy (specifically geothermal heat pumps). Notably, the use of PV systems is more widespread in Spain and Italy. Furthermore, the analyzed RETs exhibited high cost-effectiveness, particularly when public subsidies are available.

In terms of water efficiency measures, the hotel industry commonly implements various water-saving technologies, particularly in guest bathrooms (showers and toilets) and in kitchens and laundries (see Table S1). Trung and Kumar (2005) identified several prevalent water efficiency and management practices in a sample of Vietnamese hotels, including irrigating gardens during early morning or late evening hours and utilizing drought-resistant plants instead of fresh flowers.

Waste management and reduction practices in the hotel sector typically encompass the use of soap and shampoo dispensers to replace single-use packaging (Rodríguez-Antón and Alonso-Almeida 2019; Trung and Kumar 2005). In their study of the Vietnamese hotel industry, Trung and Kumar (2005) also identified the refilling of printer cartridges and the recycling of paper, cardboard, aluminum cans, plastic, and food waste as common waste management practices. Moreover, Nicholls and Kang (2012) noted that the proper disposal of oil and batteries, along with the donation of used hotel furniture and equipment, represents prevalent waste management strategies in the hotel sector in Michigan, USA.

When examining HR training and CSR measures associated with the CE, Girard and Nocca (2017) identified the implementation of zero-kilometer menus in hotel restaurants and collaboration with local suppliers as prevalent practices in Italy. Pham et al. (2019) emphasized that green training for employees serves as a "key mechanism to boost employees' voluntary green behavior." Therefore, investments in green HR management practices in hotels are likely to encourage pro-environmentally friendly behavior, ultimately enhancing a hotel's environmental performance, financial outcomes, and overall reputation.

Similarly, studies by Su and Swanson (2019) on Chinese hotels and AlSuwaidi et al. (2021) on the United Arab Emirates revealed that CSR strategies significantly motivate and drive

employees toward pro-environmental behavior. Ku et al. (2011) identified collaboration with service providers concerning food, beverages, culinary supplies, linens, and other logistical issues as the most critical CSR-related practices in hotels. Additionally, Nicholls and Kang (2012) recognized the procurement of organic linens and towels, as well as sustainably sourced wooden furniture for guest rooms, as common CSR practices within the accommodation sector in Michigan.

This body of literature underscores the essential role of HR training and CSR initiatives in promoting the adoption of CE practices in the hotel industry.

2.3 | Hotel Characteristics and Factors Influencing the Adoption of CE Practices

A body of literature highlights several hotel characteristics—such as age, category, chain affiliation, size, and type—as significant factors influencing the adoption of environmental or CE measures within the hotel industry (see Table S2).

Research by Fernández-Robin et al. (2019) indicates that environmental commitment and protection tend to be more pronounced among large and medium-sized hotels. Additionally, Nicholls and Kang (2012) found that larger hotels are more likely to utilize green messaging in their promotional campaigns compared to smaller and medium-sized establishments in the accommodation sector in Michigan, USA. Álvarez Gil et al. (2001) further established a correlation between hotel size and the implementation of environmental techniques, attributing this relationship to economies of scale. Mowforth and Munt (1998) explain that smaller hotel operators often lack the financial resources and organizational capabilities necessary to adopt extensive environmental practices. Conversely, Pham Phu et al. (2018) argue that larger hotels face greater stakeholder pressure to implement environmental measures. Mensah and Blankson (2013) also support the notion that larger establishments possess more financial and technical resources than their smaller counterparts.

Despite these findings, Manniche et al. (2021) assert that hotel size may not be a decisive factor, as smaller tourism enterprises can successfully implement various CE measures, as demonstrated by Rahman et al. (2012) in their study of North American hotels.

