ULPGC
Universidad de Las Palmas de Gran Canaria

Facultad de Economía, Empresa y Turismo

Programa de Doctorado en Turismo, Economía y Gestión

TESIS DOCTORAL

CIRCULAR ECONOMY AND TOURISM: Socioeconomic Profile of Tourists with a Greater Circular Behaviour and Factors Affecting the Implementation of Circular Practices in Hotels in a Mature Island Destination

Carlos Rodríguez Robaina

Febrero 2022

Las Palmas de Gran Canaria

ULPGC Universidad de Las Palmas de Gran Canaria | Escuela de Doctorado

UNIVERSIDAD DE LAS PALMAS DE GRAN CANARIA

ESCUELA DE DOCTORADO

Programa de doctorado en Turismo, Economía y Gestión

Título de la Tesis

Circular Economy and Tourism: Socioeconomic Profile of Tourists with a Greater Circular Behaviour and Factors Affecting the Implementation of Circular Practices in Hotels in a Mature Island Destination

Tesis Doctoral presentada por D. Carlos Rodríguez Robaina

Dirigida por la Dra. Dª. Carmen Florido de la Nuez

Codirigida por la Dra. Dª. Marta Jacob Escauriaza

Las Palmas de Gran Canaria, febrero de 2022.

“A mis padres”

AGRADECIMIENTOS

El camino recorrido para culminar la presente tesis doctoral ha sido largo, intenso y con muchos momentos de incertidumbre, pero también muy gratificante ya que me ha permitido enriquecerme tanto profesional como personalmente. Me gustaría transmitir mi agradecimiento a cada una de las siguientes personas e instituciones que han hecho posible la realización de esta tesis.

En primer lugar, quisiera agradecer a mis directoras, Carmen Florido y Marta Jacob por su paciencia, consejos, implicación y su ayuda durante estos años. Gracias por el esfuerzo, el tiempo dedicado y por animarme en esos momentos de desmotivación por los que creo que todos pasamos durante este proceso de investigación. Sin su dedicación y conocimientos no podría haber terminado esta tesis.

A mi familia, en especial a mis padres por su apoyo incondicional, por siempre creer en mí y por transmitirme la importancia de seguir formándome. A mi hermano por siempre estar ahí. A mi tío Peter Deavy por ayudarme a pulir algunos fallos del inglés. Mención especial merece mi tía Lidia quién hace 4 años me animó y se implicó para que comenzara esta tesis que ahora finaliza. Sus conocimientos y su larga carrera investigadora fueron claves para que comenzase a adentrarme en el apasionante mundo de la investigación.

Gracias a todos los compañeros académicos que me han ayudado con sus consejos y su tiempo. En especial a la Doctora Patricia Barber por sus recomendaciones.

A mis amigos, por estar presentes cuando más lo necesitaba y ayudarme a no tirar la toalla. A Jaime e Isa por su implicación.

Por último, agradecer el apoyo financiero recibido de los proyectos del Programa Europeo Interreg-Mac 2014-2020, Mac-Islandap (Mac/1.1a/207) y Mac-Islandap Advanced (Mac2/1.1a/299), para la realización de esta tesis doctoral.

INDEX

RESUMEN

Introducción y motivación de la tesis

El turismo es una actividad de indudable importancia en muchas economías del mundo. Antes de la pandemia de COVID-19, el sector turístico representaba el 10.4 % de todos los nuevos puestos de trabajo creados en el mundo y contribuía al 10.3 % del PIB mundial (WTTC, 2020). En este sentido, el turismo es una actividad esencial para la economía española, y en especial para las Islas Canarias. Según los datos del informe de Promotur del año 2019, los 15.11 millones de turistas que visitaron Canarias generaron unos ingresos totales de 15.070 millones de euros (Promotur, 2020). El turismo supone ya el 35.2% del Producto Interior Bruto y el 40.4% del empleo de la economía canaria (Exceltur, 2019).

Sin embargo, los impactos del turismo van más allá de su dimensión económica. Paralelamente al crecimiento del turismo, los impactos ambientales negativos de las actividades turísticas también han aumentado. El crecimiento y el desarrollo del turismo han alterado el estado del medio ambiente costero y han generado externalidades negativas sobre el medio ambiente como la degradación del agua de mar, el deterioro de la fauna y la flora, las emisiones de CO2 y la contaminación, la erosión y destrucción de los ecosistemas o el agotamiento de los recursos naturales y han generado una urbanización costera excesiva con problemas asociados como el impacto visual (Hunter y Green, 1995). De ahí que Canarias, por su condición de archipiélago, sea un destino muy vulnerable y con recursos muy limitados. Uno de los problemas más graves asociados al desarrollo de la actividad turística en el archipiélago es, por un lado, el consumo de altos niveles de recursos y, por otro, la generación de residuos. De hecho, Canarias lidera junto con Baleares el ranking de comunidades autónomas en generación de residuos per cápita (INE, 2021).

Estos impactos negativos del turismo se deben principalmente al modelo lineal de producción y consumo de la actividad económica. En este sentido, el concepto de Economía Circular (EC) cobra especial importancia al proponer modelos de producción con cero emisiones/residuos a través de la creación de procesos circulares e inclusivos. Kirchherr et al. (2017) describen la EC como “un sistema económico basado en modelos de negocios que reemplazan el concepto de fin de vida mediante la reducción, reutilización, reciclaje y recuperación de materiales en producción/distribución y consumo para lograr un desarrollo sostenible, lo que implica crear calidad ambiental, prosperidad económica y equidad social en beneficio de las generaciones presentes y futuras”. Por tanto, el objetivo de la EC se centra en transformar la escasez actual en una diferenciación que asegure los beneficios del futuro, a través de programas de ecoinnovación y ecoeficiencia que logren una gestión inteligente y estratégica de los recursos, transformando el valor de la cadena global de los productos y servicios en círculos ("de la cuna a la cuna") (McDonough y Braungart, 2010).

Teniendo en cuenta lo anteriormente mencionado, esta tesis surge con el propósito de generar conocimiento que sirva de guía para diseñar la transición a negocios circulares en el sector hotelero y en un destino insular de sol y playa, como Gran Canaria. Hasta

ahora, la circularidad en el turismo no ha recibido mucha atención, como se demostrará en el Capítulo 1. Existe una escasez de investigación, especialmente en forma de casos de estudio y la adopción de prácticas circulares desde una perspectiva organizacional para lograr de manera efectiva los objetivos de EC en la industria turística (Zorpas et al., 2021; Khan et al., 2021). En este sentido, esta tesis pretende solventar ese vacío en la literatura e investigar el estado actual de la EC en el turismo, analizar la implementación de prácticas circulares y posibles futuras líneas de investigación para la aplicación de la EC en un sector de gran importancia para la economía y el desarrollo de las Islas Canarias. La implementación de modelos y soluciones circulares resulta de especial importancia en destinos insulares como Canarias, donde una gestión adecuada y sostenible de los recursos parece ser un elemento clave en las políticas turísticas actuales y futuras de este destino. Las empresas y los destinos turísticos pueden aprovecharse de muchas iniciativas de EC para reducir el consumo de recursos naturales, la generación de residuos orgánicos y plásticos y las emisiones de CO2; y reutilizar, reciclar y recuperar productos, servicios, residuos, materiales, agua y energía. Al mismo tiempo estas empresas y destinos pueden conseguir una mayor rentabilidad y mayores ingresos en la prestación de servicios, por ejemplo, en el sector hotelero. Además, como Florido et al. (2019) indican, la implementación de modelos de negocios circulares en la industria del turismo ayudará a lograr un desarrollo sostenible y una mayor rentabilidad en diferentes sectores y el flujo de materiales relacionados con la construcción, energía, alimentos, agua, etc.

Para implementar una transición hacia una estrategia circular en cualquier destino, deben considerarse todos los actores relevantes: la administración pública y las Organizaciones Gestoras de un Destino (OGDs), las partes interesadas clave, la población residente, las empresas turísticas (sector privado) y los turistas (Florido et al. 2019). La presente tesis se centrará en el papel de dos de estos cuatro actores (los turistas y las empresas turísticas (sector privado), específicamente el sector hotelero. Así, se analizará el estado actual de la EC en el turismo y las prácticas circulares realizadas por los turistas e implementadas por el sector hotelero, pudiendo utilizarse los resultados de la tesis para proponer posibles líneas de acción con el objetivo de lograr una industria turística más circular.

De hecho, la actitud de los turistas hacia la EC y su comportamiento en términos de prácticas verdes, sostenibles y circulares durante sus vacaciones son cruciales para una transición hacia un modelo de economía circular en el sector turístico y el destino. Aunque los establecimientos hoteleros y el destino pongan en marcha acciones encaminadas a un cambio de modelo hacia la EC, sin un adecuado comportamiento y actitud circular por parte de los turistas, los esfuerzos realizados por los hoteleros y administraciones no serán del todo útiles. En este sentido, Sørensen y Baerenholdt (2020) indican que los turistas son coproductores de experiencias turísticas y, por lo tanto, las prácticas de los turistas sustentan la transición hacia una economía circular. Así, se considera fundamental promover una actitud consciente de los turistas sobre las consecuencias de su estilo de consumo en los destinos (Giurea et al. 2018). El comportamiento de los turistas también es fundamental para no perjudicar el compromiso medioambiental asumido por los alojamientos turísticos; por lo tanto, es

crucial que exista una estrecha colaboración entre los turistas y el personal de los alojamientos (Giurea, 2018). En consecuencia, surgen algunas preguntas como, por ejemplo, ¿qué variables socioeconómicas inciden en la actitud y el comportamiento circular o ambientalmente sostenible de los turistas? ¿Cuáles son las prácticas circulares más comunes implementadas por los turistas alojados en los establecimientos hoteleros de la isla? Estas cuestiones son analizadas en el Capítulo 2 titulado *"Socioeconomic Profile of Tourists with a Greater Circular Attitude and Behaviour in Hotels of a Sun and Beach Destination".*

El sector hotelero ha sido identificado como el sector más contaminante dentro de la industria turística. El impacto medioambiental generado por los hoteles es más visible en las zonas costeras donde predomina el modelo de turismo de sol y playa (Drius et al., 2019; Tovar-Sánchez et al., 2019). Por otro lado, Sorin y Sivarajah (2021) argumentan que los empresarios hoteleros quieren ser parte de las iniciativas de EC ya que sus clientes y empleados exigen cada vez más servicios circulares y más responsabilidad sobre su modelo de negocio y sus impactos ambientales. Por lo tanto, los gerentes de los establecimientos hoteleros muestran un creciente interés en la creación de valor de EC en sus negocios. Además, las acciones hoteleras sobre desarrollo sostenible ayudan a la economía local y, en consecuencia, al destino (Khodaiji y Christopoulou, 2020). La aplicación de los principios de EC puede proporcionar a las empresas hoteleras el marco necesario para el desarrollo empresarial y puede crear una experiencia más sostenible para todas las partes interesadas al reducir las implicaciones negativas en la sostenibilidad social y ambiental (Pamfilie et al., 2018).

Por lo tanto, en respuesta a las graves preocupaciones ambientales, la industria turística y más específicamente el sector hotelero necesita llevar a cabo una transición hacia un modelo de EC. Según Manniche et al. (2017) "una transición sistémica hacia la EC denotará que el sector hotelero se considere como un conjunto de flujos circulares de materiales interconectados, más o menos cerrados, que permiten una demostración en cascada de los recursos entre actividades o servicios como alojamiento, restauración, bienestar y ocio, etc." En este sentido, los esfuerzos hacia una mayor sostenibilidad en la industria hotelera pueden agruparse en tres áreas principales: energía, conservación de agua y gestión de residuos (Abdou et al., 2020 y Berezan et al., 2013). Las prácticas de EC adoptadas por un hotel dependen en gran medida de la antigüedad, el tamaño, la categoría del hotel, las técnicas de gestión de operaciones, las presiones ambientales de las partes interesadas, la afiliación a una cadena o la posesión de certificaciones ambientales. Relacionado con esto, surgen varias preguntas: ¿qué factores inciden en la introducción de prácticas circulares en los establecimientos hoteleros y cuáles son las prácticas circulares más comunes implementadas por estos hoteles? ¿Cuáles son las principales razones y objetivos que se persiguen con la implementación de las medidas de EC? ¿Cuáles son las principales barreras encontradas en la implantación de estas medidas? Las respuestas a estas preguntas se analizan en el Capítulo 3 titulado "*Factors affecting the adoption of circular practices in hotel establishments: a pilot study in a mature island destination*".

Objetivo de la tesis

La presente tesis doctoral tiene por objetivo evaluar la importancia del turismo en la literatura de EC, estudiar las prácticas circulares llevadas a cabo por los turistas e implementadas por los hoteleros en un destino insular maduro, Gran Canaria, y proponer algunas recomendaciones para lograr una mayor circularidad en el sector turístico. Todo ello en consonancia con la Agenda de los Objetivos de Desarrollo Sostenible (ODS) 2030 y en línea con la Estrategia de Economía Circular de Canarias 2021-2030, donde el turismo juega un papel crucial por su importancia para la economía insular y el impacto ambiental que genera. Así, esta tesis presenta los siguientes objetivos específicos:

1. Analizar el estado del arte sobre economía circular en el ámbito turístico clasificando toda la literatura científica disponible en líneas de investigación según su contenido y el principio de EC con el que se relaciona.
2. Analizar la actitud y el comportamiento de los turistas hacia las prácticas circulares en los establecimientos hoteleros de un destino insular maduro.
3. Identificar prácticas eco-innovadoras/circulares en el sector hotelero de un destino maduro y los factores que inciden en la introducción de estas prácticas circulares.
4. Definir posibles recomendaciones a seguir para la correcta implementación de una estrategia de EC en el sector turístico.

