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The Circular Economy Strategy in Hospitality: A Multicase Approach

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Abstract: The circular economy (CE) is considered a possible solution to problems, such as the increasing global demand for resources, climate change and worldwide pollution. CE can help to transform the hospitality industry from its current linear model of production to a circular one. However, there is a lack of research on circular tourism, therefore, this paper's main purpose is to shed light on CE strategies—reduction, reuse, recycle, redesign, replace and rethink—developed in the tourism sector, as well as the tourism sector's CE initiatives by means of a business case analysis method. This qualitative multicase analysis allows us to comprehend the CE practices deployed by large hotel chains, thus identifying the CE strategies and best practices. The results show that the main strategies adopted are the reduction, recycle and reuse, in this order. Nevertheless, the remaining strategies have yet to be adopted in the mainstream. This research emphasises the need to promote the CE in the hospitality industry, especially among independent hotels.

Keywords: circular tourism; circular hotels; circular economy; business case

1. Introduction

Tourism industries have been worried about sustainability for decades. Since the beginning of the 21st century, researchers have demonstrated that the hospitality industry adopts eco-friendly practices [1].

The main reason for this behaviour is accusations of the negative impacts of tourism such as the high use of resources like water [2], energy [3] and the widespread production of solid and water waste [4]. Additionally, tourism is responsible for approximately 5% of global CO_2 emissions [5], mainly due to transportation, followed by the hospitality industry. However, the number of trips continues to exacerbate the negative effects on the planet.

Another problem derived from tourism is overtourism [6]. Overtourism produces negative impacts on biodiversity, cultural and historical heritage [6,7]. Moreover, it arouses negative feelings in local inhabitants mainly due to overcrowding in holiday destinations, noise pollution, uncivil tourist behaviour and the scarcity of basic infrastructure and utilities [8].

Thus, work favouring more sustainable tourism and tourism industries are one of the main objectives of tourism enunciated in the Paris Tourism Agreement [9]. This agreement aims to limit climate change through a global commitment and collaboration among all stakeholders. It advises adopting more sustainable patterns of production within tourism industries [3].

The circular economy (CE) is considered a possible solution to mitigate problems such as the increasing global demand for resources, climate change and worldwide pollution [10]. Kirchherr et al. [11] (2017, p. 4) defined CE as: "an economic system that is based on business models which replace the 'end-of-life' concept with reducing, alternatively reusing, recycling and recovering materials in production/distribution and consumption processes, with the aim to accomplish sustainable development, which implies creating environmental quality, economic prosperity and

social equity, to the benefit of current and future generations". Thus, CE looks to maximise the use of resources and minimise greenhouse gas emissions and waste until zero waste is achieved [12]. Under the principle that nothing is wasted and everything can have a new life [13] and long-life outputs are maximised by preserving things for as long as possible.

Given the importance of tourism worldwide, some authors have started to discuss circular tourism. In economic terms in 2018, tourism grew faster than the global economy, contributing 8.8 trillion dollars to the global economy and generating 10.4% of global economic activity [14]. Regarding jobs, tourism contributed 319 million jobs, representing one in ten of all jobs globally and creating one in five of all new jobs worldwide [14].

Girard and Nocca [3] (2017, p. 68) enunciated circular tourism as "a model able to create a virtuous circle producing goals and services without wasting the limited resources of the planet that are raw materials, water and energy". Nevertheless, as previously mentioned, research on circular tourism is scarce at present. Therefore, one could consider that it is in its early infancy. In fact, CE actions have usually been located within Corporate Social Responsibility (CSR) actions, specifically in environmental actions [15]. Major research on circular tourism has focused on CE models [16] Florido et al., 2019). For that reason, these authors stress the urgency of research on how hotels adopt CE and the challenges and barriers that they face. In addition, identifying good practices within circular tourism and the hospitality industry is crucial. Given the low level of CE practices found in hospitality, there is significant room for improvement on the topic ([4] Manniche et al., 2017; [16]).

Therefore, this paper's main goal is to shed light on strategies based on CE being deployed in hospitality industries in Europe and their potential achievement of circular tourism; these are the first steps to contributing towards the enhancement of circular tourism knowledge.

The following section provides a literature review; afterwards, the method and sample is provided. Subsequently, individual and comparative analyses are discussed and, finally, some conclusions and recommendations for practice are presented.

2. Circular Economy in the Hospitality Industry

As previously mentioned, CE refers to a regenerative system that tries to restore and replace the end-of-life of a product. According to the World Economic Forum [17] (2016), there are three principles underpinning CE: (1) conservation and improvement of natural resources; (2) optimisation of resource efficiency; and (3) promotion of system effectiveness. Ghisellini et al. [18] (2015) analysed CE evolution and explained that CE was initially supported under three strategies called the 3R strategies: reduction, reuse and recycling. Later, these strategies were extended to the 6R strategies, including redesigning, remanufacturing and recovering. Recently, China has pioneered the adoption of some circular practices in tourism [15].