Based on this literature review, we propose the following hypothesis:

H1. *A larger hotel size is associated with a higher rate of adoption of environmental and circular practices.*

Bohdanowicz (2005), Ibrahim and Al-Zboun (2021), and Rahman et al. (2012) have demonstrated that managers in chain-affiliated hotels exhibit a higher commitment to environmental management. In their study, Peng and Chen (2019) observed that, when evaluating overall carbon emissions in luxury urban hotels in Taiwan, the average energy efficiency of hotel chains surpasses that of independent hotels. Conversely, Nicholls and Kang (2012) noted that independent hotels tend to participate more actively in community-oriented initiatives and the utilization of local, zero-kilometer, and/or organic products. In contrast, chain hotels more frequently implement generic or cost-saving measures, such as energy-efficient light bulbs and water conservation techniques in bathrooms. Furthermore, research by Álvarez Gil et al. (2001) and Jacob et al. (2010) indicates a positive correlation between the adoption of green practices and chain affiliation in Spain. Therefore, we propose the following hypothesis:

H2. *Chain affiliation serves as a significant determinant in the adoption of circular practices.*

Hotel category is considered a significant factor influencing the adoption of circular practices, as indicated by various authors (see Table S2). Generally, higher-category hotels exhibit a greater propensity for implementing circular practices. Ivanov et al. (2014) found that higher-category hotels in Bulgaria are more likely to employ waste separation and recycling, implement energy-saving policies, and utilize thermal energy and hydro-insulation in their facilities compared to their lower-category counterparts. Similarly, Kang et al. (2012) suggested that higher-category hotels prioritize environmental management to a greater extent, as guests in these establishments are often willing to pay a premium for green initiatives compared to those in lower-category hotels. Additionally, Razumova et al. (2015) established a correlation between hotel category and innovative practices that enhance quality, including waste and water treatment processes. In contrast, some researchers, such as Sangeetha and Rebecca (2019), argue that hotel category does not significantly influence the implementation of green and sustainable practices. Therefore, we propose the following hypothesis:

H3. *As the star category of a hotel increases, there is a tendency for hotels to adopt more circular and/or environmental measures.*

Hotel age is a critical factor influencing the adoption of environmental and circular practices, although some authors, such as Fernández-Robin et al. (2019), contend that it is not a determining factor for environmental behaviors associated with circular practices (see Table S2). Martinez-Martinez et al. (2019) found that newer hotels are more likely to implement a range of environmental practices compared to older establishments. Similarly, Álvarez Gil et al. (2001) demonstrated that the aging of hotel facilities negatively affects the adoption and frequency of environmental management practices, as newer hotels tend to feature more modern and efficient systems. Consequently, we propose the following hypothesis:

H4. *Hotel age is negatively related to the adoption of circular practices and techniques.*

Table S2 provides empirical evidence regarding the differences in environmental behavior or the implementation of green, sustainable, or circular practices across various hotel types. Reid et al. (2017) reported that, on average, sun and beach hotels (coastal and resort) implement twice as many sustainable practices as urban hotels. The study identified that the most common sustainable practices among sun and beach hotels focus on energy and climate control (including efficiency and

management), waste treatment and management, and water efficiency. In contrast, urban hotels tend to emphasize energy, waste, and water efficiency and management, rather than external environmental control and protection. Furthermore, sun and beach hotels exhibited a greater interest in waste management and alternative energy sources, such as solar, wind, and biogas. Nicholls and Kang (2012) also found that urban hotels more frequently employed energy-efficient light bulbs in guest rooms compared to rural or resort hotels. Therefore, we propose the following hypothesis:

H5. *There are differences in the adoption of circular practices depending on hotel type.*

3 | Research Methodology

Specific fieldworks were undertaken using a structured questionnaire: one in Majorca and one in Seville. The questionnaire was targeted at hoteliers in both destinations and involved a personal interview lasting between 25 and 50 min.

Samples in both destinations were calculated using Yamane's (1973) formula. Since surveys took place during the coronavirus pandemic and some hotels were closed, answers were difficult to collect. In Majorca, a 10% margin of error was calculated using 2019 data from IBESTAT (2021). Likewise, a 10% margin of error was selected for Seville using 2017 data from SAETA (2018), which is the latest officially published information.