Estructura

La tesis se estructura de la siguiente manera: tras la introducción, el Capítulo 1 presenta en primer lugar, una revisión bibliométrica sobre EC en todos los campos de investigación; en segundo lugar, determina la importancia del turismo en la literatura de EC y clasifica toda esta literatura científica disponible sobre economía circular y turismo en líneas de investigación según su contenido y el principio de EC tratado; y tercero, identifica las áreas de conocimiento en turismo que cubre cada documento académico e indica las áreas donde se necesitan nuevos conocimientos. El Capítulo 2 tiene como objetivo estudiar la actitud hacia la EC y el comportamiento ambiental y las prácticas circulares entre los turistas de un conocido destino maduro de sol y playa, Gran Canaria. Por lo tanto, este capítulo identifica el perfil socioeconómico de los turistas con una mayor actitud y comportamiento circular en la isla. El Capítulo 3, en primer lugar, analiza la actitud y compromiso de los directivos de los hoteles hacia las prácticas de gestión de EC en la industria hotelera de Gran Canaria; y, en segundo lugar, identifica los factores que inciden en la implantación de prácticas circulares por parte de dichos establecimientos hoteleros. Finalmente, la tesis finaliza con las principales conclusiones, así como con las principales contribuciones e implicaciones de la tesis. Asimismo, en este último apartado se indican algunas limitaciones y se sugieren futuras líneas de investigación.

Metodología

La metodología utilizada en esta tesis difiere según el capítulo. En el caso del Capítulo 1 y con el fin de identificar los estudios para el análisis bibliométrico llevado a cabo, primero realizamos una revisión general de documentos, actas de congresos y artículos sobre EC en general indexados en la Web of Science, seguida de una revisión bibliográfica de artículos específicos y actas de congresos sobre EC y turismo en particular en dos bases de datos: Web of Science (base de datos de Thomson Reuters) y Scopus. En ambas revisiones únicamente se consideraron artículos publicados en inglés, realizándose la última búsqueda en la última semana de enero de 2020. El proceso de selección de cada artículo comenzó analizando el título, el resumen y las palabras clave de cada documento (primer paso para aceptar el artículo para la muestra), y luego, se continuó con el texto principal, centrándonos especialmente en los resultados y conclusiones (segundo paso para aceptar/rechazar el artículo). Todos los artículos fueron revisados en detalle con el objetivo de eliminar aquellas publicaciones que fueran irrelevantes para el estudio.

Para la revisión bibliométrica general sobre EC en cualquier campo o área se realizó una búsqueda utilizando la palabra clave "economía circular". El período temporal para esta revisión general sobre EC comprendió desde 1914 hasta enero de 2020, examinándose 5696 artículos científicos. Por otro lado, para analizar la importancia de la literatura de EC en turismo y con el objetivo de clasificar toda esta literatura científica disponible en líneas de investigación, las palabras clave utilizadas están relacionadas con el sector turístico y la economía circular, tales como, *hotel, turismo, economía circular, turistas circulares, hoteles circulares, prácticas medioambientales, prácticas verdes, ecoinnovaciones*, etc. El período considerado para esta revisión bibliográfica sobre EC y turismo fue de 2009 a enero de 2020 y se analizaron 55 artículos y libros. Posteriormente, cada artículo fue estudiado y, según su contenido, clasificado en uno de los 8 grupos descritos en el capítulo.

Con el objetivo de analizar y dar respuesta a las hipótesis planteadas en el Capítulo 2 y el Capítulo 3, se realizaron trabajos de campo específicos a través de cuestionarios estructurados, un cuestionario dirigido a turistas en el caso del Capítulo 2 y, otro a jefes de departamento o directores de hotel en el Capítulo 3. En ambos casos, se empleó un cuestionario estructurado que combinaba preguntas abiertas y cerradas y se dividían en cuatro secciones en el Capítulo 2 y cinco secciones en el Capítulo 3. Las encuestas fueron realizadas tanto presencialmente como vía online. Tras completar el trabajo de campo, los datos fueron tabulados utilizando el programa de análisis estadístico SPSS, versión 27.0 de Windows. Se realizaron análisis descriptivos para obtener el perfil del turista en el Capítulo 2 y el perfil de los hoteles en el Capítulo 3 y se utilizaron pruebas Anova y otros análisis estadísticos, tales como pruebas no paramétricas (test de Kruskal-Wallis o U de Mann-Whitney) para determinar las relaciones existentes y si hubo diferencias estadísticamente significativas entre las diferentes variables.

Resumen de cada capítulo

Como ya se ha mencionado anteriormente, la presente tesis se centrará en los siguientes objetivos: i) analizar, en primer lugar, el estado del arte de la EC en el sector turístico; ii) investigar el comportamiento y la actitud de los turistas en relación con las prácticas circulares y; iii) estudiar la implantación de prácticas circulares por parte de los establecimientos hoteleros de un destino insular maduro, Gran Canaria, así como los factores que influyen en su implementación. Para dar respuesta a estos objetivos, la tesis doctoral se desarrolla a lo largo de tres capítulos.

El Capítulo 1 evalúa la importancia del turismo en la literatura sobre EC e identifica las tendencias de investigación actuales y los posibles vacíos existentes en la literatura sobre EC y turismo. En concreto, el primer capítulo, "*Circular Economy Contributions to the Tourism Sector: A Critical Literature Review*", presenta, en primer lugar, una revisión bibliométrica sobre la economía circular en todos los campos de investigación, analizando la importancia de la EC en la literatura, las principales revistas que contienen publicaciones sobre EC y los campos de investigación donde se publica esta producción científica. Tras esta revisión bibliométrica se lleva a cabo un análisis de la importancia de la literatura de EC en turismo clasificando toda esta literatura científica disponible en líneas de investigación según su contenido y el principio de EC tratado. Por último, se presenta un modelo para identificar las áreas de conocimiento en turismo que cubre esta producción científica sobre EC y turismo e indicar las áreas donde se necesitan nuevos conocimientos. Los resultados de este estudio revelan que se necesita más investigación sobre la intersección del turismo con la EC para generar posibles soluciones hacia una industria turística más sostenible. En este sentido, se necesita más trabajo empírico e investigación para mejorar nuestra comprensión sobre la EC en el sector turístico. La investigación futura podría centrarse en definir una estrategia circular global que involucre a todos los actores y áreas del sector turístico sobre cómo atraer turistas a un hotel o destino circular.

Los resultados del primer capítulo muestran la importancia de un cambio hacia la circularidad en el sector turístico. Como se mencionó anteriormente, para implementar una transición hacia una estrategia de EC en cualquier destino, se deben considerar todos los actores relevantes: la administración pública y las OGDs y las partes interesadas clave, la población residente, las empresas turísticas y los turistas (Florido et al., 2019). Por ello, en los Capítulos 2 y 3 de esta tesis nos centramos en el papel de los turistas y de las empresas turísticas, concretamente del sector hotelero. Los residentes y la administración pública y las OGDs serán objeto de análisis en futuras líneas de investigación.

En consecuencia, el segundo capítulo, titulado "*Socioeconomic Profile of Tourists with a Greater Circular Attitude and Behaviour in Hotels of a Sun and Beach Destination*", analiza la actitud hacia la EC y el comportamiento ambiental y las prácticas circulares entre los turistas de un destino maduro internacionalmente reconocido de sol y playa, Gran Canaria. Por tanto, identifica el perfil socioeconómico del turista con mayor actitud y comportamiento circular en Gran Canaria analizando diferentes aspectos

como la concienciación e información del turista y su interés o reticencia a cambiar sus prácticas durante su estancia en el hotel; las prácticas circulares más comunes y las que la industria hotelera debe promover para alcanzar esta transición. Los principales hallazgos de este capítulo muestran que la actitud de los turistas hacia las prácticas circulares varía según el perfil socioeconómico: nacionalidad, nivel educativo y nivel de ingresos; los turistas mayores tienen una mayor actitud proambiental o circular en los establecimientos hoteleros que los más jóvenes; y las prácticas hoteleras sostenibles más comunes llevadas a cabo por los turistas son el uso de contenedores de reciclaje y la reutilización de toallas y sábanas. Asimismo, las mujeres demuestran tener comportamientos proambientales significativamente más altos que los hombres. Los resultados obtenidos en este capítulo pueden ser útiles para diseñar la transición de un modelo lineal a un modelo circular en la industria hotelera de un destino, ya que identifica las áreas que la industria debe promover para alcanzar dicha transición.

El tercer capítulo, "*Factors Affecting the Adoption of Circular Practices in Hotel Establishments: A Pilot Study in a Mature Island Destination*", investiga el compromiso por la economía circular y los factores que afectan a la implantación de prácticas circulares en los establecimientos hoteleros de Gran Canaria. Los principales resultados de este capítulo ponen de manifiesto que los factores clave que afectan la adopción de prácticas de EC por parte de los hoteles son el tamaño de éstos, su categoría, la afiliación a una cadena y tener una certificación ambiental. Los resultados también identifican las prácticas circulares más comunes relacionadas con los residuos, el agua, la energía y la Responsabilidad Social Corporativa (RSC) y las principales barreras y razones para implementar esas prácticas. Estos hallazgos tienen implicaciones para el diseño de una estrategia circular en los establecimientos hoteleros de un destino de sol y playa.

Los resultados de la tesis podrían ser útiles para diseñar la transición de un modelo lineal a un modelo circular en la industria hotelera de la isla y de cualquier otro destino maduro de sol y playa con características similares.

Conclusiones

Hasta ahora la circularidad en turismo no ha recibido mucha atención en la literatura. Esto demuestra la importancia y el interés por el tema ya que se trata de un campo de investigación relativamente joven y con muchas perspectivas de crecimiento. Por lo tanto, el principal valor añadido de la tesis es que constituye una de las primeras investigaciones que incluye un análisis de la importancia de la literatura de EC en la industria del turismo y clasifica toda esta literatura científica disponible en líneas de investigación según su contenido y el principio de EC tratado. Además, los Capítulos 2 y 3 se centran en datos de turistas y hoteleros de un destino insular maduro de sol y playa, mientras que la mayoría de los artículos sobre el tema se focalizan en hoteles urbanos o en destinos no insulares o no maduros. En este sentido, la implantación de soluciones de EC es especialmente importante en destinos insulares como Gran Canaria, donde existen altos niveles de consumo de recursos y una gran cantidad de generación de residuos. El cambio a un modelo circular en los destinos insulares debería ser un elemento clave en las políticas turísticas actuales y futuras. En

consecuencia, la importancia de esta tesis recae en proporcionar evidencia de las características de las empresas que conducen a una mayor implementación de prácticas circulares en los hoteles e identificar aquellas empresas donde se debe llevar a cabo un mayor esfuerzo político en esta transición hacia una EC, así como aquellos turistas con una mayor actitud y comportamiento circular. La transición a un modelo circular representa una gran oportunidad para la industria turística canaria, especialmente en estos tiempos de cambio como consecuencia de la crisis provocada por la pandemia del COVID-19.

A continuación, se presentan las conclusiones más relevantes de cada capítulo, así como las principales implicaciones y futuras líneas de investigación.

En el Capítulo 1 se analiza la importancia del turismo en la literatura sobre EC y las tendencias de investigación actuales y posibles lagunas en la literatura sobre EC y turismo. Los resultados derivados de este estudio muestran la necesidad de llevar a cabo una mayor investigación sobre la intersección del turismo con la EC para generar posibles soluciones hacia una industria turística más sostenible. En este sentido, se necesita más trabajo empírico e investigación para mejorar nuestra comprensión sobre la EC en el sector turístico. Futuras líneas de investigación deberían centrarse en definir una estrategia circular global que involucre a todos los actores y áreas del sector turístico sobre cómo atraer turistas a un hotel o destino circular.

El segundo Capítulo identifica el perfil socioeconómico del turista con mayor actitud y comportamiento circular en Gran Canaria a través del análisis de diferentes aspectos como la concienciación e información del turista y su interés o reticencia a cambiar sus prácticas durante su estancia en el hotel; y las prácticas circulares más comunes y las que la industria hotelera debe promover para alcanzar esta transición. Los principales resultados del Capítulo 2 indican que la actitud de los turistas hacia las prácticas circulares varía según el perfil socioeconómico: nacionalidad, nivel educativo y nivel de ingresos; los turistas de mayor edad tienen una mayor actitud proambiental o circular en los establecimientos hoteleros que los más jóvenes; las prácticas hoteleras sostenibles más comunes llevadas a cabo por los turistas son el uso de contenedores de reciclaje y la reutilización de toallas y sábanas, por último, las mujeres presentan comportamientos proambientales significativamente más altos que los hombres. De este modo, los resultados obtenidos en este capítulo podrían ser de utilidad para diseñar la transición de un modelo lineal a un modelo circular en la industria hotelera de un destino ya que identifica el tipo de turista con mayor actitud circular que la industria debe atraer para lograr esta transición y aquellas prácticas circulares donde los turistas hacen menos esfuerzo y las empresas turísticas deben promover para ayudar a conseguir el cambio a un modelo circular en el sector.

En el Capítulo 3 se investiga el compromiso por la economía circular y los factores que inciden en la implantación de prácticas circulares por parte de los establecimientos hoteleros de Gran Canaria. Los resultados empíricos de este capítulo muestran que los factores clave que afectan la adopción de prácticas de EC por parte de los hoteles son el tamaño del hotel, su categoría, la afiliación a una cadena y tener una certificación ambiental. Los resultados también identifican las prácticas circulares más comunes

relacionadas con los residuos, el agua, la energía y la Responsabilidad Social Corporativa (RSC) y las principales barreras y razones para implementar esas prácticas. Adicionalmente, este capítulo también muestra cuáles son las prácticas circulares que menos llevan a cabo los establecimientos hoteleros. Por lo tanto, los gerentes de hoteles deberían considerar comenzar a aplicar gradualmente estas otras prácticas y continuar manteniendo las prácticas que ya implementan. Estos hallazgos tienen implicaciones para el diseño de una estrategia circular en los establecimientos hoteleros de un destino de sol y playa.

Finalmente, es importante señalar que la presente tesis presenta ciertas limitaciones que conviene mencionar. Por un lado, y aunque se ha seguido un riguroso análisis bibliométrico de publicaciones sobre EC en el sector turístico (Capítulo 1), sólo se han considerado artículos y estudios publicados en inglés en las dos bases de datos analizadas. Por lo tanto, no se tiene en cuenta el resto de literatura sobre EC y turismo publicada en otro idioma. Además, los artículos de congresos (no indexados por Web of Science ni Scopus) o los informes publicados de proyectos europeos sobre EC no se han incluido en esta revisión, aunque pueden proporcionar contribuciones importantes a este campo de investigación relativamente nuevo. Por otro lado, la tesis analiza la actitud hacia la EC y el comportamiento ambiental y las prácticas circulares entre los turistas (Capítulo 2) y las prácticas circulares implementadas por el sector hotelero (Capítulo 3) de un conocido destino maduro de sol y playa, Gran Canaria. En consecuencia, se deben realizar más estudios empíricos para que los resultados sean representativos para todos los destinos turísticos de sol y playa y otro tipo de destinos turísticos, por ejemplo, destinos urbanos, para poder comparar resultados. Además, el Capítulo 3 solo proporciona información de una muestra piloto de establecimientos hoteleros de 2 a 5 estrellas en un destino insular maduro ya que la recopilación de datos se llevó a cabo durante la pandemia de COVID-19 cuando muchos hoteles permanecían cerrados. De ahí que primero, los resultados de los hoteles se deban tomar con cautela, habría que ampliar la muestra de hoteles para confirmar estos resultados en una temporada turística sin COVID-19; y segundo, se deben realizar más estudios en otro tipo de establecimientos turísticos como pensiones, apartamentos o alquileres vacacionales, así como en otro tipo de destinos turísticos y en un año sin pandemia.