The specific case of the hospitality industry has focused mainly on energy, water and recycling measurements to promote sustainability. Although these measurements per se cannot be considered to lie under the CE umbrella, some could be considered pioneers in circular tourism. In fact, Manniche et al. [4] (2017) analysed the situation of circular tourism in the South Baltic Region and found that the hotels analysed had been practising sustainability activities for several years and their transition to circular practices were adopted mainly within strategies of reduction.

Recently, eco-innovations have been noted such as the first steps towards more circular businesses [16]. Alonso-Almeida et al. (2016) analysed eco-innovations deployed in four industries in tourism and found that hospitality was the strongest among them. In fact, some of these eco-innovations could be included under CE practices such as storing rainwater and geothermal energy or the use of electric vehicles for internal transport.

Nevertheless, Florido et al. [16] (2019) advised that a change towards circularity needs to develop radical innovations, although they can be achieved in different stages and sustainable green measurements can be passed from one stage to another. Manniche et al. [4] (2017) found that some circular initiatives had been deployed in hospitality in building and construction, refurbishing and

redecorating, and operation services. These authors also emphasised that the first services to transition from linear to circular had been energy and water and, to a lesser extent, waste.

In the case of CE energy measurements, Vourdaubas [19] (2016) found that hospitality in Greece used renewable energy sources including thermal, geothermal and biomass generated energy. Girard and Nocca [3] (2017) explained that some CE measurements taken in Italian hotels used natural gas, electric buses and zero km menus. In addition, these strategies to reduce CO_2 emissions help to build a differentiation strategy for hotels [20].

Regarding CE water measurements, some hotels have started to install water control systems [4] or storing water for gardening [20,21], especially in destinations where water is scarce and/or an expensive resource [2].

Finally, in the case of waste, a central issue in CE, the waste hierarchy establishes a priority order from prevention, preparation for reuse, recycling, and energy recovery and disposal [22]. Given the quantity of waste that is produced by the hospitality industry, hotels can develop multiple strategies [4]. Florido et al. [16] (2019) asserted that reuse and reduction strategies widely contributed to circular tourism, more so than recycling, because less resources are wasted with the concept of circular tourism [18].

Other strategies linked with CE are collaborative consumption and industrial symbiosis [23]. Furthermore, Girard and Nocca [3] (2017) asserted that recovery, reuse, redevelopment, valorisation and regeneration are key for circular tourism. Circular tourism requires knowledge to aid its advance but its impact could be simultaneously beneficial to residents and tourists. Manniche et al. [4] (2017) provided CE recommendations for hospitality in the short and long term based on business cases studied in the South Baltic Region. In energy, they recommended the adoption of environmental management and monitoring systems and providing access to renewable energy sources; enhancing these sources in the long term could achieve 100% circular energy. In the case of water, investing in environmental management systems for water and access to environmentally responsible laundry services is the main recommendation in the short term. In the long term, they suggested investing or developing greywater systems. In waste, these authors stressed restaurants as a focal point for CE activity development. Thus, some circular initiatives to reduce and prevent food waste could be redesigning and planning menus to reduce waste, reuse leftover food for other plates, reduce the number or size of platters and/or using food distribution networks or sharing platforms.

Thus, according to the scarce previous research it is possible to assert, firstly, that the hospitality industry is slowly incorporating CE practices and evolving some previously sustainable adopted practices into more innovative ones, mainly across three issues: energy, water and waste. Second, the most commonly deployed strategies are reduction, reuse and recycling; in other words, the aforementioned 3Rs.

Therefore, the following topics will be analysed: (1) What CE strategies are being deployed by the biggest hotel chains in Europe? (2) Which issues are being targeted? (3) A comparative analysis among the selected hotel chains.

3. Method and Sample

Once a review of the existing literature on how a CE is being applied in the hospitality industry has been carried out, a multicase study will be conducted and applied to four relevant international European hotel chains. Specifically, the British InterContinental Hotels Group; the French-owned largest European hotel chain, Accor; and the two largest Spanish hotel chains, Melía Hotels International and NH Hotel Group, have been selected.

In this qualitative research, a multiple business case analysis has been conducted. Business case analyses facilitate an in-depth look at one issue when knowledge is limited ([24] Bryman and Bell, 2003). This method is very useful in understanding the different aspects of sustainability in tourism (e.g., [2,18]).

Table 1 summarises the most relevant data of each of the cases analysed.

Table 1. Case descriptions.