The questionnaire administered during the fieldwork in both locations was organized into five distinct sections. It comprised a combination of open and closed questions, along with items rated on a 5-point Likert scale, where responses ranged from "strongly disagree" (1) to "strongly agree" (5) or from "never" (1) to "always" (5). Section 1 focused on innovation practices related to the CE within hotel operations. Section 2 addressed practices pertaining to water and energy management in hotels. Section 3 included questions aimed at identifying best practices for recycling within hotel establishments. Section 4 examined best practices in HR and CSR in the hotel sector. Section 5 gathered information on the respondent's profile, along with basic details about the hotel. The questionnaire used emphasizes circular practices grounded in the 3R principle (EMF 2013)—Reduce, Reuse, and Recycle—which encompasses a broader spectrum of initiatives compared to the existing literature that primarily concentrates on green or environmental practices limited to the 2R framework (Reduce and Recycle). Consequently, the items included in the proposed model are designed to reflect the 3R principle, thereby informing the definition of all constructs and variables within the model.

Upon completion of the fieldwork, the collected data were tabulated using SPSS version 27.0 for Windows. Descriptive analyses and Analysis of Variance (ANOVA) tests were employed to determine relationships and test the proposed hypotheses. ANOVA tests have been shown to be robust and yield valid results, even in cases where the assumptions of data normality and homoscedasticity are not satisfied (Blanca Mena et al. 2017; Gamage and Weerahandi 1998).

To assess the equality of variances among the different groups, Levene's test was utilized. In the post hoc analysis, the Dunnett's T3 (DMS) statistics were reported when the assumption of equal variances was met, whereas Tamhane's T2 statistics were employed when the assumption was violated. This methodological approach ensured the integrity and reliability of the statistical analyses conducted in the study.

The fieldwork conducted in Majorca occurred between March and July 2021, while the data collection in Seville took place from November 2020 to April 2021. Table S3 provides the technical specifications of the survey employed during both fieldwork phases.

Hotels were classified based on various characteristics, including age, category, chain affiliation, size, and type. Table S4 presents the descriptive statistics regarding the fundamental hotel information for both destinations.

4 | Results

4.1 | Validity and Reliability Analysis

The validity and reliability of the perceptual measures were rigorously evaluated. Content validity was established through a broad bibliographic review of related research, ensuring that the questionnaire was designed based on established research concerning circular and environmentally friendly practices in the hotel industry. This approach facilitated the use of appropriate terminology, and each item was assessed to confirm its relevance to the intended constructs.

To evaluate the reliability of the scale items, Cronbach's α reliability coefficient was employed, serving as an internal consistency measure that indicates the degree of relatedness among a set of items. The Cronbach's α values for each construct in the survey exceeded 0.70, with most constructs achieving values above 0.80, indicating a strong positive correlation among the items (Nunnally 1978). These values surpassed the requisite minimum thresholds of 0.7 and 0.5 as recommended by Hair (2011), thus affirming the internal reliability of the proposed constructs. Consequently, these findings provide reasonable support for the discriminant validity of the scales utilized in this research.

4.2 | Hypotheses Testing

ANOVA and Student's *t* tests for independent samples were used to test the proposed hypotheses.

H1. *A larger hotel size is associated with a higher rate of adoption of environmental and circular practices.*

Table 1 contains the ANOVA test results for energy and waste management, and HR and CSR practices. It only indicates items where there are significant differences regarding the hypothesis. The results indicate significant differences in the implementation of energy efficiency and management, as well as waste management practices, between larger

TABLE 1 | ANOVA test for classification according to hotel size (number of rooms).

	Levene's test		ANOVA					
	F	Sig.		Sum of squares	Df	Root mean square	*F*	Sig.
Innovation	2.110	0.083	Between groups	3.070	4	0.768	0.980	0.421
			Within groups	104.989	134	0.783		
			Total	108.059	138			
Water efficiency and management	3.213	0.015**	Between groups	2.012	4	0.503	0.633	0.640
			Within groups	106.560	134	0.795		
			Total	108.572	138			
Energy efficiency and management	0.630	0.642	Between groups	4.110	4	1.028	2.586	0.040**
			Within groups	53.252	134	0.397		
			Total	57.363	138			
Waste management	0.971	0.426	Between groups	10.143	4	2.536	5.886	0.000**
			Within groups	57.729	134	0.431		
			Total	67.871	138			
Other recycling actions	3.947	0.005*	Between groups	2.676	4	0.669	1.483	0.211
			Within groups	60.441	134	0.451		
			Total	63.117	138			
HR and CSR management	0.449	0.773	Between groups	6.204	4	1.551	2.106	0.084*
			Within groups	98.702	134	0.737		
			Total	104.906	138			
6 Functions	1.449	0.222	Between groups	1.277	4	0.319	1.347	0.256
			Within groups	31.760	134	0.237		
			Total	33.037	138			

Note: $^{**}p < 0.05$; $^{*}p < 0.10$.

and medium-sized hotels, with a significance level of 5%. Furthermore, there are notable differences in HR and CSR practices, with a significance level of 10%. These findings provide support for hypothesis H1.