Teniendo en cuenta todo lo anterior y los resultados de esta tesis, futuras investigaciones deberían avanzar hacia el análisis de otros actores importantes para lograr una transición de EC en el sector turístico, como las OGDs y el sector público o la población residente en el destino. Las OGDs y el sector público deben proporcionar un marco adecuado para alentar a los hoteleros a modificar su comportamiento para conseguir una transición hacia un modelo de EC. Además, la burocracia debe ser más flexible y deben promoverse incentivos para que los hoteleros lleven a cabo prácticas más circulares, también deben proporcionar fondos financieros para aplicar estrategias circulares, especialmente para pymes y hoteles independientes. Por otro lado, la población residente representa otro actor importante para alcanzar esta transición. En este sentido, se propone analizar sus actitudes y percepciones respecto a la economía circular en la industria turística.

Las conclusiones y futuras líneas de investigación que se abordan en esta tesis doctoral son el inicio de una línea de investigación en el campo de la economía circular en el sector turístico.

Bibliografía

Abdou, A. H., Hassan, T. H., Dief, E., and Moustafa, M. (2020). A description of green hotel practices and their role in achieving sustainable development. *Sustainability*, *12*(22), 9624.

Berezan, O., Raab, C., Yoo, M., and Love, C. (2013). Sustainable hotel practices and nationality: The impact on guest satisfaction and guest intention to return. International *Journal of Hospitality Management*, 34, 227-233.

Drius, M., Bongiorni, L., Depellegrin, D., Menegon, S., Pugnetti, A., and Stifter, S. (2019). Tackling challenges for Mediterranean sustainable coastal tourism: An ecosystem service perspective. *Science of the Total Environment*, *652*, 1302-1317.

Exceltur (2019). *Estudio del Impacto Económico del Turismo sobre la Economía y el Empleo de las Islas Canarias*. Available online: https://www.exceltur.org/2019/ (accessed on 15 May 2021).

Florido, C., Jacob, M., and Payeras, M. (2019). How to carry out the transition towards a more circular tourist activity in the hotel sector. The role of innovation. *Administrative Sciences*, *9*(2), 47.

Giurea, R. (2018). *Contributions regarding the research of the sustainable development in agro-tourism from a circular economy perspective* (Doctoral dissertation, University of Trento).

Giurea, R., Precazzini, I., Ragazzi, M., Achim, M. I., Cioca, L. I., Conti, F., ... and Rada, E. C. (2018). Good practices and actions for sustainable municipal solid waste management in the tourist sector. *Resources*, *7*(3), 51.

Hunter, C., and Green, H. (1995). *Tourism and the environment: A sustainable relationship?* Routledge.

INE (2021). *Estadística sobre recogida y tratamiento de residuos* (Statistics on the treatment and collection of waste). Per capita indicators. 2010-2019 Series. Available online: https://www.ine.es/jaxi/Tabla.htm?tpx=32999&L=1 (accessed on 17 December 2021).

Khan, O., Marrucci, L., Daddi, T., and Bellini, N. (2021). Adoption of circular economy and environmental certifications: Perceptions of tourism SMEs. *Journal of Management and Sustainability*, *11*(1), 218-218.

Khodaiji, J. D., and Christopoulou, D. (2020). Sustainable development and the circular economy in Greece: case examples from Costa Navarino and Grecotel. *Worldwide Hospitality and Tourism Themes*.

Kirchherr, J., Reike, D., and Hekkert, M. (2017). Conceptualizing the circular economy: An analysis of 114 definitions. *Resources, conservation and recycling*, *127*, 221-232.

Manniche, J., Topsø Larsen, K., Brandt Broegaard, R., and Holland, E. (2017). *Destination: A circular tourism economy: A handbook for transitioning toward a circular economy within the tourism and hospitality sectors in the South Baltic Region.*

McDonough, W., and Braungart, M. (2010). *Cradle to cradle: Remaking the way we make things*. North point press.

Pamfilie, R., Firoiu, D., Croitoru, A. G., and Ionescu, G. H. I. (2018). Circular Economy–A New Direction for the Sustainability of the Hotel Industry in Romania. *Amfiteatru Economic*, 20(48), 388-404.

Promotur (2020). *Perfil del turista que visita Islas Canarias 2019*. Available online: https://turismodeislascanarias.com/es/ (accessed on 8 April 2021).

Sørensen, F., and Bærenholdt, J. O. (2020). Tourist practices in the circular economy. *Annals of Tourism Research*, *85*, 103027.

Sorin, F., and Sivarajah, U. (2021). Exploring Circular economy in the hospitality industry: empirical evidence from Scandinavian hotel operators. *Scandinavian Journal of Hospitality and Tourism*, *21*(3), 265-285.

Tovar-Sánchez, A., Sánchez-Quiles, D., and Rodríguez-Romero, A. (2019). Massive coastal tourism influx to the Mediterranean Sea: The environmental risk of sunscreens. *Science of the Total Environment*, 656, 316-321.

WTTC (2020) *Travel and Tourism. Global Economic Impact & Trends 2020*. World Travel & Tourism Council website. Available online: https://wttc.org/Research/Economic-Impact (accessed on 15 April 2021).

Zorpas, A. A., Navarro-Pedreño, J., Panagiotakis, I., and Dermatas, D. (2021). Steps forward to adopt a circular economy strategy by the tourism industry. *Waste Management & Research*, *39*(7), 889-891.

I. INTRODUCTION

Introduction and motivation of the thesis

Tourism is an activity of undoubted importance in many economies around the world. Prior to the COVID-19 pandemic, the tourism industry accounted for 10.4% of all new jobs created worldwide and contributed to 10.3% of global GDP (WTTC, 2020). Tourism is an essential activity for the Spanish economy, and especially for the Canary Islands. According to the data of Promotur 2019 report, the 15.11 million tourists who arrived to the Canary Islands in 2019 generated a total income of 15.070 million Euros (Promotur, 2020). Tourism already accounts for 35.2% of the Gross Domestic Product and 40.4% of employment of the Canarian economy (Exceltur, 2019).

However, the impacts of tourism go beyond its economic dimension. Parallel to tourism growth, the environmental negative impacts of tourism activities have also increased. Tourism growth and development have altered the state of the coastal environment and have generated negative externalities on the environment such as seawater degradation, deterioration of fauna and flora, CO2 emissions and pollution, erosion and destruction of ecosystems or the depletion of natural resources and have generated an excessive coastal urbanisation with associated problems such as the visual impact (Hunter and Green, 1995). Hence, the Canary Islands, due to its archipelago status, is a very vulnerable destination with very limited resources. One of the most serious problems associated with the development of tourist activity in the Canary Islands is, on the one hand, the consumption of high levels of resources and, on the other, the generation of waste. In fact, the Canary Islands lead together with the Balearic Islands, the ranking of autonomous communities with the highest waste per capita generation indicator (INE, 2021).

These negative impacts of tourism are mainly due to the linear model of production and consumption. In this sense, Circular Economy (CE) implies a radical change of model, according to Kirchherr et al. (2017), “CE describes an economic system, based on business models which replace the end-of-life concept by reducing, reusing, recycling, and recovering materials in production/distribution and consumption to accomplish sustainable development, which implies creating environmental quality, economic prosperity and social equity for the benefit of current and future generations”. Then, the objective of CE is focused on transforming the current scarcity into differentiation that ensures the benefits of the future, through eco-innovation and eco-efficiency programmes that achieve an intelligent and strategic management of resources, transforming the global chain value of products and services in a circle ("from cradle to cradle") (McDonough and Braungart, 2010).

Considering the above-mentioned, this thesis arises with the purpose of generating knowledge that could be used as guidelines to design the transition to circular businesses in the hotel sector and in an island sun and beach destination. Until now, circularity in tourism has not received much attention, as Chapter 1 will demonstrate. There is a scarcity of research, particularly case studies focused on the adoption of CE from an organizational view to successfully achieve the CE objectives in the tourism sector (Zorpas et al., 2021; Khan et al., 2021). In this sense, this thesis is intended to fill

that gap in the literature and to investigate the current state of CE in tourism, the implementation of circular practices and possible future lines of research for the application of the CE in a sector of great importance for the islands economy and development. The implementation of CE models and solutions is especially important at island destinations such as the Canary Islands where an adequate and sustainable management of resources seems to be a key element in current and future tourism policies for this destination. Tourism businesses and destinations can take advantage of many CE initiatives to reduce the consumption of natural resources, organic and plastic waste generation, and CO2 emissions; and reuse, recycle and recover products, services, waste, materials, water and energy, but also to achieve greater profitability and increased revenues in services provision, for example, in the hotel sector. Additionally, as Florido et al. (2019) stated, the implementation of circular business models in the tourism industry will help it to achieve a sustainable development and greater profitability in different sectors and the flow of materials related to construction, energy, food, water, etc.

To implement a transition towards a CE strategy at any destination, one must consider all the relevant actors: the public administration and Destination Management Organizations (DMOs), key stakeholders, resident population, tourism businesses (private sector) and tourists (Florido et al., 2019). This thesis will focus on the role of two of these four actors (the tourists and the tourism businesses (private sector), specifically the hotel sector. So, this thesis will analyse the current state of CE in tourism and circular practices carried out by tourists and implemented by the hotel sector and in this way the thesis results could be used to propose possible lines of action to achieve a more circular tourism industry.

In fact, tourists' attitude towards CE and their behaviour in terms of green, sustainable, and circular practices during their holidays are crucial for a transition to a circular economy model in the tourism sector and destination. Although the hotel establishments and the destination implement actions aimed at a change in a CE model, without an adequate circular behaviour and attitude on the part of tourists, the efforts made by hoteliers and administrations will not be entirely useful. Hence, Sørensen and Bærenholdt (2020) indicate that tourists are co-producers of tourism experiences, and hence, the tourists' practices sustain the transition to a circular economy. It is essential to promote a conscious attitude of tourists about the consequences of their consumption style at destinations (Giurea et al., 2018). The behaviour of tourists is also important to avoid damaging the environmental commitment assumed by tourist accommodation; therefore, collaboration between tourists and staff is needed (Giurea, 2018). Thus, some questions arise (e.g., what socioeconomic variables affect the circular or environmentally sustainable attitude and behaviour of tourists; what are the most common circular practices implemented by tourists staying in hotel establishments in the island?). These issues are dealt with in Chapter 2 entitled "Socioeconomic Profile of Tourists with a Greater Circular Attitude and Behaviour in Hotels of a Sun and Beach Destination".

The hospitality industry has been identified as the most polluting sector within the tourism industry. The environmental impact of hotels is more visible in coastal areas

where the sun and beach tourism model is dominant (Drius et al., 2019; Tovar-Sánchez et al., 2019). Additionally, Sorin and Sivarajah (2021) argue that hotel operators want to be part of the CE initiatives as their clients and employees are increasingly demanding more circular services and more responsibility on their business model and its environmental impacts. Therefore, hotel managers have a great interest in the CE value creation in their business. On the other hand, hotel actions on sustainable development help the local economy and in turn the destination (Khodaiji and Christopoulou, 2020). The application of the CE principles can provide hotel companies with the necessary framework for business development and can create a more sustainable experience for all stakeholders by reducing the negative implications on social and environmental sustainability (Pamfilie et al., 2018).

Therefore, in response to serious environmental concerns, the tourism industry and more specifically the hotel sector needs to make a transition towards a CE model. Acording to Manniche et al. (2017) "systemic transition of CE will denote that the hotel sector will be considered as a set of circular flows of interconnected, more or less closed materials, permitting a cascade demonstration of the resources between activities or services like accommodation, restaurants, well-being and leisure, etc." In this sense, efforts towards greater sustainability in the hotel industry can be grouped into three main areas: energy, water conservation and waste management (Abdou et al., 2020 and Berezan et al., 2013). The CE practices adopted by a hotel are largely dependent on the age, size, hotel category, operations management techniques, stakeholder environmental pressures, chain affiliation or having environmental certifications. Related to this, several questions arise: What factors affect the introduction of circular practices in hotel establishments and what are the most common circular practices implemented by these hotels? What are the main reasons and objectives pursued with the implementation of CE measures? What are the main barriers found in the introduction of these measures? The answers to these questions are analysed in Chapter 3 entitled "Factors Affecting the Adoption of Circular Practices in Hotel Establishments: A Pilot Study in a Mature Island Destination".

General Aim and Objectives

The general aim of the thesis is to evaluate the importance of tourism in the CE literature, to study the circular practices carried out by tourists and implemented by hoteliers in a mature island destination, Gran Canaria, and to propose some recommendations to achieve greater circularity in the tourism sector. All in accordance with the 2030 Sustainable Development Goals (SDGs) agenda and in line with the Canary Islands Circular Economy Strategy 2021-2030, where tourism plays a crucial role due to its importance for the islands' economy and the environmental impact it generates. Thus, this thesis has the following specific objectives:

1. To analyse the state of the art on Circular Economy (CE) in the tourism field classifying all the scientific literature available in lines of research according to its content and the principle of CE discussed.
2. To analyse the attitude and behaviour of tourists towards circular practices in hotel establishments of a mature island destination.

3. To identify eco-innovative / circular practices in the hotel sector of a mature destination and the factors affecting the introduction of these circular practices.
4. To define possible recommendations to follow for the correct implementation of a CE strategy in the tourism sector.