InterContinental Hotels Group Source: https://www.ihg.com/intercontinental/content/us/es/support/aboutintercontinental IHG Responsible Business Report (2015, 2016) and IHG Annual Report and Form 20-F (2017, 2018).
InterContinental Hotels Group (IHG) was created in 1946 by Pan American Airways, but is currently British. At present, it is the largest hotel chain in the world, as of 31 December 2018, with 5603 hotels across more than one hundred countries, offering 836,541 rooms and employing more than 400,000 people. Among its most important hotel brands are InterContinental, Kimpton, Crowne Plaza, Hotel Indigo, EVEN Hotels, Holiday Inn, Holiday Inn Express, Staybridge Suites, Candlewood Suites and Voco by IHG.
Accor Source: https://group.accor.com/fr-FR/group/who-we-are/our-history AccorHotels Registration Document and Annual Financial Report (2015, 2016 and 2017) and Accor Integrated Report (2018).
Accor was created in 1967 by Paul Dubrule and Gérard Pélisson with the opening of the Novotel hotel in Lille Lesquin. At present, it is the second largest European hotel chain and the first French one, having, as of 31 December 2018, 4780 hotels distributed across more than one hundred countries, with an offer of 703,806 rooms and employing more than 285,000 people. Among its most relevant hotel brands are Ibis, Ibis Budget, Ibis Styles, Hotel F1, Jo and Joe, Novotel, Mercure, Adagio, Tribe, SO Sofitel, Sofitel Legend, Grand Mercure, Peppers, Sebel, Mama Shelter, 25 h Hotels, Hyde, Pullman, MGallery, Swissôtel, Mövenpick, Mantis, Angsana, onefinestay, Sofitel, Raffles, Orient Express, Fairmont, Delano, Banyan Tree, The House of Originals and Rixos.
Meliá Hotels International Source: https://www.meliahotelsinternational.com/es/accionistas-e-inversores/informacion-financiera/informe-integrado Annual Report Meliá Hotels Group (2015, 2016, 2017, 2018).
Meliá Hotels International was created in 1956 by Gabriel Escarrer Juliá with the opening of the Altair Hotel in Mallorca. At present, it is the first Spanish hotel chain counting, as of 31 December 2018, 391 hotels in 44 countries, with an offer of 98,518 rooms and employing 46,000 people. Its most relevant hotel brands include Gran Meliá Hotels & Resorts, Paradisus by Meliá, ME by Meliá, Meliá Hotels and Resorts, Innside by Meliá, Sol by Meliá and TRYP by Wyndham.
NH Hotel Group Source: https://www.nh-hoteles.es/corporate/es/compania-responsable-y-sostenible/informes-rsc Annual Report NH Hotel Group (2015, 2016, 2017, 2018).
NH Hotel Group was created in 1978 by Antonio Catalán with the opening of the Hotel Ciudad de Pamplona. At present, it belongs to Minor International Public Company Limited (MINT) and is the second largest Spanish hotel chain counting, as of 31 December 2018, 350 hotels distributed in 28 countries, with an offer of 54,374 rooms and employing 54,374 people. Among its most relevant hotel brands are NH Hotels, NH Collection and nhow, and, in 2019, Tivoli, Anantara, Avani, Elewana and Oaks.

Source: Our own elaboration.

In order to achieve our goal, Global Reporting Initiative (GRI) reports have been used. These reports include their initiatives and impacts on issues such as climate change, human rights, corruption, governance and social well-being [25]. Therefore, this report should include the company initiatives in CE in a global way; this report type is preferred by researchers [26,27].

Figure 1 shows the procedure used to analyse the information found in the GRI reports.
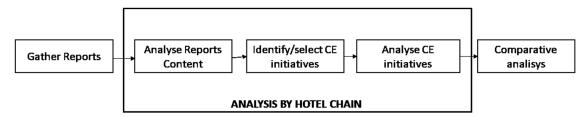

Figure 1. Procedure to analyse the information found in the GRI reports. Source: Our own elaboration.

4. Business Cases Analysis

4.1. Case Analysis 1. InterContinental Hotels Group (IHG)

IHG, in the field of sustainability and EC, aims to reduce its impact on the environment by using a digital sustainability platform, called IHG Green Engage. This platform is a global standard applicable to the entire group; it helps hotels to manage and control their energy consumption, CO_2 emissions, water use and waste generation through more than 200 green solutions and implementation plans that strive for profitability while minimising its environmental impact.

A priority objective of IHG Green Engage is water saving. Consequently, it offers technologies and processes that recommend almost 30 ecological solutions dedicated exclusively to water.

Green solutions are initiatives that the group's hotels can implement at the time of their construction or in their daily operations. Each green solution describes the action the hotel should take (such as replacing incandescent light bulbs in the rooms) and provides detailed steps to implement the solution. These recommendations cover the design, operations and technologies to reduce energy, water and waste, reduce carbon emissions, improve guests' health and comfort and reduce operating and maintenance costs. Some examples of the 200 plus ecological solutions are the use of efficient lighting and lighting controls, the installation of water-efficient bathroom fixtures, the use of energy efficient appliances and systems, rainwater storage, alternative energy supplies, improving indoor air quality, increasing waste management and sustainable event management.