When we further investigate these differences, focusing on the 5% level, Table S5 indicates that there are differences for energy efficiency and management practices between the smallest hotels (1–25 rooms) and those with 26 rooms or more, in general; and between those with 50–125 rooms and those with more than 126 rooms. Contrary to expectations, the smallest hotels implement more energy efficiency and management measures. In terms of waste management, there are differences between the smallest hotels (1–25 rooms) and larger hotels; and between hotels with 26–50 rooms and those with 126–250 rooms at a 10% level. Consequently, with regard to circular waste management practices, larger hotels demonstrate a greater tendency to adopt such practices. Therefore, hypothesis H1 is partially supported.

H2. *Chain affiliation serves as a significant determinant in the adoption of circular practices.*

Table 2 presents the results of the Student's *t* test for energy and waste management, as well as HR and CSR practices. These results confirm significant differences between independent and chain hotels regarding energy efficiency and management, as well as waste management. This finding only partially supports hypothesis H2, as independent hotels demonstrate greater environmental proactivity in the implementation of energy efficiency and management practices, whereas chain hotels exhibit a more proactive approach to waste management practices.

H3. *As the star category of a hotel increases, there is a tendency for hotels to adopt more circular and/or environmental measures.*

The results in Table 3 indicate that there are significant differences according to hotel category in all circular practices, except water efficiency and management, waste management practices and HR and CSR practices. Thus, hotel category seems key for implementing circular practices in energy efficiency and management, innovation and other recycling practices. If we consider the global 6CE function indicator, the results also show significant differences between hotels in different categories.

TABLE 2 | Analysis of the differences depending on whether the hotel is independent or belongs to a chain.

		Levene's test		Independent samples *t* test				95% CI	
		F	Sig	*T*	Df	Sig	Diff. of means (Ind-Chain)	Lower	Upper
Innovation	Equal variances assumed	0.110	0.740	0.223	136	0.824	0.038	−0.296	0.372
	Equal variances not assumed			0.220	68.117	0.826	0.038	−0.303	0.379
Water efficiency and management	Equal variances assumed	13.166	0.000**	1.533	136	0.128	0.266	−0.077	0.608
	Equal variances not assumed			1.242	49.090	0.220	0.266	−0.164	0.695
Energy efficiency and management	Equal variances assumed	3.019	0.085	4.079	136	0.000***	0.473	0.244	0.702
	Equal variances not assumed			3.855	62.372	0.000	0.473	0.228	0.718
Waste management	Equal variances assumed	3.448	0.065	−2.210	136	0.029**	−0.303	−0.575	−0.032
	Equal variances not assumed			−1.927	54.493	0.059	−0.303	−0.619	0.012
Other recycling actions	Equal variances assumed	3.160	0.078	0.734	136	0.464	0.0934	−0.158	0.345
	Equal variances not assumed			0.762	75.450	0.448	0.0934	−0.151	0.337
HR and CSR management	Equal variances assumed	2.711	0.102	0.328	136	0.743	0.0538	−0.270	0.378
	Equal variances not assumed			0.342	75.973	0.733	0.0538	−0.260	0.367
6 Functions	Equal variances assumed	2.556	0.112	1.230	136	0.221	0.116	−0.0716	0.303
	Equal variances not assumed			1.109	57.486	0.272	0.116	−0.0935	0.326

Note: $^{**}p < 0.05$; $^{***}p < 0.001$.