Structure

After the introduction, this thesis is structured as follows. Chapter 1 presents first, a bibliometric review on the CE in all fields of research; second, evaluates the importance of tourism in the CE literature and classifies all this scientific literature available on the circular economy and tourism into research streams according to its content and CE principle dealt with; and third, identifies the knowledge areas in tourism that the paper cover and indicates the areas where new knowledge is needed. Chapter 2 aims to study the attitude towards CE and the environmental behaviour and circular practices among tourists of a well-known mature sun and beach destination, Gran Canaria. Hence, to identify the socioeconomic profile of tourists with a greater circular attitude and behaviour in the island. Chapter 3 first, analyses the attitude and commitment of hotel´s managers towards CE management measures in the hotel industry of Gran Canaria; and second, identifies the factors affecting the implementation of circular practices by those hotel establishments. Finally, the thesis includes the main conclusions, as well as the contributions and implications. Additionally, some limitations and future lines of research are suggested.

Methodology

The methodology used in this thesis differs depending on the chapter. In the case of Chapter 1 and to identify studies for review, firstly a general review of documents, conference proceedings and papers on CE indexed in the Web of Science was carried out, followed by a literature review of specific articles and conference proceedings on the CE and tourism in two databases: the social science citation index of the Web of Science (Thomson Reuters database), and Scopus. In these two reviews, only papers published in English were considered and the last search was made at the end of January 2020. The selection process of each paper started with an analysis of the title, abstract and keywords selected in the paper (first step to accept the paper for the sample), and then, we went on with the main text, especially focusing on the findings and conclusions (second step to accept/reject the article). All papers were scanned to filter out irrelevant publications.

For the general bibliometric review on CE in any field or area, the keyword “circular economy” was searched, and the period scanned for this general review on CE was from 1914 to January 2020 and 5696 scientific papers were analysed. On the other hand, to analyse the importance of the CE literature in tourism and to classify all this scientific literature available into research streams, the keywords used are related to the tourism sector and circular economy, such as hotel, tourism, circular economy, circular tourists, circular hotels, environmental practices, green practices, eco-innovations and so on. The period considered for this literature review on CE and

tourism was from 2009 to January 2020 and 55 articles and books were analysed. Subsequently, each contribution was analysed and, according to its content, classified in 8 streams described in the chapter.

To analyse and answer the hypotheses raised in Chapter 2 and Chapter 3, specific fieldworks were carried out through structured questionnaires, one questionnaire answered by tourists in the case of Chapter 2 and a second one answered by hoteliers or hotel managers in Chapter 3. In both cases, a combination of face-to-face and online surveys followed a structured questionnaire which combined open and closed questions and divided into four sections in Chapter 2 and five sections in Chapter 3. After completing the fieldwork, data were tabulated using the Statistical Package for the Social Sciences (SPSS) version 27.0 for Windows. Descriptive analyses were undertaken to obtain the tourist profile in Chapter 2 and hotels' profile in Chapter 3 and Anova tests and other statistical analysis (e.g., non-parametric tests) were used to determine relationships and whether there were statistically significant differences between the different variables.

Summary of each chapter

This thesis focuses on analysing first, the state of the art of CE in the tourism sector; second on investigating the behaviour and attitude of tourists in relation to circular practices and third, on studying the implementation of circular practices by hotel establishments in a mature island destination, Gran Canaria, and the factors that influence their implementation.

Chapter 1 evaluates the importance of tourism in the CE literature and identifies current research trends and possible gaps in the literature on CE and tourism. Specifically, the first chapter, "Circular Economy Contributions to the Tourism Sector: A Critical Literature Review", presents, first, a bibliometric review on the circular economy in all fields of research, analysing the importance of CE in the literature, the main journals publishing research on CE and the research fields where this scientific production is published; second, an analysis of the importance of the literature of CE in tourism classifying all this scientific literature available on the circular economy and tourism into research streams according to its content and CE principle dealt with; and third, a model to identify the knowledge areas in tourism that this scientific production on CE and tourism cover and to indicate the areas where new knowledge is needed. The results of this study reveal that more research is needed about the tourism intersection with CE in order to generate possible solutions towards a more sustainable tourism industry. In this sense, further empirical work and research are needed to improve our understanding of CE in tourism. Future research could focus on defining a global circular strategy that involves all tourism sector actors and areas, on how to attract tourists to a circular hotel or destination.

The first chapter shows the importance of a change towards circularity in the tourism sector. As previously mentioned, to implement a transition towards a CE strategy at any destination, one must consider all the relevant actors: DMOs and key stakeholders, resident population, tourism businesses and tourists (Florido et al., 2019). Therefore,

in Chapters 2 and 3 of this thesis we focus on the role of tourists and tourism businesses, specifically of the hotel sector. Residents and public organizations will be analysed in future lines of research.

In this sense, the second chapter, entitled "Socioeconomic Profile of Tourists with a Greater Circular Attitude and Behaviour in Hotels of a Sun and Beach Destination", aims to analyse the attitude towards CE and the environmental behaviour and circular practices among tourists of a well-known mature sun and beach destination, Gran Canaria. Hence, to identify the socioeconomic profile of tourists with a greater circular attitude and behaviour in Gran Canaria by analysing different aspects such as tourists' awareness and information and their interest or reluctance to change their practices while staying at the hotel; and the most common circular practices and those that the hotel industry must promote to reach this transition. Main findings from this chapter show that tourists' attitude towards circular practices varies according to socio-economic profile: Nationality, educational level and income level; older tourists have a higher pro-environmental or circular attitude in hotel establishments than younger ones; the most common sustainable hotel practices carried out by tourists are the use of recycling bins and reusable towel and linen schemes, and women report significantly higher pro-environmental behaviours than men. The results obtained from this chapter could be useful to design the transition from a linear model to a circular model in the hotel industry of a destination as it identifies the areas that the industry must promote to reach this transition.

The third chapter entitled "Factors Affecting the Adoption of Circular Practices in Hotel Establishments: A Pilot Study in a Mature Island Destination" investigates the commitment to circular economy and the factors affecting the implementation of circular practices by hotel establishments in Gran Canaria. Main results of this chapter show that the key factors affecting the adoption of CE practices by hotels are hotel size, category, chain affiliation and having an environmental certification. Results also identify the most common circular practices related to waste, water, energy and Corporate Social Responsibility (CSR) and main barriers and reasons to implement those practices. These findings have implications for the design of a circular strategy in hotel establishments of a sun and beach destination.

The results of the thesis could be useful to design the transition from a linear model to a circular model in the hotel industry of the island and of any other mature sun and beach destination.

Bibliography

Abdou, A. H., Hassan, T. H., Dief, E., and Moustafa, M. (2020). A description of green hotel practices and their role in achieving sustainable development. *Sustainability*, *12*(22), 9624.

Berezan, O., Raab, C., Yoo, M., and Love, C. (2013). Sustainable hotel practices and nationality: The impact on guest satisfaction and guest intention to return. International *Journal of Hospitality Management*, 34, 227-233.

Drius, M., Bongiorni, L., Depellegrin, D., Menegon, S., Pugnetti, A., and Stifter, S. (2019). Tackling challenges for Mediterranean sustainable coastal tourism: An ecosystem service perspective. *Science of the Total Environment*, *652*, 1302-1317.

Exceltur (2019). *Estudio del Impacto Económico del Turismo sobre la Economía y el Empleo de las Islas Canarias*. Available online: https://www.exceltur.org/2019/ (accessed on 15 May 2021).

Florido, C., Jacob, M., and Payeras, M. (2019). How to carry out the transition towards a more circular tourist activity in the hotel sector. The role of innovation. *Administrative Sciences*, *9*(2), 47.

Giurea, R. (2018). *Contributions regarding the research of the sustainable development in agro-tourism from a circular economy perspective* (Doctoral dissertation, University of Trento).

Giurea, R., Precazzini, I., Ragazzi, M., Achim, M. I., Cioca, L. I., Conti, F., ... and Rada, E. C. (2018). Good practices and actions for sustainable municipal solid waste management in the tourist sector. *Resources*, *7*(3), 51.

Hunter, C., and Green, H. (1995). *Tourism and the environment: A sustainable relationship?* Routledge.

INE (2021). *Estadística sobre recogida y tratamiento de residuos* (Statistics on the treatment and collection of waste). Per capita indicators. 2010-2019 Series. Available online: https://www.ine.es/jaxi/Tabla.htm?tpx=32999&L=1 (accessed on 17 December 2021).

Khan, O., Marrucci, L., Daddi, T., and Bellini, N. (2021). Adoption of circular economy and environmental certifications: Perceptions of tourism SMEs. *Journal of Management and Sustainability*, *11*(1), 218-218.

Khodaiji, J. D., and Christopoulou, D. (2020). Sustainable development and the circular economy in Greece: case examples from Costa Navarino and Grecotel. *Worldwide Hospitality and Tourism Themes*.

Kirchherr, J., Reike, D., and Hekkert, M. (2017). Conceptualizing the circular economy: An analysis of 114 definitions. *Resources, conservation and recycling*, *127*, 221-232.

Manniche, J., Topsø Larsen, K., Brandt Broegaard, R., and Holland, E. (2017). *Destination: A circular tourism economy: A handbook for transitioning toward a circular economy within the tourism and hospitality sectors in the South Baltic Region.*

McDonough, W., and Braungart, M. (2010). *Cradle to cradle: Remaking the way we make things*. North point press.

Pamfilie, R., Firoiu, D., Croitoru, A. G., and Ionescu, G. H. I. (2018). Circular Economy–A New Direction for the Sustainability of the Hotel Industry in Romania. *Amfiteatru Economic*, 20(48), 388-404.

Promotur (2020). *Perfil del turista que visita Islas Canarias 2019*. Available online: https://turismodeislascanarias.com/es/ (accessed on 8 April 2021).

Sørensen, F., and Bærenholdt, J. O. (2020). Tourist practices in the circular economy. *Annals of Tourism Research*, *85*, 103027.

Sorin, F., and Sivarajah, U. (2021). Exploring Circular economy in the hospitality industry: empirical evidence from Scandinavian hotel operators. *Scandinavian Journal of Hospitality and Tourism*, *21*(3), 265-285.

Tovar-Sánchez, A., Sánchez-Quiles, D., and Rodríguez-Romero, A. (2019). Massive coastal tourism influx to the Mediterranean Sea: The environmental risk of sunscreens. *Science of the Total Environment*, 656, 316-321.

WTTC (2020). *Travel and Tourism. Global Economic Impact & Trends 2020*. World Travel & Tourism Council website. Available online: https://wttc.org/Research/Economic-Impact (accessed on 15 April 2021).

Zorpas, A. A., Navarro-Pedreño, J., Panagiotakis, I., and Dermatas, D. (2021). Steps forward to adopt a circular economy strategy by the tourism industry. *Waste Management & Research*, *39*(7), 889-891.

II. EMPIRICAL CHAPTERS

CHAPTER 1
Circular Economy Contributions to the Tourism Sector: A Critical Literature Review

Circular Economy Contributions to the Tourism Sector: A Critical Literature Review

Abstract: Economic activity today is still based on a linear model of production and consumption: extract/produce and consume/throw, which exhausts natural resources and generates waste. The current linear economy does not optimize materials nor favour their recycling, reuse or recovery. Hence, the concept of Circular Economy (CE) has received increasing attention between policymakers and stakeholders worldwide. However, the literature on CE was mainly developed for the manufacturing sector, and only a few references are found on the tourism sector even though it is a sector where huge consumption of energy and water, food waste, congestion problems and CO2 emissions take place. This work aims to evaluate the importance of tourism in the CE literature and to identify current research trends and possible gaps in the literature on CE and tourism. In order to identify papers for this, the authors carried out a literature review of papers in the social science citation index (Web of Science) and Scopus. The keywords used are related to the tourism sector and CE, and the last search was made at the end of January 2020. Only papers published in English have been considered in the sample, which totals to 55 articles. Each contribution is analysed and, according to its content, classified into eight streams; then, the research identifies two knowledge areas in tourism that this scientific production covers and the areas with lack of knowledge generated. Findings show that more research is needed about tourism's intersection with CE in order to generate possible solutions towards a more sustainable tourism industry.

Keywords: Circular economy; CE principles; circular practices; rural tourism; cultural tourism; maritime sector; renewable energy; resources consumption; sustainable development; waste generation.

1. Introduction

Nowadays, more resources are being defined as critical, and resource depletion is getting more threatening (European Commission, 2014a). Economic activity is still described with a linear model of production and consumption that assumes a take–make–waste pattern in which with energy, labour and capital produce goods and services obtained from natural resources with a single life cycle. Resources are taken from the earth (take), processed into components (make) and, after being used, thrown away (waste). This is called the cradle-to-grave principle (McDonough and Braungart, 2010). This linear consumption pattern in which the end user is responsible for the removal of the product seemed to be successful in providing affordable products and global welfare but was totally based on waste of resources and the creation of garbage (Ellen MacArthur Foundation, 2013b).

In light of this, the Circular Economy (CE) has been an object of increasing attention among policymakers, stakeholders and managerial staff in the last few years, becoming a priority in national policies in a growing number of countries. CE appears as an alternative to the current model of production and consumption with the potential of solving environmental challenges, and at the same time, it opens up

opportunities for business and economic growth. Within a CE society, no waste for disposal should exist; instead, waste should be viewed as a new resource within the economy (Geng and Doberstein, 2008). Following the CE model, the pressure on the critical resources and the negative effects of disposing of waste can be reduced, whilst reutilization of resources and products can be promoted. Hence, more value can be obtained from the produced resources.

Tourism is an important contributor to employment and GDP in many countries and regions, especially in the EU, where five countries are among the ten best tourism destinations in the world (UNWTO, 2017). Tourism also has the potential to contribute to development in rural, peripheral, or less developed areas. Indeed, infrastructures created for tourism purposes contribute to local development, while jobs created or maintained can help counteract industrial or rural decline. Nevertheless, tourism also causes significant environmental impacts and can generate great pressure on local resources, producing negative externalities. In addition to land use, it requires resources such as water, energy, and food, producing large amounts of waste (solid waste and sewage), as well as congestion on roads, noise and air pollution and, therefore, CO2 emissions (Rico et al., 2019), and the reason is the linear economy model that we currently follow.

However, the literature on CE was developed mainly for the manufacturing sector, and there are few references to the tourism sector despite the fact that it is an industry predominantly configured around the model of the linear economy. Therefore, many CE solutions can also be applied to tourism businesses and destinations to reverse the trend and reduce consumptions of natural resources, waste and CO2 emissions. However, even recognizing that resources are scarce and limited and that this linear model is no longer viable, in general, the tourism industry has not shown a clear and decisive transition towards a more circular tourism model (Manniche et al., 2017).