With regard to food waste, in some of the group's hotels the Winnow system is already being applied; from an intelligent meter, it easily detects what and how food is wasted in hotels. This has allowed the group to reduce an average of 20% of food waste in these hotels. In parallel, by 2020, IHG has set out its commitment that 90% of its seafood products should be from fisheries of sustainable origin, including the prohibition of serving shark fins in the bars and restaurants of its hotels.

In addition, the group works with the carpet supplier Ege to test carpets using a thread produced from recycled plastic bottles and fishing nets. In 2018, a carpet test was carried out in eight hotels in Europe using four tons of 100% recycled thread and, given the good results obtained, this practice will be extended to more hotels in 2019. As for bedding, since 2018 bed linen has been purchased for Voco hotels from Trendsetter, which supplies them with pillows and comforters that are filled with 100% recycled plastic.

Finally, IHG is making a great effort to reduce greenhouse gas emissions using climate science. In the same way, with the aim of reducing plastic waste, in 2018 it promised to eliminate single-use plastic straws before the end of 2019. Likewise, an initiative has been implemented to remove plastic water bottles from meetings and events in favour of reusable glass bottles.

4.2. Case Analysis 2. Accor

Accor, as a commitment to sustainability and the transition to CE, has defined the Planet 21 in Action programme, which follows in the wake of the Planet 21 programme, and which aims to reduce the use of water, expand the recycling of its waste, protect biodiversity, reduce energy use and CO_2 emissions, increase the use of renewable energy and promote eco-design and sustainable construction. Its development includes a series of programmes related to the CE and sustainability, among which are:

- Plant for the planet. Accor asks their customers to reuse their towels. Savings made on water and energy are used to fund tree planting. One tree is planted every minute.
- Ecodesign. Novotel offers eco-designed beds made from wood sourced from sustainably managed forests Forest Stewardship Council (FSC) certified, as well as bedspreads and pillowcases made from recycled bottles; eco-certified soap, shower gel and shampoo is available in the rooms, as are environmentally-friendly, eco-certified cleaning products.
- Healthy and sustainable food. In its restaurants, Accor is committed to (a) offering healthy, balanced and high-quality food, and Accor uses products grown in their kitchen gardens, as well

as local products; and (b) reducing food waste and banning the use of overfished species in its restaurants.

Since 2018, hotels in the group must conform to the Planet 21 in Action programme and follow 16 actions that are common across the group such as the use of lighting and the commitment to energy savings. In addition, approximately 60 initiatives related to CE are proposed and hotels can freely choose which they will act on.

The hotel group has made an effort to implement a new room design using recycled and more environmentally sensitive products that are created to be recycled, limiting the quantities used in manufacturing and optimizing transport and packaging. In these rooms, it offers its customers complementary bath products, with an eco-label, selecting products certified as environmental by independent authorities, as well as using furniture made with FSC (Forest Stewardship Council) certified wood among others.

Its Novotel brand has integrated environmental criteria throughout the process of redesigning its room concept. Thus, the N'Room incorporates ecological products and includes taps with water-saving features, energy-efficient LED lighting, GUT (Gemeinschaft umweltfreundlicher Teppichboden) certified carpets placed with a solvent-free adhesive, quilts and pillows made of recycled material, Live N Dream beds with an ecological design and energy efficient televisions (A++ label). Likewise, paints were chosen as a wall covering to reduce waste. A large percentage of these items are manufactured in companies with an ISO 14001 certification.

To meet the global objective of reducing emissions set by the Paris climate agreement, Accor is committed to making hotels become carbon neutral buildings.

Throughout the years, a growing number of hotels have installed "smart" construction technologies, including IoT (Internet of Things) solutions to improve data collection and automate construction systems. The systems offer the benefit of reducing energy consumption and maintenance costs.

Since 2016, Accor has had a waste policy that defines three priorities designed to help the transition to the CE: (1) Treat 100% of hazardous waste in approved facilities; (2) classify and value the waste generated by the group's operational activities, and classify and recover 95% of the waste in 10 years; and (3) reduce the quantity and volume of the most important waste categories: food waste, packaging waste and paper waste.

Regarding the results obtained thanks to these initiatives, the group has been reducing, in all periods for which it offers public information, both water consumption and energy use, including greenhouse gas emissions. Specifically, in the period analysed in the present study, the group has managed to reduce water consumption in its hotels by 6.1%, energy use by 5.6% and greenhouse gas emissions by 8.3%. Although the company has not yet published its energy consumption data per room corresponding to 2018, the trend marked by the previous two years seems to indicate that there has also been a reduction in consumption in the last year (see Table 2).

Table 2. Accor environmental commitment results.

	2006/2010	2011/2015	2015/2018
Reduction in water consumption	−12%	−8.4%	−6.1%
Reduction in energy use	−5.5%	−5.3%	−5.6%
Reduction in greenhouse gas emissions		−6.2%	−8.3%
	2016	2017	2018
Energy consumption (kWh/average room)	41.95	39.00	-

Source: Accor Integrated Report (2015, 2016, 2017, 2018) and our own elaboration.