Indeed, further results on differences (Table S6) show differences in innovation, energy efficiency and management, and other recycling practices, and the 6-function indicator between two- and four-star hotels. Additionally, there are differences between two-star, and three-and four-star hotels for other recycling practices; as well as the 6 functions between one- and two-star hotels, two-and four-star hotels, and four- and five-star hotels. Surprisingly, and contrary to what might be expected, lower category hotels (two-stars) are more proactive in implementing certain CE practices; however, the results support hypothesis 3 when considering the 6 functions together. Higher star hotels are more proactive than lower star hotels.

H4. *Hotel age is negatively related to the adoption of circular practices and techniques.*

When we test for equality of means for different hotel age groups with an ANOVA test, the results in Table 4 indicate significant differences in water and energy efficiency and management practices, HR, CSR practices and in the 6 functions.

Further analysis of these differences shown in Table S7 demonstrate that older hotels (opened up to 2000) are less proactive in implementing water and energy efficiency and management measures and techniques, while there are also differences between hotels opened from 2001 to 2010, and those opened from 2011 to today. It seems that even among newer hotels (from 2000), there are further differences between those opened from 2001 to 2010 and those opened later. For HR and CSR practices, differences are observed between hotels opened before 1980 and those opened from 1990 to 2010. Additional differences are found between hotels opened

TABLE 3 | Analysis of the differences according to hotel category.

	Levene's test		ANOVA					
	F	Sig.		Sum of squares	Df	Root mean square	*F*	Sig.
Innovation	2.823	0.027**	Between groups	8.478	4	2.120	2.818	0.028**
			Within groups	102.301	136	0.752		
			Total	110.780	140			
Water efficiency and management	1.138	0.341	Between groups	5.674	4	1.418	1.724	0.148
			Within groups	111.873	136	0.823		
			Total	117.546	140			
Energy efficiency and management	3.251	0.014**	Between groups	6.681	4	1.670	4.434	0.002***
			Within groups	51.232	136	0.377		
			Total	57.912	140			
Waste management	0.571	0.684	Between groups	3.841	4	0.960	1.836	0.125
			Within groups	71.135	136	0.523		
			Total	74.977	140			
Other recycling actions	1.592	0.180	Between groups	6.636	4	1.659	3.978	0.004***
			Within groups	56.719	136	0.417		
			Total	63.355	140			
HR and CSR management	2.091	0.085	Between groups	6.188	4	1.547	2.117	0.082
			Within groups	99.357	136	0.731		
			Total	105.544	140			
6 Functions	2.608	0.038**	Between groups	5.417	4	1.354	6.217	0.000***
			Within groups	29.623	136	0.218		
			Total	35.040	140			

Note: $^{**}p < 0.05$; $^{***}p < 0.01$.

from 1990 to 2000 and the newest hotels (opened from 2011 onward). In terms of the 6 functions, there are differences between the oldest hotels (opened before 1979) and those from 1990 to 2010, as well as between the two more recent age groups. In general, newer hotels are more proactive in implementing CE-related practices. These results support hypothesis 4.

H5. *There are differences in the adoption of circular practices depending on hotel type.*

Finally, H5 is tested with a Student's *t* test by hotel type (urban and sun and beach holiday and resort hotels). Urban hotels are those in Seville, sun and beach those in Majorca.

The results in Table 5 show significant differences between urban and sun and beach hotels in all circular practices, except HR and CSR practices. There are differences between urban hotels (Seville) and sun and beach hotels (Majorca) in terms of innovation, water and energy efficiency and management, and waste management. Additionally, they present differences in all 6 functions. The results show that urban hotels are more proactive than sun and beach hotels in implementing CE-related practices.

5 | Discussion

The findings indicate first significant differences in the implementation of energy efficiency and management practices, as well as waste management, between larger and medium-sized hotels in both destinations. This outcome supports Hypothesis 1 (H1) and aligns with prior research conducted by Aragón-Correa (1998), Fernández-Robin et al. (2019), Álvarez Gil et al. (2001), Mensah and Blankson (2013), Mowforth and Munt (1998), Pham Phu et al. (2018), and Sinha and Fukey (2020). This result can be explained by the fact that large hotels can exploit economies of scale (Jacob et al. 2010) and recoup investments in energy and water efficiency as well as waste management technologies and facilities more rapidly. Additionally, smaller-sized hotels have less pressure from customers and stakeholders regarding environmental sustainability (Becherer and Helms 2014) and often lack HR with the necessary skills to implement it (Chan et al. 2018; Halme and

TABLE 4 | Analysis of differences according to hotel age.