Several research questions arise regarding the circular economy and tourism, mainly the following: What is the importance of the field of tourism in the CE literature? What are the current trends of research in CE and tourism? What kind of knowledge is produced? This chapter presents a comprehensive review on the circular economy and tourism in an attempt to answer these questions.

The aims of this chapter are, first, to present a bibliometric review on the circular economy in all fields of research, analysing the importance of CE in the literature, the main journals publishing research on CE and the research fields where this scientific production is published; second, to analyse the importance of the literature of CE in tourism and to classify all this scientific literature available on the circular economy and tourism into research streams according to its content and CE principle dealt with; and third, to further develop the model of knowledge needs in tourism of Jacob et al. (2014) to identify the knowledge areas in tourism that this scientific production on CE and tourism cover and to indicate the areas where new knowledge is needed.

After the introduction, this chapter is structured as follows: Section 2 describes the CE background framework, mainly the origin of the CE concept and the importance of the

transition from a linear to a circular economy. Section 3 describes the research methodology used for conducting the research. Section 4 provides information about the findings of two bibliometric reviews; Section 4.1 describes the literature review of general documents, conference proceedings and papers on the circular economy in any area indexed in the Web of Science, whereas in Section 4.2, the literature review presented focuses only on specific papers on CE and tourism from the social science citation index (Web of Science) and Scopus. Section 5 presents the discussion of the main results. Finally, the chapter concludes with a summary of future fields of research and final remarks on the contribution of this research.

2. Background Framework

This section provides a brief introduction to the CE concept, presenting its historical origins, main schools of thoughts and selected definitions.

2.1. The Origin of the Circular Economy Concept

The idea of Circular Economy has received increasing attention within recent years, but the concept is not new. The origin of the concept has been widely discussed, and it cannot be linked to one single date or author, as there are many authors who have written about it. Several schools of thought have analysed, developed and described industrial systems with such features using different terminology and approaches.

The origin of the CE term dates back to the 1920s, through different perspectives and schools of thought. Leontief (1928) introduces the concept in his research 'The Economy as a circular flow', Von Bertalanffy (1968) developed in 1937 the first breakthrough of 'The general system theory' and Lyle (1996) promoted recovery and systems regeneration (materials and energy) through regenerative design.

However, it was at the end of the 1990s when the CE concept was first coined by the environmental economists Pearce and Turner (2003) who claim that the term was first used in Western literature in the 1980s to describe a closed system of economy–environment interactions. Stahel and Reday (1977) were the first to refer to a closed-loop economy. His idea of improved durability was actually drawn directly from Boulding (1966), who wrote: 'I suspect that we have underestimated, even in our spendthrift society, the gains of increased durability'. Greyson (2007) also claims that Boulding was the originator of the term when he wrote: 'Man must find his place in a cyclical ecological system which is capable of continuous reproduction of material form even though it cannot escape having inputs of energy' (Murray et al., 2017). Another interesting claim is by Robèrt (1991), who stated: 'Most environmental problems are based on the same systemic error, linear processing of material. Until resources are processed in cycles, either by society or by biogeochemical processes, the global economy and public health will continue to deteriorate'.

Afterwards, other researchers discussed CE ideas, such as Benyus (1997), who talked about biomimicry, McDonough and Braungart (2010), in the field of industrial design, or Pauli (2010), who wrote about the blue economy. Yuan and Bi (2006) and Liu et al

(2009) claimed that it was originally a Chinese concept. More recently, Mathews and Tan (2011) suggested that 'the goal of the eco-initiatives is to eventually establish a so-called circular economy or what is otherwise known as a "closed-loop" economy'.

Nowadays, this term has received a great impulse with the work of the Ellen MacArthur Foundation, founded in 2010 in order to spread these innovative ideas and to accelerate the transition towards a circular regenerative and restorative economy. This organization indicates that the generic concept has been refined and developed by the following schools of thought and their authors: Cradle to Cradle, Performance Economy, Biomimicry, Industrial Ecology, Natural capitalism, Blue Economy and Regenerative Design (McDonough and Braungart, 2010; Lyle, 1996; Stahel and Reday, 1977; Pauli, 2010; Benyus, 2008; Frosch and Gallopoulus, 1989 and Hawken et al., 1999).

Other schools of thought related to the CE concept are Degrowth theory, Economy for the Common Good, Collaborative Economy and Social Economy. Against this background, these schools of thought have a multidisciplinary character reflecting that the circular economy must be analysed from a global point of view where diverse perspectives and approaches interact about its basic principles. Table 1 summarises the information presented in this section.

Once the origin of the CE concept has been analysed, the importance of a change from linear to circular economy will be explained.

Table 1. Origin of the Circular Economy concept.

Year	Author	Topic/School of thought
1928	Leontief	"The Economy as a circular flow"
1937	Von Bertalanffy	"The general system theory"
1966	Boulding	Improved durability
1977	Stahel and Reday	Performance economy
1989	Frosch and Gallopoulus	Industrial Ecology
1990	Pearce and Turner	Closed system of economy-environment interactions
1991	Robèrt	''Most environmental problems are based on the same systemic error, linear processing of material"
1994	Pauli	Blue economy
1996	Lyle /regenerative design	Regenerative design
1997	Benyus	Biomimicry
1999	Hawken et al.	Natural capitalism
2002	McDonough and Braungart	Cradle to Cradle
2011	Mathews and Tan	"Closed-loop economy".

2.2. From Linear to Circular Economy

Currently, the linear model of production and consumption exhausts the natural resources and generates waste. This model, which assumes that there is an unlimited supply of natural resources, and that the environment has an unlimited capacity to absorb waste and pollution, is dismissed (Cooper, 1999). In this context, it seems necessary to find a more holistic model of production that eliminates planned obsolescence through the transformation of 'products' into 'systems', where the equation production cost—environmental damage—product price is optimized, generating environmental benefits, profitability for companies and low prices for consumers.

In view of this, the CE concept arises, which aims at building a sustainable society through changing the current linear 'take, make and dispose' economy to a closed-loop society where no waste exists (European Commission, 2014b). The aim is to implement a new economy, circular and not linear, based on the principle of 'close the cycle of life' of products, services, waste, materials, water, and energy, rethinking waste as new resources capable of being reused in the system.

This concept stems from the belief that linear consumption will reach its limits in the foreseeable future (Ellen MacArthur Foundation, 2013a and Van Dijk et al., 2014). The belief that linear consumption is reaching its limits originates from the fact that the amount of resources available for use will decline steadily over the next years and decades, leaving little to play with for future use (Ellen MacArthur Foundation, 2014 and Mentink, 2014). In fact, the linear economy has generated environmental damages, especially in countries that have experienced rapid economic development, such as China (Geng and Doberstein, 2008).

2.3. Circular Economy: Concept

Circular Economy as a new economic model has its origins in Environmental Economics, whose aim is the integration of science into sustainability and sustainable development (Andersen, 2007).

There are many definitions of the CE concept: Feng et al. (2007) described it as a mode of economic development based on ecological circulation of natural materials, requiring compliance with ecological laws and sound utilization of natural resources to achieve economic development; Sauvé et al. (2016) defined CE as a model of production and consumption of goods through closed-loop material flows that internalize environmental externalities linked to virgin resource extraction and the generation of waste (including pollution); Hu et al. (2011) stated that the focus of the CE is on resource productivity and eco-efficiency improvement, and they adopt the 4R approach—reduce, reuse, recycle and recover; in addition, Geissdoerfer et al. (2017) defined it as a regenerative system in which resource input and waste, emission and energy leakage are minimized by slowing, closing and narrowing material and energy loops. This can be achieved through long-lasting design, maintenance, repair, reuse,

remanufacturing, refurbishing, and recycling. In its most basic form, a CE can be loosely defined as one which balances economic development with environmental and resource protection (UNEP, 2018).

Kirchherr et al. (2017) gave a broader definition: 'A circular economy describes 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, thus operational at the micro level (products, companies, consumers), meso level (eco-industrial parks) and macro level (city, region, nation and beyond), 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'.

More recently, Suárez-Eiroa et al. (2019) argue that a circular economy is a regenerative production–consumption system that aims to maintain extraction rates of resources and generation rates of wastes and emissions under suitable values for planetary boundaries, through closing the system, reducing its size, and maintaining the resource's value as long as possible within the system, mainly leaning on design and education, and with the capacity to be implemented at any scale.

Given the broad variety of definitions of the CE concept, this study will focus on the definitions given by the Ellen MacArthur Foundation and the Circle Economy cooperative, which summarizes and gathers all previous definitions mentioned on the CE concept. This Foundation defines CE as an industrial system that is restorative or regenerative by intention and design. It replaces the 'end-of-life' concept with restoration, shifts towards the use of renewable energy, eliminates the use of toxic chemicals, which impair reuse, and aims for the elimination of waste through the superior design of materials, products, systems and, within this, business models (Ellen MacArthur Foundation, 2013b).

The Ellen MacArthur Foundation has divided the CE definition into principles and characteristics. The principles were developed to be action guides for companies and organizations, whereas the characteristics describe the theoretical CE concept. Ghisellini et al. (2015) carried out an extensive review of the CE literature from the late 1990s until mid-2017, and as a result, they state that CE comes out basically through three main actions, the so-called 3R principles: Reduce, Reuse and Recycle.

CE systems intentionally focus on designing products that create no waste and introduce a strict distinction between consumable and durable components. These consist of primarily biological material that can be safely returned to the biosphere when the product reaches its end of life, possibly after the product has gone through a cascading process with multiple phases of reuse and the durable components consist largely of metals and most plastics only embedded in products intentionally designed for reuse (Ellen MacArthur Foundation, 2013a).

On the other hand, the Circle Economy cooperative describes the CE concepts as closing material loops and mimicking natural ecosystems when regarding society and

businesses (Circle Economy, 2018). Hence, the final goal of CE is to manage and recycle materials efficiently and only use renewable energy without having negative impacts on human life or ecosystems.

According to Kalmykova et al. (2018), the dissemination of the circular economy is hampered because the CE field is currently populated by diverging approaches.

Considering all these definitions, we can define CE as an economic model that is interrelated with sustainability concept and whose aim is that the value of products, materials, and resources, such as water and energy, stays in the economy as long as possible, thus reducing waste generation. It is about implementing a new economy based on the principle of 'closing the life cycle' of products, services, waste, materials, water, and energy, reconsidering waste as a new resource that can be reused in the system. Therefore, the CE implies a radical change in the current production system and consequently in the way of doing of companies, citizens, policymakers and legislators.

3. Methodology

In order to identify studies for review, the authors firstly carried out a general review of documents, conference proceedings and papers on circular economy indexed in the Web of Science, followed by a literature review of specific articles and conference proceedings on the circular economy and tourism in two databases: the social science citation index of the Web of Science (Thomson Reuters database), and Scopus. The authors decided to use these two databases because they are the two most important databases containing the literature which shows the greatest impact in a particular field, or more than one discipline. In these two reviews, the last search was made at the end of January 2020.

For the general bibliometric review on CE in any field or area, the keyword "circular economy" was searched, and the article parts analysed were first the title, abstract and keywords selected in the paper, and then, we went on with the main text, especially focusing on the findings and conclusions. Only papers published in English were considered for the sample, which totals to 5696 scientific papers. The period scanned for this general review on CE was from 1914 to January 2020.

To analyse the importance of the CE literature in tourism and to classify all this scientific literature available into research streams, the keywords used are related to the tourism sector and circular economy, the topic of this study, such as hotel, tourism, circular economy, circular tourists, circular hotels, environmental practices, green practices, eco-innovations and so on. Only papers published in English have been considered in the sample, which totals to 55 articles and books. The period considered for this literature review on CE and tourism was from 2009 to January 2020. The selection process of each paper started with an analysis of the title, abstract and keywords selected in the paper (first step to accept the paper for the sample), and then, we went on with the main text, especially focusing on the findings and conclusions (second step to accept/reject the article). All papers were scanned to filter

out irrelevant publications. The main reason to reject publications was that they did not really focus on tourism. Subsequently, each contribution was analysed and, according to its content, classified in 8 streams described in the following sections.

4. Findings

4.1. General Literature Review on CE

A literature review was conducted using the keyword 'circular economy' in the Web of Science database. The last search was made at the end of January 2020. Only papers published in English were considered in the sample, which totals to 5696 scientific papers.

Table 2 shows the origin of some of the papers used in this study. The journal that gathers the most papers on CE is the Journal of Cleaner Production with 524 papers, followed by Sustainability with 256 and Resource, Conservation and Recycling with 203 papers. After them, the most important journals are Waste Management New York N Y (116), Waste Management (109), Advanced Material Research (77) and Journal of Industrial Ecology (76), among others. Scientific reports mainly arise from the Ellen MacArthur Foundation (Ellen MacArthur Foundation 2013a, 2014 and 2015), and the European Commission, the EC is currently working on the implementation of the Circular Economy Action Plan (European Commission 2014a, 2014b, 2015 and 2016).

Table 2. Publications on CE by journal (191496-January 2020). Top Eight.

Source	Count
Journal of Cleaner Production	524
Sustainability	256
Resources, Conservation and Recycling	203
Waste Management New York N Y	116
Waste Management	109
Advanced Materials Research	77
Journal of Industrial Ecology	76
Procedia CIRP	72

Figure 1 presents the temporal evolution of the papers on CE published per year. As we can observe, CE is a novel concept within the scientific field, as most of the papers were published after 2006, and 2018 and 2019 being the years with more published papers, with 1009 and 1627, respectively.

Figure 2 presents the number of CE publications by country. As we can observe, in the field of CE scientific knowledge production, China has the highest number of publications on CE with 1520 papers published.