4.3. Case Analysis 3. Meliá Hotels International

Sustainability in Meliá is based on a global sustainability policy, in the strategic alliance that the group has with UNICEF and in sustainable products and services by the "Eco-Touch by Meliá" brand. Meliá is aligning with the European Commission's proposals regarding EC through four actions:

1. "Encourage and promote the recycling and reuse of certain materials and waste;
2. Take advantage of the momentum of technology to limit the consumption of certain materials to reduce their consumption and waste generation;
3. Use renewable, biodegradable or compostable raw materials;
4. Commit to the eco-design of our hotels, products and services to, on the one hand, improve the operation from an environmental perspective, and on the other, reduce waste generation". (Meliá Hotels Group Annual Report, 2018)

Along this line, Meliá's environmental commitment is outlined in pilot projects to minimise food waste, in the fight against single-use plastics, promoting the use of glass bottles or jars for customers and water dispensers and water bottles or customised glass for employees, in reducing their dependence on paper and in using more sustainable product formats; for example, it is acting so that almost all the coffee in capsules consumed in Meliá hotels located in Spain will be compostable, in the use of certified management systems, adjusting to environmental certifications, such as Earthcheck and Travelife seals and ISO certifications 14001 and 50001, as well as other certifications such as Biosphere, Green Leaders, Green Globe, and SAPLING level, as certified by Responsible Tourism Tanzania.

In the last year analysed, Meliá received the recognition of Best in Class in the environmental dimension, granted by RobecoSAM CSA and in that year approved the Purchasing and Contracting Policy for Responsible Services and the Supplier Code of Ethics, reinforcing the applicable management standards to the supply chain.

In the four years analysed, Meliá has made an important commitment to sustainability, which has materialised in both reductions in electricity consumption and CO_2 emissions. Specifically, if 2012 is considered as a base year, the group has managed to go from 21.12 kWh per stay in the 2012/15 period to 20.28 kWh per stay in the 2012/18 period. Likewise, it has managed to reduce its CO_2 emissions from 13.2 kg per stay in the 2012/15 period to 12.88 kg per stay in the 2012/2018 period. However, it has failed to control water consumption, which has risen from 0.40 m^3 per stay in the 2012/15 period to 0.51 m^3 per stay in the 2012/18 period. Similarly, it has not managed to reduce its generation of waste, from 1.45 kg per stay in 2015 to 1.54 kg per stay in 2018, although it has made an important effort in the selective collection of waste, from 33.4% in 2015 to 56.1% in 2018. Finally, as noted previously, Meliá has made an important commitment to ensure that its hotels achieve environmental certifications, achieving 149 environmental seals in 2015 and 180 in 2018 (see Table 3).

Table 3. Meliá Hotels International environmental commitment results.

	2012/2015	**2012/2016**	**2012/2017**	**2012/2018**
Electricity consumption (kWh/stay)	21.12	21.00	20.76	20.28
Water consumption (m^3/stay)	0.40	0.50	0.51	0.51
CO_2 emissions (kg/stay)	13.2	13.30	13.17	12.88
	2015	**2016**	**2017**	**2018**
Sustainability certificates	149	178	160	180
Waste regenerated (kg/stay)	1.45	1.45	1.33	1.54
Selective waste collection (%)	33.4	34.2	46.6	56.1

Source: Meliá Hotels Group annual report (2015, 2016, 2017, 2018) and our own elaboration.

4.4. Case Analysis 4. NH Hotel Group

Both the 2014–2018 Strategic Plan and the subsequent 2017–2022 report include the company's lines of action in the field of sustainability and CE, which are reflected in its annual reports and CSR reports, which follow the guidelines set out by the GRI and its Guide for the Preparation of Sustainability Reports in its G4 version; namely, the Ten Principles of the UN Global Compact and the Progress Report and the UN's Sustainable Development Goals.

In the analysed period, NH's environmental contribution has focused on reducing resource consumption, reducing CO_2 emissions, obtaining environmental certifications for its hotels and using "green" energy sources, as well as in working to minimise its impact on climate change, increasing resource efficiency and developing more sustainable products. All this has reduced the environmental footprint of the company, in addition to its responsible consumption of natural resources.

Since 2015, NH has evaluated its suppliers based on various parameters related to environmental management, environmental protection, carbon footprint reporting or alignment with Sustainable Development Goals (SDGs) through the qualification module of Suppliers in Electronic Trading Platforms. For all its actions in this area, over the years NH has received several awards such as the one granted by SOHO to the economic sustainability award granted by the Valencian Association of companies in the energy sector (AVAESEN), the InnDEA Foundation and recognition of the best global hotel sustainability project at FITUR.