	Levene's test		ANOVA					
	F	Sig.		Sum of squares	Df	Root mean square	*F*	Sig.
Innovation	0.302	0.911	Between groups	5.330	5	1.066	1.389	0.232
			Within groups	99.747	130	0.767		
			Total	105.077	135			
Water efficiency and management	1.493	0.196	Between groups	13.067	5	2.613	3.945	0.002***
			Within groups	86.121	130	0.662		
			Total	99.188	135			
Energy efficiency and management	0.097	0.993	Between groups	12.457	5	2.491	7.774	0.000***
			Within groups	41.665	130	0.320		
			Total	54.122	135			
Waste management	1.184	0.320	Between groups	2.909	5	0.582	1.188	0.319
			Within groups	63.678	130	0.490		
			Total	66.587	135			
Other recycling actions	1.159	0.333	Between groups	3.117	5	0.623	1.391	0.232
			Within groups	58.283	130	0.448		
			Total	61.400	135			
HR and CSR management	0.600	0.700	Between groups	10.420	5	2.084	3.034	0.013**
			Within groups	89.278	130	0.687		
			Total	99.697	135			
6 Functions	2.278	0.051	Between groups	5.509	5	1.102	5.746	0.000***
			Within groups	24.930	130	0.192		
			Total	30.440	135			

Note: ***$p < 0.01$; **$p < 0.05$.

Korpela 2014). Additionally, larger hotels can afford to hire more qualified staff to implement circular or environmental measures, and many environmental technologies lead to better results in larger hotels due to increased learning effects at scale (Jacob et al. 2010).

Second, independent hotels are more environmentally proactive in introducing energy efficiency and management, and waste management practices than chain hotels. Thus, chain affiliation is not a key factor for implementing circular and/or environmentally sustainable practices and the findings do not support H2. This contradicts previous findings by Bohdanowicz (2005), Jacob et al. (2010) or Peng and Chen (2019). A possible explanation is independent hotels do not follow a corporate strategy and focus on more immediate cost-saving practices requiring fewer financial resources.

Third, hotel category seems a key factor for implementing circular practices in energy efficiency and management, innovation, and other recycling practices; the differences between two-star hotels and three and four-star hotels are especially important. These results support H3 and some previous literature (Sangeetha and Rebecca 2019), while contradicting other previous research (Atay et al. 2013; Álvarez Gil et al. 2001; or Ivanov et al. 2014, among others). In this regard, more research is needed.

Fourth, hotel age is a key factor for implementing circular practices in water and energy efficiency and management, HR, and CSR. Older hotels (opened pre-2000) are less proactive in implementing these practices, supporting H4 and previous literature (Álvarez Gil et al. 2001; Kularatne et al. 2019; or Martinez-Martinez et al. 2019 among others). This result could be due to newer hotels having invested in facilities with water and energy-saving devices or waste recycling. Older hotels would have to invest to adapt facilities, and this is not always viable. In turn, newer hotels are more open to innovating and applying HR and CSR practices as managers are usually more sensitive and receptive to training for these areas.

Finally, urban hotels (Seville) are more active in implementing circular practices for water and energy efficiency and management, and other recycling practices than sun and beach hotels (Majorca). The result supports H5, confirms the findings of

TABLE 5 | Analysis of differences according to hotel type.