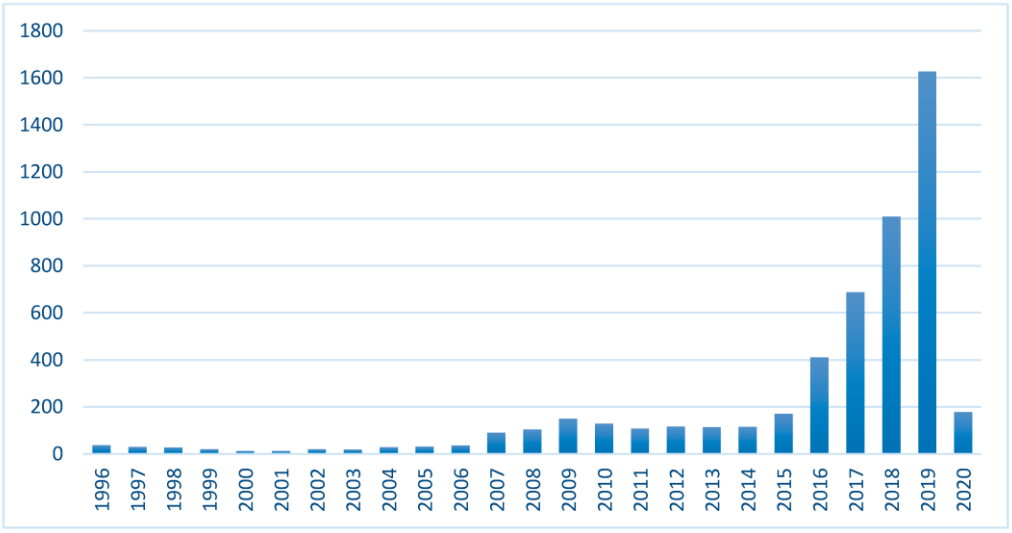


Figure 1. Number of papers published per year.

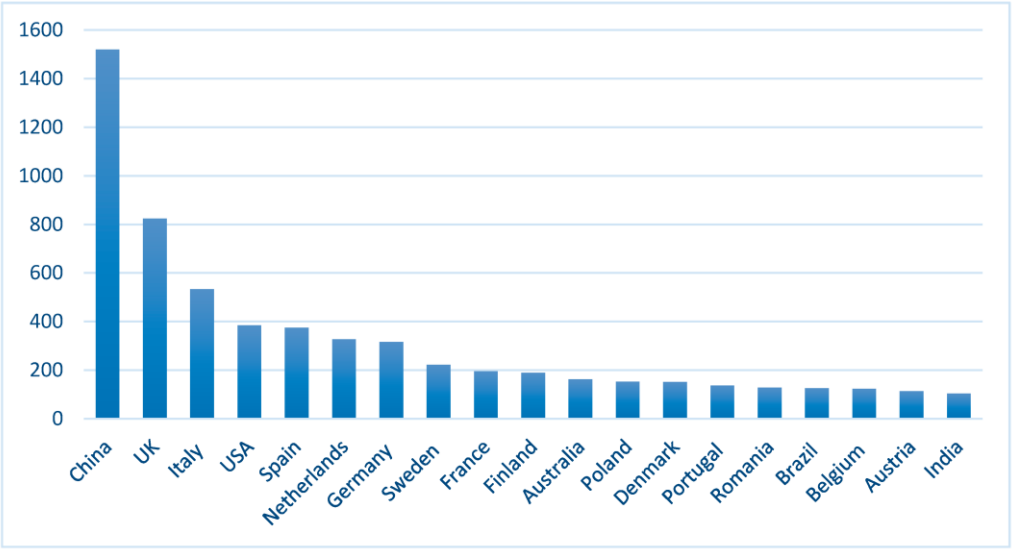


Figure 2. Number of publications by country.

Table 3 presents the papers published on Circular Economy classified by research areas. We can observe that Engineering is the most productive field in terms of published papers, followed by Environmental Sciences and Ecology and then by Business Economics.

Table 3. CE Publications by Research Areas.

Research Area	Count	Percentage of 5696 papers
Engineering	3128	54.92%
Environmental Sciences and Ecology	2821	49.53%
Business Economics	2469	43.35%
Science Technology Other Topics	1625	28.53%
Energy Fuels	1567	27.51%
Computer Science	940	16.50%
Public Environmental Occupational Health	696	12.22%
Instruments Instrumentation	653	11.46%
Materials Science	625	10.97%
Chemistry	578	10.15%
Agriculture	525	9.22%
Geography	397	6.97%

4.2. Literature Review on Circular Economy and Tourism

The literature on CE analysed in Section 4.1 was mainly developed for the manufacturing sector, and it mainly focuses on engineering and science technologies. Only a few references are found in the tourism sector, even so, it is a sector where large consumptions of energy and water, food waste, congestion problems and CO2 emissions and pollution take place.

In effect, the tourism sector has not received much attention in the CE development framework. Naydenov (2018) states that the tourism sector has until now not yet received much attention as a possible context for CE initiatives and analyses. However, Vargas-Sánchez (2018) argues that this is an area that will deserve much more attention at the international level in the years to come from academics, practitioners, and public policymakers.

If we look at the literature, we do not find studies that identify specific guidelines to carry out the transition of the tourism sector towards a circular economy, as it exists in other sectors such as the industrial one. In addition, the flows of resources and materials within the tourism sector intersect with other sectors, which reinforce the need to carry out this transition. Circular tourism implies a model in which each tourism actor (tourist, Destination Management Organizations (DMOs), suppliers (hotels, restaurants, etc.), and resident population) adopts an eco-friendly approach (Florido et al., 2019).

When a search about this topic (using keywords such as ‘circular economy and tourism’, ‘circular tourism’, ‘circular tourists’, ‘hotel and circular economy’, ‘circular hotels’, ‘green practices and tourism’, ‘environmental practices and hotels, tourists or tourism’, ‘eco-innovations and hotels, tourism, or tourists’, and so on) is carried out in scientific databases (Web of Science or Scopus), results indicate a scarcity of available literature. The last search was made at the end of January 2020. Only papers published in English have been considered in the sample, which totals to 55 articles and books. Subsequently, each contribution was analysed and, according to its contents, classified into one of the eight streams described in the following section.

The vast majority of the publications found are from Chinese authors; this may be because the government of China has chosen CE as its sustainable development strategy. This strategy, formally accepted in 2002, has been already implemented and developed in a number of pilot areas in the country (Su et al., 2013).

Some authors have conducted literature reviews related to the topic of CE and tourism. Niñerola et al. (2019) carried out a literature review on sustainability and related concepts through the Scopus database, and they show that there are not many papers related to the keywords 'circular economies' and 'blue economies'. Vargas-Sánchez (2018) analyses the state of the art of CE in tourism, and findings show the scarcity of scientific literature available in this field and the lack of a common understanding of this concept. D'Amato et al. (2017) carry out a bibliometric review to analyse the diversity within and between Circular Economy, Green Economy (GE) and Bio Economy (BE) concepts. They find, first, that there is a Chinese dominance in CE research; second, that 'CE focuses on industrial urban processes for decoupling resource use and economic output'; and third, that between these concepts, GE is the one where the keyword tourism is more frequently found and analysed. However, none of these reviews classify the publications on circular economy and tourism on research streams or identify current trends in research or the areas where there may be a greater need for research in circular economy and tourism. To fill these gaps, this study analysed, first, all the publications on circular economy and tourism and classified them into eight streams according to their keywords and the topics covered, as can be seen in Table 4. A few papers can be classified in several streams. Second, the study further develops the model of knowledge needs in tourism of Jacob et al. 2014 to identify the knowledge areas in tourism that this scientific production on CE and tourism cover and to indicate the areas where new knowledge is needed on CE and tourism.

Table 4. Circular economy and tourism by streams.

Circular Economy and Tourism	
Stream	**Keywords**
Agriculture and rural tourism	Leisure agriculture, agro-tourism, forestry economy, eco-agriculture, agro-circular economy, phyto-depuration, fertilizer
Application of renewable energy in the tourism sector	Renewable energy, waste-to-energy, low carbon economy, cleaner production, sustainable energy, smart technology
Cultural tourism and circular economy	World heritage sites, cultural urban landscape, alternative tourism, scenic spots
Hotels and tourists' circular practices	Circular hotels, tourists, hotel business case, eco-innovations, hotel sector's competitiveness
Maritime sector and tourism	Marine debris, marine litter, microplastics, blue growth, maritime economy, development of seaport cities, aquaculture, seagrasses
Resources consumption in the tourism sector	Use of resources, environment, infrastructure
Sustainable Development Goals	Sustainable Development Goals, climate change, sustainable jobs, governance, sustainability
Tourism and waste generation	Waste management, septage management, solid-waste management, secondary raw materials, recycling materials

4.2.1. Agriculture and Rural Tourism

Many of the studies found are focused on agriculture and rural tourism. Jia et al. (2014) discuss a development model of leisure agriculture for the Yi County (China) and conclude that it can be used to promote the sustainable development of local ecotourism. Giurea et al. (2017) present some preliminary aspects for a comparison between the agro-tourism sectors in Italy and Romania, taking into account the main topics that can affect their sustainability, including the CE concept. Immacolata (2018) argues that rural tourism can only be an integrated and coordinated component within integrated rural development models specific for each territory able to ensure a balance between consumption and reproduction of rural collective resources in a new approach to the circular economy. Xuan et al. (2011) describe the agro-circular economy concept as the agricultural sustainable development strategy based on the 3-R principle and including green agriculture, ecological agriculture, and sustainable agriculture.

Su et al. (2012) expose the connotation of circular economy and ecological agriculture, proposing Rex rabbit industry as an example. They apply cycle of economic theory as a guide to material and energy use optimization for the purpose of using a 4R (Reduce, Reuse, Recycle and Reorganize) principle. Bonanno et al. (2018) analyse the application of different methods to achieve sustainable goals in a farm holiday company in Sicily.

Zhang and Tang (2019) analyse and evaluate the optimal combination and utilization mode of agricultural and animal husbandry circular economy in mountainous areas in Tibet, taking into account natural resources utilization, agricultural products production and processing, agricultural and animal husbandry production and construction, and eco-tourism development in order to provide better services. They argue that mountain agriculture and animal husbandry leisure tourism mode is an effective way of developing circular practices in rural tourism.

Yuan and Xue (2009) study how to construct small towns in a rural area in China based on circular economy to solve environmental problems. The basis for doing this is developing eco-agriculture, eco-industry and eco-service and constructing eco-agricultural areas, eco-industrial areas, and eco-tourism areas.

Finally, Kupczyk et al. (2019) present a study on the beach wrack problem, which is not only a problematic phenomenon for the environment but also a factor that reduces the tourist attractiveness of the seaside resorts, thus creating a social problem. The use of beach wrack as a fertilizer in agriculture or enrichment of compost will close the circulation of organic matter in the environment, entering the reed bed system into a circular economy.

4.2.2. Application of Renewable Energy in the Tourism Sector

Renewable energy plays a key role in the transition towards a CE model in the tourism sector, and many authors have investigated it. Dong (2018) argues that using renewable resources instead of conventional energy is an important aspect for the

application of circular economy in tourism. These renewable energies can be widely used in tourist areas, travel, accommodation, catering, transportation, shopping, entertainment, and other tourism enterprises. Falcone (2019) complements the current interest towards tourism and circularity principles by doing a Strengths, Weaknesses, Opportunities and Threats–Analytic Network Process (SWOT–ANP) to explore the potential development of a second-generation biorefinery in Salento (Italy) able to integrate waste management, renewable energy, and bio-products production in the tourism industry. At the same time, Wu (2019) applies a SWOT analysis method to explore the low-carbon economy in Zhaoqing City (China), the optimization of energy structure, the promotion of low-carbon tourism, the development of circular economy, and the enhancement of carbon sink capacity in this city. Additionally, Uche-Soria and Rodríguez-Monroy (2019) analyse the potential of municipal solid waste recovery as an efficient alternative to landfill deposition in isolated environments such as the island of La Gomera (Canary Islands), where tourism is the main economic activity. That would be an additional energy source for heat and electricity.

Hens et al. (2018) provide a review of essentials that contributed to the fundamental changes in Cleaner Production (CP), indicating the links between CP and green and circular economy. The tourism sector should use CP approaches bringing down its carbon footprint and using its inputs more efficiently in order to make the transition to a circular economy. Ma et al. (2016) study the renewable energy systems used in tourism circular economy by selecting a scenic spot, and Patti (2017) discusses the attitude towards the circular economy and low-carbon tourism by investigating consumption behaviour of people who use sharing utilities. The study also explores motivations to share utilities and the knowledge and sensitivity towards CE. Jaroszewska et al. (2019) analyse the CE implementation level in the energy sector of tourist small and medium-sized enterprises (SMEs) in a Polish coastal area, part of the South Baltic Region. They conclude that the tourism sector in the Polish part of South Baltic Region is ready to implement a change from a linear to a circular economy in the context of energy. Finally, Pan et al. (2018) provide an overview of the interrelationships between tourism and sustainability, reviewing current challenges and barriers, such as high energy use, extensive water consumption and habitat destruction. They also discuss the key cross-disciplinary elements in sustainable tourism, including green energy, green transportation, green buildings, green infrastructure, green agriculture, and smart technologies.

4.2.3. Cultural Tourism and Circular Economy

According to the UNWTO (2018a), cultural tourism represents around 37% of the total tourism sector, with an annual growth of around 15%. The promotion of the circular economy principles in the rehabilitation and conservation of heritage initiatives is crucial for the sustainable continuity of this sector.

Taking this into account, Fang and Zhang (2010) consider that the implementation of CE theory would lead to a long-term protection of world cultural heritage sites in China through the practice of eco-designing, energy conservation, green services facilities provision, waste eco-disposal and green consumption. Valls et al. (2019) present

Madeira´s perception of the slow tourism model, interviewing entrepreneurs in the island´s lodging, restaurant and bar, shopping, transportation, intermediation, tourist activity industries and its public sector. In addition, Nocca (2017) studies the role that cultural heritage can play in the sustainable development framework with the analysis of 40 case studies of culture-led regeneration projects focusing the attention on the double relationship between the tourism sector and climate change. Results show that cultural heritage conservation/valorisation is mainly interpreted in touristic and real estate impacts. Cultural heritage plays a marginal role in the 2030 Agenda for Sustainable Development as it is only mentioned in the goal 11. Finally, Shi and Zhang (2013) state that CE is fundamental to guarantee the promotion of regional economy development and to carry out a sustainable development of scenic spots.

4.2.4. Hotels and Tourists' Circular Economy Practices

Some of the studies analysed focus on the applicability of CE practices and principles in the tourism sector and how to carry out the transition towards a CE model of different international hotel chains or in a tourism destination. For example, Pamfilie et al. (2018) state that the application of CE principles can provide hotel companies with the necessary framework for business development and can help to create a more sustainable experience for all stakeholders by reducing the negative implications on social and environmental sustainability. They study the applicability of the CE principles of hotel establishments in Romania from the perspective of industry managers. Rodríguez-Antón and Alonso-Almeida (2019) analyse CE practices deployed by four relevant international European hotel chains, identifying their CE strategies and best practices. Similarly, Naydenov (2018) presents worldwide examples of circular practices in the tourism sector arguing that hospitality and tourism companies can contribute to sustainable tourism when applying the CE principles, and at the same time, Menegaki (2018) studies the published sustainability reports of twenty-five four-star and five-star hotels in Greece to explain how and up to what degree they can be regarded as circular practices.