NH has approved two major sustainability projects aimed at achieving its environmental objectives, which are the Green Savings Project and Green Hotel Project.

The Green Savings Project is focused on obtaining savings in the company's operations, as well as in energy efficiency to ensure savings in water, energy and other consumptions, such as laundry, whereas the Green Hotel Project is aimed at offering value to customers through innovative sustainable actions that improve brand perception.

NH has the global certification in environmental management ISO 14001 and in energy efficiency ISO 50001 for accommodation, catering, meetings and events, to which we must add other external individual certifications in sustainability and globally recognised seals, such as BREEAM, LEED, Green Key, Green + Hotels, and badges, such as Green Leaders of TripAdvisor.

With regard to the results obtained, since 2015 the consumption of energy per room per night has been acceptably reduced, going from 53.11 kWh in that year to 48.8 kWh in 2018. However, water consumption has hardly altered in this period, rising from 0.310 m^3 per room per night to 0.314. However, despite the efforts made in this area, their carbon footprint has increased significantly, going from 5.45 kg of CO_2 per room per night in 2015 to 7.05 kg in 2018. On the other hand, NH has made an important commitment that their hotels achieve environmental certifications, as evidenced by the fact that they have gone from having 126 certified hotels in 2015 to 141 in 2018. Finally, the average satisfaction of their customers with the sustainability of the hotels they were staying in, despite descending in the first years of the study, has achieved the highest value of the series with an average rating of 8.28 points out of 10 in 2018 (see Table 4).

Table 4. NH Hotel Group environmental commitment results.

	2013	2014	2015	2016	2017	2018
Energy consumption (kWh/RN)	53.11	49.95	50.40	50.19	49.3	48.8
Water consumption (m^3/RN)	0.299	0.304	0.310	0.318	0.318	0.314
Carbon Footprint (Kg CO_2e/RN)	9.47	7.79	5.45	5.30	6.91	7.05
Green certificate (hotels)	70	101	126	129	132	141
Average satisfaction with sustainability (over 10)	8	8.1	8.19	8.17	8.15	8.28

Source: NH Hotels Group Annual Report (2015, 2016, 2017, 2018) and our own elaboration.

5. Comparative Analysis

As can be seen in Table 5, most of the initiatives carried out by the four hotel groups selected in the four years chosen focus on the three main Rs supporting the CE: reduction, reuse and recycle, as previous research has noted.

Table 5. Comparative analysis of CE initiatives cited in the GRI of the four hotel chains analysed.

		Reduction	Reuse	Recycle	Redesign	Replace	Rethink
IHG	2015	█		█		█	
	2016	█	█	█	█	█	█
	2017	█	█	█	█		█
	2018	█	█	█	█		█
ACCOR	2015	█	█	█			█
	2016	█	█	█		█	█
	2017	█	█	█	█		█
	2018	█	█	█	█		█
MELIÁ	2015	█	█	█		█	
	2016	█		█		█	
	2017	█		█	█	█	
	2018	█	█	█			█
NH	2015	█	█	█			█
	2016	█	█	█		█	█
	2017	█		█		█	█
	2018	█	█	█		█	█

Source: Our own elaboration.

With regard to reduction, the four hotel groups, following their respective Sustainability Reports, have made great efforts in this area.

Reduction strategies are most commonly implemented strategy across entire hotel chains. By analysing every hotel chain in detail, Table 6 summarises how the reduction strategy is pursued.

Table 6. CE reduction strategy initiatives taken by analysing hotel chains.

	Energy	CO$_2$	Foo Waste	Water	Waste	Operations/Maintenance	Fertilizers and Pesticides	Plastics	Sustainable Mobility	Healthy Issues
IGH	█	█	█	█	█	█	█	█		
Accor	█	█	█	█	█	█	█	█		
Melia	█	█		█		█		█	█	█
NH	█	█		█		█		█	█	█

Source: own elaboration.

Thus, it is possible, according to Table 6, that the CE reduction strategy is deployed in three dimensions: (1) Basic initiatives: energy, CO$_2$ emissions, water and operations and maintenance; (2) plastics; and (3) special initiatives: food waste, fertilisers and pesticides, sustainable mobility and healthy issues.

The second of the Rs refers to reuse. The four chains are betting on the reuse of some of their elements once they are no longer used for their main activity to a lesser extent than the reduction strategy; for example, IHG has a specific programme aimed at reusing old coffee machines to give them a second life. Accor uses quilts and pillows made from recycled material and ensures that all wastewater effluents from their hotels are treated systematically for reuse, either by connecting to a collective treatment plant or a specific plant. In addition, in periods of low activity, the excess wind or photovoltaic electricity produced by the equipment installed in the hotels allows this energy to be stored in batteries, which facilitates the reuse of that energy. Meliá promotes the use of renewable energies, and one of its lines of action in the field of sustainability is the reuse of certain materials and waste. Finally, NH is betting on the use of furniture made from reused materials.