		Levene's test		Independent samples *t* test				95% CI	
		F	**Sig**	***T***	**Df**	**Sig**	**Dif. of means (Sun–Urban)**	**Lower**	**Upper**
Innovation	Equal variances are assumed	2.197	0.141	−3.413	136	**0.001*** **	−0.500	−0.790	−0.210
	Equal variances are not assumed			−3.406	132.301	0.001	−0.500	−0.790	−0.210
water efficiency and management	Equal variances are assumed	15.858	0.000***	−2.413	136	0.017	−0.371	−6.674	−0.067
	Equal variances are not assumed			−2.395	105.502	**0.018** **	−0.371	−0.677	−0.064
Energy efficiency and management	Equal variances are assumed	9.342	0.003***	−6.174	136	0.000	−0.605	−0.799	−0.411
	Equal variances are not assumed			−6.153	127.379	**0.000*** **	−0.605	−0.799	−0.410
Waste management	Equal variances are assumed	2.478	0.118	2.100	136	**0.038** **	0.259	0.015	0.503
	Equal variances are not assumed			2.090	122.463	0.039	0.259	0.013	0.504
Other recycling actions	Equal variances are assumed	5.517	0.020**	−1.287	136	0.200	−0.146	−0.370	0.078
	Equal variances are not assumed			−1.289	135.66	0.200	−0.146	−0.370	0.078
HR and CSR management	Equal variances are assumed	0.704	0.403	−2.253	136	**0.026** **	−0.326	−0.612	−0.040
	Equal variances are not assumed			−2.254	135.934	0.026	−0.326	−0.611	−0.040
6 Functions	Equal variances are assumed	2.622	0.108	−3.536	136	**0.001*** **	−0.291	−0.454	−0.128
	Equal variances are not assumed			−3.524	127.852	0.001	−0.291	0.454	−0.127

** $p < 0.05$; *** $p < 0.001$.

Nicholls and Kang (2012) on energy efficiency, and is linked to most urban hotels being independent (linked to H2).

6 | Conclusions

This study attempts to fill this gap in the literature. It first looks at CE practices related to water, energy, waste, HR, and CSR at hotels in two destinations: Majorca (Balearic Islands) and Seville (Andalusia). Second, it identifies the main factors affecting the implementation of circular measures in these destinations. The findings show that hotel size, category, age, and type are key factors for adopting several CE practices.

This analysis offers valuable insights for academics and professionals in tourism by examining CE practices within the hotel sector. Its significance lies in the focus on hotels located in a mature sun-and-beach island destination, contrasted with an urban destination. This comparison is particularly relevant, as existing research predominantly centers on city hotels and/or non-insular or non-mature tourism destinations. Furthermore, while much of the prior literature emphasizes environmentally friendly practices, CE encompasses a wide-ranging array of initiatives, which are explored in this study. This study emphasizes circular practices grounded in the 3R principle—Reduce, Reuse, and Recycle—which encompasses a broader spectrum of initiatives compared to the existing literature that primarily concentrates on green or environmental practices limited to the 2R framework (Reduce and Recycle).

Transitioning to a CE model, particularly in island destinations, ought to be a central component of contemporary and future tourism policies. Consequently, this research provides essential evidence regarding effective characteristics for the wider adoption of circular practices in hotels and identifies areas where increased policy efforts are warranted to facilitate this transition.

This study could serve as a guideline for hoteliers seeking to transition to a CE, as well as for policymakers aiming to develop measures that support small and medium-sized enterprises (SMEs) in this endeavor. Therefore, further research is necessary to find those innovative CE practices that can aid this transition and to delineate CE actions and strategies applicable to the hotel industry but also across the entire tourism value chain.

This research has several limitations: first, it focuses on two Spanish destinations and results may differ for other destinations; second, the fieldwork took place in 2021 during the COVID pandemic, so results may be biased by its impact. Therefore, future research could focus on confirming these findings in other destinations and in a non-pandemic year. Third, the sample was collected in Majorca and Seville before the enactment of specific CE legislation, namely the "Law on Urgent Measures for the Sustainability and Circularity of Tourism in the Balearic Islands," approved in June 2022, and the "Circular Economy Law of Andalusia," approved in March 2023. Consequently, the empirical evidence regarding CE practices in both destinations reflects voluntary initiatives within the hotel industry. In this context, the findings may serve to identify CE practices where legislative measures could play a role in encouraging the adoption and enforcement of CE initiatives. Fourth, while the quantitative methodology employed in this study provides valuable insights, it may not fully capture the complexity of stakeholder dynamics or the broader implications of these practices. To address this limitation, future research could integrate qualitative methodologies to complement the findings of this quantitative analysis. Specifically, a Delphi survey is proposed to incorporate the perspectives of experts and managers in the hotel sector, thereby enhancing the depth of analysis. Moreover, longitudinal studies would be beneficial for assessing the long-term impact of measures implemented under recent policies.

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Conflicts of Interest

The authors declare no conflicts of interest.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section.