Florido et al. (2019) design guidelines on possible actions and opportunities to carry out a successful transition towards a circular model in hotel companies and describe a model for this transition in a tourist destination. Jones and Wynn (2019) examine how a number of academics and companies in the tourism and hospitality industry have used circular economy, natural capital and resilience concepts in their business operations and development plans. Finally, Sørensen et al. (2019) report the findings of an exploratory Delphi study whose aim was to identify potential tourist practices for the future development of CE principles in tourism. Findings indicate that there are many possibilities for developing CE tourist practices.

4.2.5. Maritime Sector and Tourism

Around 300 million tons of plastics are produced per year globally (Plastics Europe, 2020). A significant amount of these plastics becomes marine litter. For example, in the Balearic Islands, Martínez-Ribes et al. (2007) found that debris contamination was double in summer months (high tourism season) than in low season and that cigarette

butts were the most abundant item in high tourist season. These authors state that beach users (mainly tourists in the Balearic Islands with almost 14 million international tourists in 2018, basically concentrated in summer months) are the main source of summer debris.

This problem is studied in several papers. Considering that debris accumulation leads to a decrease of tourism and subsequent income fall, Agamuthu et al. (2019) conclude that the long-term sustainable solution to overcome this issue, especially microplastics, would be the adoption of a CE model, and Williams and Rangel-Buitrago (2019) provide solutions that can be applied to the marine litter problem, such as, cutting down plastic waste at the source, beach cleanups, use of the circular economy, education and a reduction in packaging.

Paulauskas (2018) frames Blue Growth by applying Circular Economy 3.00 growth methodology to the maritime sector, presenting a circular model of maritime cluster and describing a circular system of blue growth. Circular economy 3.00 methodology is enabled to frame EU and Blue growth according to five qualitative growth stages: physical, economic, green, sustainable, and smart. Ezzat (2016) focuses on adopting the CE model in seaports cities as a means to enhance sustainable development, taking the Suez Canal Corridor Project (Egypt) as an example. In addition, Leow and Tan (2019) address the environmental and food safety issues of aquaculture through the application of technology across the value-chain of production for cost-effective production and sustainable aquaculture farming. The system provides a perfect platform for the implementation of CE. Eco-tourism opportunities should also be utilized to promote the adoption of these technologies as well as to further public awareness and education in this sector.

Finally, Calvo (2018) explains that the beaching of Oceanic Posidonia detritus (banquette) in the Mediterranean Sea can be an environmental, economic, and social problem especially for the tourism sector and concludes that it has potential applications in the field of Soil Bioengineering. The Reuse of Oceanic Posidonia detritus in the field of Soil Bioengineering is related to one of the 3-R CE principle.

4.2.6. Resources Consumption in the Tourism Sector

The tourism sector is dependent on the environment. The environment is an attribute of the product offered, an input of tourism activity, but at the same time, tourism has significant environmental impacts and uses a wide range of natural resources. Taking this into account, two studies have been found related to resource consumption in the province of Catalonia (Spain). Agell et al. (2016) identify, classify and analyse 29 key indicators, producing a global adaptation indicator, based on the use of resources and environmental quality, to quantify Catalonia's capacity to adapt to climate change impacts, and Petit-Boix et al. (2018) compare the environmental performance of implementing rainwater harvesting (RWH) systems in two neighbourhoods with a water-stressed Mediterranean climate: Calafell (Catalonia), a high-density, tourist city, and Ukiah (California), a typical sprawled area.

Scheepens et al. (2016) analyse and design complex circular economy systems using two Life Cycle Assessment (LCA)-based methods. They use the practical case of the analysis, design and implementation of a business model for sustainable water recreation in a province in the Netherlands to validate the usefulness of these two LCA-based methods. Additionally, Fang et al. (2009) study how to develop a circular economy and reuse the infrastructure resource in declined mines. As an example, they propose developing a tourism and entertainment industry in the declined mine by making use of the abandoned idle infrastructure resources. Finally, Matarazzo et al. (2018) study the environmental impacts of the tourism industry through the life cycle assessment analysis, taking the example of an overnight stay in a hotel of a tourist in Sicily (Italy). The overnight stay in a hotel implies multiple environmental consequences caused by the consumption of specific items such as light bulbs, television, disposable products, air conditioning and electricity in general, as well as the food from the dinner and breakfast.

4.2.7. Sustainable Development Goals

Tourism has the potential to contribute to all 17 Sustainable Development Goals (SDGs) approved by the United Nations in 2005 and to be achieved by the year 2030. In particular, tourism has been included as targets in goals 8, 12 and 14 on inclusive and sustainable economic growth, sustainable consumption and production, and the sustainable use of oceans and marine resources, respectively (UNWTO, 2018b). We identify several papers that deal with one or several of these goals. Specifically, Boluk et al. (2019) apply a critical lens to the 2030 United Nations Sustainable Development Goals (SDG), using six themes as a conceptual framework for interrogating the SDG agenda in tourism (degrowth and circular economy is one of these themes). Ghosh and Agamuthu (2018) propose that countries that have focused on tourism development should consider options for implementing CE principles in sustainable tourism projects. CE can result in many net benefits and supports achieving the sustainable development goals 2030. At the same time, Girard and Nocca (2017) consider the circular tourism sector as its capacity to trigger and stimulate circular flows, aiming to conciliate the tourism sector and sustainable resource management. They present a deep analysis of impacts produced by the tourism sector and its great potential in contributing to the achievement of SDGs.

Calvo et al. (2017) highlight some of the current issues and future implications in social and solidarity economy using case studies from around the world and providing an up-to-date account of the strengths and weaknesses of these initiatives including the circular economy. This study is related to goal 8, so it refers to inclusive and sustainable economic growth. Similarly, goals 8 and 13 on inclusive and sustainable economic growth and action to combat climate change and its impacts, respectively, are related to Viola et al.'s (2018) study that reports some examples of sustainable jobs in the tourism sector focusing on environmental aspects. Prideaux and Yin (2019) comment on how autonomous vehicles (AVs) may disrupt current forms of tourism mobility because of the climate change problem and suggest an agenda for future research. The tourism industry should be informed of the potential for disruption in existing transport mobility patterns and be given time to respond with new products

and experiences. This is linked to goals 7 and 13 on sustainable and modern energy and action to combat climate change and its impacts, respectively.

Nocca (2017) argues that although the role of cultural heritage in sustainable development has been recognized in the international debate about Sustainable Development Goals (SDGs), it is explicitly mentioned only once in Goal 11. Dong et al. (2018) study the current socio-economic and environmental situation of main regions along the China–Mongolia–Russia Economic Corridor and expose the main ecological environment risks, proposing a green development mode to achieve sustainable socio-ecological-economic development of the corridor. This includes the ecological civilization mode, four hierarchies of Chinese circular economy mode, green service industry and low carbon tourism. Finally, Fuldauer et al. (2019) argue that evidence-based identification and evaluation of waste management strategies, grounded in participatory processes, can itself contribute to Sustainable Development Goals delivery in Curacao, a tourist island in Venezuela.

4.2.8. Tourism and Waste Generation

Regarding waste generation, tourism plays an important role, not only because of the large number of tourists worldwide, but also because of the higher volume of waste per capita of tourists compared to the resident population. According to the European Environment Agency, tourism is responsible for 6.8% of the waste generated in Europe (EEA, 2010). In fact, a tourist generates twice more garbage than a resident (González Camazón, 2016). Focusing on well-known mature sun and beach tourism destinations in Spain, the Balearic and the Canary Islands lead the classification of autonomous communities in terms of waste production per inhabitant. In the Canary Islands, this percentage rises significantly: if we consider a resident population of 2,106,624 inhabitants and a figure of 14,981,113 tourist arrivals with an average stay of 9.36 days, we obtain that tourists are responsible for 26.7% of the Canarian waste. Padrón Fumero et al. (2016) show that in Tenerife, an additional tourist increases the waste production by 2.97 kg/day, 1.32 kg/day higher than that of a resident. Mateu-Sbert et al. (2013) estimate that an additional tourist on the island of Menorca generates 1.31 kg/day of waste, a figure higher than that of a resident.

Noll et al. (2019), taking the Greek tourist island of Samothraki as an example, provide an analysis for developing policy and management options for reducing, re-using, and recycling of construction and demolition waste on islands where waste treatment options are limited. According to Margeta (2019), tourism activities in Croatian islands explain the significant seasonal variability in the amount of wastewater, and in fact, in summer months (high tourism season) it is up to 10 times higher than in winter, creating serious problems for property owners due to uncontrolled disposing of septage, which endangers the environment and human health. Additionally, Margeta (2019) analyses the problem of septage management in Croatian islands, where tourism is one of the main economic activities, in accordance with the CE framework.

Ragazzi et al. (2017) study the recycling programme of Trento (a tourist city in Italy), dealing with factors associated with waste recycling, like specific criteria (waste

containers selections for door-to-door collection, public awareness, and tariff) and solutions (door-to-door bins, warnings, criteria for historic centres). This city reached one of the highest levels of waste-selective collection and waste stream systematization in Italy, being a model for practical solutions and implementation systems for other cities.

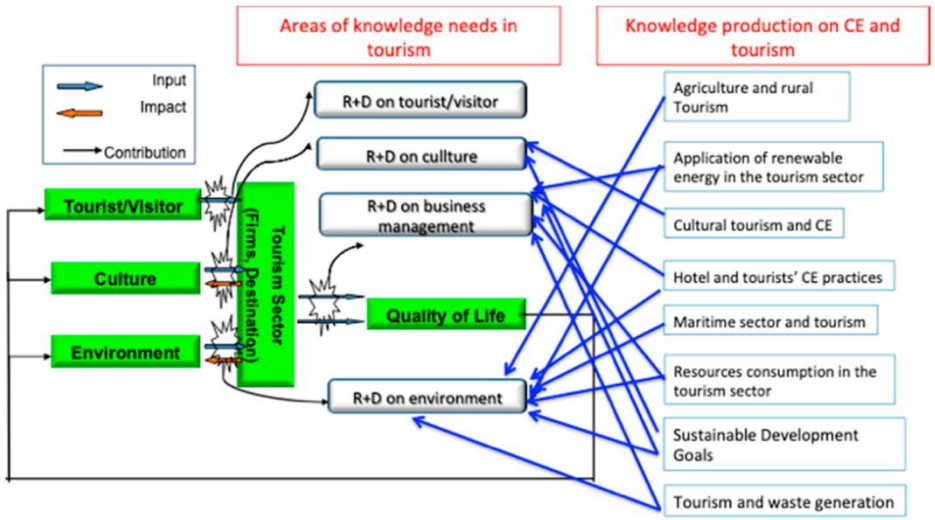
Trombin et al. (2017) investigate the introduction of affordable technological facilities to treat sludge and the organic fraction of municipal solid waste in the country of Sibiu (Romania), where industrialization and tourism are increasing constantly, while pollution control and the introduction of CE principles are still lacking.

Deselnicu et al. (2018) present key elements of the revised waste proposal of the European Commission Circular Economy Package and conclude that a smarter use of resources will help the preservation of essential resources for current and future generations and create synergies for industries which mainly depend on it, such as tourism, agriculture, and food manufacturing. Finally, Fuldauer et al. (2019) propose an integrated methodology for long-term waste management planning to deliver on the United Nations' Sustainable Development Goals in Small Islands Developing States, heavily dependent on tourism, using a national-scale demonstration on Curacao Island (Venezuela).

Once all the publications on circular economy and tourism have been classified into streams and analysed, Table 5 presents the main results of each paper by stream and relates it to the 3R Principles of CE.

But what knowledge needs areas does this scientific production contained in Table 5 cover? Jacob et al. (2014) propose a model of knowledge needs in tourism, based on the input of tourism activities (tourist, environment, culture). It considers the knowledge needed by the firms and the destination, Destination Management Organizations (DMOs) and key stakeholders. The firm (and the destination) must manage these resources to meet tourist demands, to create wealth and to increase welfare and quality of life in the destination. The model identifies at least four areas of knowledge needs that would benefit from innovations and a fifth one if the need to analyse tourism activity as a generator of wealth is also considered.

When we studied this knowledge production on CE and tourism and relate it to the model of knowledge needs in tourism of Jacob et al. (2014), we identify that knowledge production on CE and tourism mainly concentrates on generating new knowledge on the environment and on business management, and little knowledge on the culture (Figure 3); however, no new knowledge is generated on the tourist. Hence, there is a gap in the literature.



Source: Elaboration based on Jacob et al. (2014).

Figure 3. Model of knowledge needs in tourism and correspondence with knowledge production on CE and Tourism.

Table 5. Circular Economy and Tourism. Research summary.