Therefore, the CE reuse strategy is focused on two dimensions: (1) utilities: energy and water and (2) furniture, small appliances and amenities.

The third R is related to recycling, and is widely used by the four chains analysed. IHG has a general system for recycling its waste and a specific one, developed with the support of Clean the World, which involves the recycling of shampoo and soap products discarded by customers; through Clean the World, it distributes them to people with economic problems. Accor also has a general waste recycling programme. In addition, it uses room furniture using recycled products. Currently, it is preparing its buildings to separate wastewater from grey water, as the latter can be recycled for use together with rainwater. It is building hotels with a wooden structure that will be easily recyclable in the future. It also recycles building elements when its buildings are rehabilitated, and recycles 100% of hazardous waste in specialised facilities. Presently, more and more hotels are collecting and processing their waste in advanced waste treatment facilities, which reduces the need for "in situ" separation of these materials. Meliá separates and counts its waste and recycles solid soap residue. It promotes the recycling of certain materials and waste such as soap, coffee and textile items. NH has a general recycling programme that makes special mention of packaging and glass. It has a waste separation system (paper, glass, used oil, plastics,) and a subsequent recycling system. The soap is recycled for use by pets and for compost. It also separates the caps of PET material for donation and recycles paper and plastic bottles.

The remaining CE strategies have a significantly less vital role; these strategies are redesign, replace and rethink.

With regard to redesign, IHG has redesigned hotels, such as the Holiday Inn Winchester, with the aim of supporting environmental sustainability. Specifically, the hotel has features that include intelligent lighting and air conditioning, with heat recovery systems and LED lighting installed in all public areas. In addition, it is a hotel "without a sewer", because the water used by the hotel is filtered and reused, so no water is discharged into the sewer. In addition, low-flow shower heads are installed in all bathrooms; these do not impede water quality. Similarly, aerators have been installed in all faucets. The hotel is also a leader with its waste management initiatives, with 100% of waste diverted from landfills, and food waste is processed in anaerobic digesters. For guests with electric cars, there is a charging point for electric cars in the hotel.

Accor, in its Planet 21 programme, promotes eco-design and sustainable construction, whilst Novotel has eco-designed beds. In addition, it has implemented an eco-design process programme, "Eco-Design Processes", which includes designing beds or rooms using recycled and environmentally sensitive products designed for recycling, thus limiting the quantities used in manufacturing, optimising transport and packaging. Novotel has integrated environmental criteria throughout the process of redesigning its room concept, resulting in the N'Room. The N'Room will incorporate ecological products and will include faucets with water-saving features, low energy LED lighting, certified GUT carpeting, including a solvent-free adhesive, duvets and pillows made of recycled material, eco-friendly beds, called Live N Dream, and energy efficient televisions (A++). Finally, paint was chosen as a wall covering to reduce waste from items such as wallpaper or flooring. A large percentage of the items will be manufactured in companies with an ISO 14001 certification. As a chain, it has a commitment to eco-design and innovation.

Meliá, meanwhile, has redesigned the facilities of its hotels by introducing improvements in the insulation of the pipes to reduce thermal loss and introduce double push-button tanks and adjustable discharge volumes, flow regulators, grey water and stormwater recovery and double glazing with thermal bridge breakages and solar film in windows to improve the thermal insulation of the facilities.

As regards replace, the four chains have been replacing elements of their facilities as they become obsolete or because they generated higher operating costs than the new elements. Most of these replacements have focused on the field of energy resources and on improving the energy efficiency of the facilities. The clearest example is the exchange of traditional light bulbs for energy-saving LED bulbs; however, this extends to other replacements in toilet plumbing, for example reducing the flow

of taps and installing new air conditioners, boilers and glazing, among others. These actions are so common that most of the reports of these chains do not even quote them.

Finally, rethink has gained great prominence in the chains analysed. IHG has used 'rethink' in the field of organic waste and has an ORCA machine (alternative for the conversion of organic waste), nicknamed Dino, which uses natural microorganisms and biochips to quickly break down food waste into harmless water, which can be safely discharged into the sanitary sewer system. Likewise, the green solutions mentioned previously have emerged from a process of rethinking how to improve the environmental sustainability of the hotel.

Accor has used 'rethink' in the design of its rooms, its furniture and its facilities, not to mention how to reduce their carbon footprint, even involving its guests, offering them the option of reducing and compensating their carbon footprint. In addition, it has created an internal environmental management system for hotels, called Charter 21, which has a series of administrative measures that establish an efficient framework (organisation, training, information, etc.), as well as specific measures for improving its environmental performance. It should also be noted that Accor has started the construction of a hotel called Jo and Joe, with a wooden structure, which absorbs CO_2 when it grows, stores it throughout its life and can then be recycled. The use of a translucent laminated wood, three times stronger than regular wood, is also being studied. Since 2016, a working group on CE has been created within Accor.

The Meliá group has promoted, together with the University of the Balearic Islands, research projects focused on improving the efficient criteria of a hotel's energy and water consumption, supporting start-ups in the design of monitoring prototypes for continuous waste reduction hoteliers and acts, together with Diversey, to boost CE through the recycling of soap, coffee and textile waste.

With regard to NH, in the four years analysed it has given much importance to rethink in its sustainability reports. As part of the NH meetings initiative for company events, the eco-friendly meetings have been designed to allow the client to organise emission-neutral meetings, compensating for this impact by supporting sustainable development and climate change projects managed by Carbon Clear. Likewise, after the success of the NH Alexanderplatz in Berlin, new beehive projects have been developed in other hotels, to which new orchard projects in urban hotels have been added.

6. Conclusions

Nowadays, concern regarding sustainability is the reason for changes in the current linear production system, changes that are necessary in order to try to stop climate change and other environmental problems. CE is considered to be a possible solution to face these problems. Specifically, on 2 December 2015, the European Commission issued a report titled 'Close the Circle: An Action Plan of the European Union for the Circular Economy' seeking a transition towards a more circular economy (CE), where products, materials, and resources are kept in the system for as long as possible while minimizing the generation of waste [28].

However, the literature is scarce and some definitions such as 'circular tourism' are not generalized yet. In fact, this term has been used by a few authors who could be considered pioneers in its diffusion [3,4].

The tourism sector must play a significant role in delivering sustainable solutions for people, the planet, prosperity and peace. Tourism was the third top world category in export earnings in 2015, representing 10% of world GDP, 30% of services exports and 1 out of every 10 jobs in the world. Moreover, tourism has a great capability to contribute to the 17 GDSs; specifically, tourism has been included as targets in Goals 8, 12 and 14 (http://tourism4sdgs.org/tourism-for-sdgs/tourism-and-sdgs/).

In the field of tourism, the hospitality sector has always been considered a great generator of risks to the environmental sustainability of tourist destinations due to the significant amount of energy resources it consumes, as well as the considerable amount of waste generated. Faced with this situation, as we have seen in this paper, larger chains have been making great efforts to be sustainable and to maintain the sustainability of the environment in which they operate.

From the study carried out we can conclude that the four hotel chains analysed follow similar approaches regarding the strategic lines and policies established in the field of sustainability, although the specific initiatives implemented differ in some cases. Such differences are especially visible when analysing some of these four chains specific hotels which take advantage of their own peculiarities to implement initiatives oriented towards sustainability (urban gardens on roofs, placement of hives, non-use of sewers, etc.). Nevertheless, circular economy principles and strategies are not adopted to a high degree yet, even in the biggest hotel chains worldwide.

Within the strategic lines defined by the four hotel groups, it has been found a relevant position is the search for sustainability in its three aspects—economic, social and environmental—and the reduction of the impact of their activity on the environment and the progress in the transition to EC. The policies are clearly oriented towards the classic 3Rs—reduction, reuse and recycle—the first of which seeks the reduction of energy and water consumption, the reduction of waste generation and the reduction of the use of single use plastics. Reuse is used by these chains, especially in aspects related to the reuse of energy. Recycling is mainly aimed at the management, separation and classification of waste generated by hotels—paper, glass, used oil, plastics, etc.—for subsequent recycling. Nevertheless, impacts of these strategies have not been measured enough and are not known yet. In addition, the strategies adopted could be considered basic and not very innovative, with some exceptions.

In recent years, rethink and redesign have taken on a leading and innovative role in offering customers easily recyclable and reusable products and services that reduce hotel operating costs by extending their useful life and allowing alternative uses.

It can be said that these four chains are betting, as a priority, on the reduction of energy and water consumption—in the latter case especially in those destinations where this element is scarce—as well as for the reduction of their greenhouse gas emissions and, as a result of these initiatives, for the reduction of their operating costs.

A common element of the two largest chains analysed is the concern they show in their annual reports for ensuring that those hotels that have franchisees have the same sensitivity as the parent company towards all these aspects related to sustainability.

Likewise, it should be noted that, upon approval by the United Nations General Assembly of the 2030 Agenda for Sustainable Development, in most of the Memoirs consulted, explicit mention is made of the SDGs that are intended to be achieved. In the same way, in these Memoirs reference is made to the objective of transforming the linear economy model into a CE model.

On the other hand, the results achieved are perfectly consistent with those indicated by the previous literature, while the four chains, as indicated in previous studies, are oriented, primarily, to the classic 3Rs (reduction, reuse and recycle).

This research is a first approach to circular tourism, but more efforts are needed in order to comprehensively analyse CE initiatives and measurement impacts. Additionally, government involvement is needed, particularly in encouraging and supporting circular tourism among large and small independent hotels.

Finally, the method used in this research is not free of limitations. Its main limitation is that the results do not allow generalisation. Nevertheless, this method attempts to understand extant business practices better than any other method.

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