Circular Economy and Tourism. Research Summary			
Stream 1: Agriculture and rural tourism			
Author	**Main Results**	**Policy implications**	**3R Principle**
Bonanno et al. (2018)	The farm-holiday company could be considered as a role model for the territory's enhancement, acting as a driving force for the local economy by following the green economy principles.	To reevaluate and relaunch sustainable tourism in the area.	Reduce and Reuse
Giurea, et al. (2017)	Agro-tourism represents one of the main types of tourism with the highest potential; its development is for the rural environment a way of sustainable economic, social and cultural development.	To develop and improve the environmental performance of agro-tourism activities to ensure an operational framework for agro-tourism managers.	Reduce and Recycle
Immacolata (2018)	Rural tourism, today, can only be an integrated and coordinated component within integrated rural development models specific to each territory.	To ensure a balance between consumption and reproduction of rural collective resources, an active participation of all territorial stakeholders in strategic choices is needed in a new approach to the CE.	3R
Jia et al. (2014)	The development of leisure agriculture can not only reduce the increasing ecology and humanistic environment pollution and excessive consumption of resources, but also use local resources fully, extending industry chain between tourism and agriculture.	Leisure agriculture tourism can help not only to develop new tourism products but also to promote the development of catering, lodging, transportation, business, and other service industries and to promote the employment transfer of rural labour and increase farmers´ income.	3R
Kupczyk et al. (2019)	The possible use of beach wrack as a fertilizer in agriculture or enrichment of compost will close the circulation of organic matter in the environment, thus entering the reed bed system into a CE.	To monitor the beach wrack on the beaches of eutrophicated water reservoirs, because they cause the return of nutrients to the highly trophic.	Reuse
Su et al. (2012)	Cycle of economic theory employment as a guide to material and energy use optimization for the purpose of using the 4R (Reduce, Reuse, Recycle and Reorganize) principle.	n.a.	3 R
Xuan et al. (2011)	It is urgent to implement agro-circular economy development model: energy comprehensive utilization pattern, ecological breeding pattern, agriculture waste comprehensive utilization pattern, agricultural eco-tourism pattern etc.	In order to control the agricultural non-point pollution from the source and build a resource-saving and environment-friendly Erhai ecological agriculture, an agro-CE model must be implemented	3R

Yuan and Xue (2009)	The development of small town should depend on its own conditions like traffic, location, resources and economic characteristics.	Ecological industry system must be completed relying on the strict scientific management system, thereby getting sustainable development of a small town.	3R
Zhang and Tang (2019)	According to the 3-R principles, scientific development and construction will achieve maximum economic benefits and sustainable development of agriculture and animal husbandry with the least waste and waste discharge and make rational and effective use of Tibet's unique rich natural resources.	It is needed to establish an efficient production system of agriculture and animal husbandry and to speed up the increase of farmers' and herdsmen's income to promote the development of regional agriculture and animal husbandry industry.	3R
Stream 2: Application of renewable energy in the tourism sector			
Author	**Main Results**	**Policy implications**	**3R Principle**
Dong (2018)	Renewable energies can be widely used in the tourism cycle economy system in tourist areas, travel, accommodation, catering, transportation, shopping, entertainment, and other tourism enterprises.	Government support to promote the development of renewable resources and technology in the development of CE of tourism.	Reduce
Falcone (2019)	Results show a higher level of priority for the pressures coming from the overall external setting involving values, dominant practices, rules, and technologies over the internal tourism industry dynamics.	To reduce the administrative burdens of bureaucracy by introducing, on a large scale, e-government services and to promote social awareness information campaigns.	3R
Hens et al. (2018)	Cleaner production will increasingly become an important part of the vision, strategy, policy, and management not only in production sectors but also in service sectors as tourism, health care and administration.	A wider and more integrated approach, combining technological advances with human ecology, policies, psychology, and ethical aspects are mandatory to ensure sustainable development.	3R
Jaroszewska et al. (2019)	The tourism sector in the Polish part of South Baltic Region is, at different levels, ready to implement a change from linear economy in the context of energy.	To spread and redistribute “over tourism” from the current most popular cities in South Baltic Region to the less popular smaller towns, rural areas and villages.	3R
Ma et al. (2016)	Results show the feasibility and availability of the renewable energy system used in tourism CE.	The use of renewable resources is an objective requirement of sustainable development in tourism and an important aspect of tourism CE	3R
Pan et al. (2018)	The transformation of tourism towards sustainability and a green economy demands a cross-disciplinary approach to implementation.	Integrative policies, investments in innovative technologies, strong partnerships between governments and tourism firms, and promotion of green practices are needed.	3R
Patti (2017)	Results confirm the relationship between sharing consumption of goods and services and attitudes towards	The adoption of new creative models that follow CE and sharing consumption behaviour represent the strategy for a	3R

	CE and circular tourism.	long-run development.	
Uche-Soria and Rodríguez-Monroy (2019)	Evidence on how the practice of recycling and the use of renewable energy considerably reduce the greenhouse effect.	To implement waste policies for improving the integral management of municipal solid waste.	3R
Wu (2019)	Results show that the low-carbon economy concept provides some ideas for Zhaoqing's (China) economic development. However, its transportation system is not perfect.	To develop a low-carbon economy, governments, enterprises, and individuals need to participate actively.	3R
Stream 3: Cultural tourism and circular economy			
Author	**Main Results**	**Policy implications**	**3R Principle**
Fang and Zhang (2010)	The overall environmental protection should be paid relatively great attention during the tourism development process so that the overall landscape cannot be broken and destroyed.	It is urgent to nurture environment-friendly and low-carbon tourism products by energy conservation and clean production, source and terminal pollution control, green goods and infrastructure systems from industry aspects.	Reduce and Reuse
Nocca (2017)	The impacts related to cultural-led projects are mainly interpreted in terms of tourism and real estate impact. The benefits from cultural heritage conservation/regeneration are multidimensional.	Design tools to evaluate the contribution of cultural heritage to sustainable development and to identify new effective model for sustainable management of cultural heritage.	Reduce and Reuse
Shi and Zhang (2013)	The environmental problems of tourism scenic spots are an important aspect to guarantee the promotion of regional economy development.	To guarantee the promotion of regional economy development.	Recycle and Reuse
Valls et al. (2019)	How the application of a slow tourism strategy as a result of an endogenous drive achieves rapid sustainable development (Case of Madeira).	To invest in creative and cultural industries, natural and cultural heritage, and recreational and leisure activities, in order to qualify the tourism area, encouraging the creation of qualified employment in the sector.	Reduce and Recycle
Stream 4: Hotels and tourists' circular practices			
Author	**Main Results**	**Policy implications**	**3R Principle**
Florido et al. (2019)	Findings identify the main opportunities and benefits of a transition in the hotel sector and describe a three-axis model to carry out this transition in a tourism destination.	Governments should focus on defining circular strategies and designing circular certifications for hotel establishments.	3R
Jones and Wynn (2019)	Some companies use these concepts in their sustainability strategies and development planning.	To explore how information systems can be better deployed to support these concepts and sustainability management in general.	3R

Menegaki (2018)	Presentation of systemised information on the state-of-the art of 25 4- and 5-star hotels in Greece, through the first sustainability databank.	There is a need of targeted policy implementation by central, regional, and municipal governments.	3R
Naydenov (2018)	When applying the CE principles, hospitality and tourism companies can contribute to sustainable tourism.	Environmental education and the environment are still important for sustainable development training.	3R
Pamfilie et al. (2018)	The hotel industry in Romania is not yet sufficiently prepared to adopt the CE principles, the adoption of an integrated management system does not have much influence on the performances of the operators in the field.	Given that the new performance standards go beyond the economic sphere, social and environmental problems should not be ignored as they can cause losses for the sector.	3R
Rodríguez-Antón and Alonso-Almeida (2019)	The main CE strategies adopted by four international hotel chains analysed are the reduction, recycle and reuse, in this order.	To encourage and support circular tourism among large and small independent hotels.	3R
Sørensen et al. (2019)	There are many possibilities for developing CE tourist practices.	More research is needed about tourists' practices and tourism's intersection with CE, in order to facilitate a greater consensus about possible solutions and ways towards more environmentally sustainable tourism.	Reduce
Stream 5: Maritime sector and tourism			
Author	**Main Results**	**Policy implications**	**3R Principle**
Agamuthu et al. (2019)	The long-term sustainable solution to overcome marine debris would be CE. It gives value to waste and promotes reduction in waste generation owing to implementation of 3R.	An urgent, integrated and cooperative effort is required to curb the global issue of marine debris.	3R
Calvo (2018)	The results confirm the thermal insulation role of Posidonia oceanica and highlight potential applications in the field of Soil Bioengineering solving the problems for the tourism sector.	To raise public awareness of the importance of seagrass and the beached detritus for the preservation of coastal ecosystems.	Reuse
Ezzat (2016)	Both theoretical and empirical best practices stressed the rule of CE models in supporting sustainable development in seaport cities.	To support some of the dimensions of the CE model including the legislative, institutional, and cultural issues.	3R
Leow and Tan (2020)	Eco-tourism opportunities could be utilized to promote the adoption of technologies as well as to further public awareness and education in the aquaculture sector.	The concern over the spread of diseases from escaped farmed fish into the wild need to be addressed to ensure the continued viability of aquaculture farming as a critical food source.	3R
Paulauskas (2018)	Circular Economy 3.00 methodology enabled to frame EU and Blue growth accordingly to clear qualitative growth	Existing amorphous liberal set of possible growth opportunities must be transferred into a clearly defined	Reuse and Recycle

	stages: physical, economic, Green, sustainable, and smart. Matrix of growth enabled to recognize and separate growth features and construct clear prioritized leap of possible approaches.	target strategy with a clear understanding of supporting and resisting forces of Blue Growth.	
Williams and Rangel-Buitrago (2019)	Stopping litter generation at the source is the key, which means less waste is produced, this is vitally important in the production of micro-and nano-plastics. Product design is also a crucial component.	Marine litter management must be developed within a policy framework that sets clear objectives and in an institutional environment where stakeholders have different defined roles.	3R
Stream 6: Resources consumption in the tourism sector			
Author	**Main Results**	**Policy implications**	**3R Principle**
Agell et al. (2016)	The absolute value of the indicator (from 0 to 10) dropped slightly between 2005 and 2011.	Catalonia must continue to make every effort to ensure that the land, natural systems, and society are progressively less vulnerable to the impacts of climate change.	3R
Fang et al. (2009)	The utilization model of infrastructure in declined mine mainly includes the model of high-efficiency agriculture, tourism, industrial transformation, real estate, commerce, and store.	It is necessary to adopt CE principles to reuse the infrastructure resource in a declined mine.	Reduce and Reuse
Matarazzo et al. (2018)	The Life Cycle Assessment (LCA) makes it possible to split the entire tourism industry into different steps, focusing especially on the analysis of all the effects created in each phase.	To promote accessibility, availability, and free exchange of small and medium businesses LCA data developing protected, compatible, transparent and accredited Public Data Banks.	Reduce
Petit-Boix et al. (2018)	The implementation of rainwater harvesting was environmentally beneficial with respect to the business-as-usual scenario. It is more attractive in Calafell (Spain), a high-density, tourist city, which had 60% lower impacts than in Ukiah (US).	Implementing rainwater harvesting could be a viable alternative to meet water needs in areas with a high building concentration and water demand.	Reduce and Reuse
Scheepens et al. (2016)	The approach of Eco-efficient Value Creation helps to avoid many pitfalls of the design of circular business models and the Circular Transition Framework reveals pitfalls and opportunities in implementation.	Water recreation service must be converted to a sustainable business model through the introduction of sustainable yachts, using renewable energy and applying sustainable materials.	3R
Stream 7: Sustainable Development Goals			
Author	**Main Results**	**Policy implications**	**3R Principle**
Boluk et al. (2019)	Results show that degrowth and transitions to a CE present alternative paradigm under development which	Issues and mechanisms of governance are essential to shape tourism's future into a form that is equitable,	3R

	provide evidence that there are viable alternatives to the pervasive progrowth neoliberal model of capitalism.	inclusive, just, ecologically compatible, and thereby sustainable.	
Calvo et al. (2017)	There is growing interest in social and solidarity economy initiatives but research in this area remains scarce.	Social and solidarity economy initiatives need to be more widely disseminated amongst the general public.	3R
Dong et al. (2018)	Actions to achieve sustainable development of the area includes establishing green, low-carbon, CE system, low carbon eco-tourism pilot area and cultivating green development and ecological civilization.	To formulate grade circular economic system through whole process of production, circulation, and consumption, promoting green, circular and low-carbon development, according to the 3R principle.	3R
Fuldauer et al. (2019)	Results show that the CE strategy outperformed all other strategies with regard to delivery on SDGs indicators in the low future waste growth scenario by 2030.	To adopt education and awareness campaigns in schools and companies as well as subsidies for material reuse centres.	3R
Ghosh and Agamuthu (2018)	CE can result in many net benefits and support to achieve the SDGs 2030 for countries focused on the tourism development. The keys are to define how to implement CE programmes and what the focus areas should be.	Policies for collaboration between the purchasers and suppliers of materials to work together and to realize the benefits of a more CE in both the public and private sectors procurement.	3R
Nocca (2017)	The indicators related to cultural heritage should reveal authenticity, integrity and cultural values and monitor impacts on tourism sector, environmental capital, community well-being, etc.	Indicators have to be used to assess and monitor the state of conservation of cultural heritage, but also to evaluate the impacts of cultural heritage conservation/regeneration on city multidimensional productivity.	Reduce and Reuse
Girard and Nocca (2017)	The tourism sector can represent a threat (because of its negative impacts) but, at the same time, a starting point in the achievement of sustainable development. The CE is proposed as a model to operationalize sustainable principles.	Circular tourism requires appropriate tools, indicators, knowledge, and data in order to assess/monitor the performances of this new model.	3R
Prideaux and Yin (2019)	From a mobility perspective, the introduction of AVs will offer numerous opportunities for changes in the current flow of domestic and international tourists within and between destinations.	To introduce legislation that either promotes or hinders the introduction and rapid adoption of AVs.	3R
Viola et al. (2018)	Education is the strategic and necessary lever towards the creation of Sustainable Jobs, which lead to the spread of so-called sustainable employment.	Help to better predict future skills needs, balance better skills and labour market needs and bridge the gap between education and employment.	3R

Stream 8: Tourism and waste generation			
Author	**Main Results**	**Policy implications**	**3R Principle**
Deselnicu et al. (2018)	Smarter use of resources will also help to protect the environment, preserve essential resources for current and future generations, and create synergies for industries which most depend on it, such as tourism, agriculture, and food manufacturing.	Clear rules, common standards, and support for the use of more secondary raw materials are necessary to create a safe and sustainable supply of raw materials to the industry.	3R
Fuldauer et al. (2019)	Evidence-based identification and evaluation of waste management strategies, grounded in participatory processes, can itself contribute to SDGs delivery in Curacao (Venezuela).	To implement laws which restrict certain tourism-generated waste streams this cannot be dealt with locally.	3R
Margeta (2019)	Due to tourism activities the amount of wastewater in Croatian islands seasonally varies considerably and in summer is up to 10 times higher than in winter.	The EU legal framework requires that organic waste be disposed of in accordance with the CE principles	Reuse and Recycle
Noll et al. (2019)	The material stock expanded from 175 t/cap to 350 t/cap in the period between 1971 and 2016, leading to a 15-fold increase of annual Construction and Demolition Waste (CDW) generation.	To inform the stakeholders of any construction project on discarding options for CDW. The management of CDW should be based on a collective waste management system to work on reuse, recycling, or processing.	3R
Ragazzi et al. (2017)	Trento community reached one of the highest levels of waste selective collection and waste stream systematization in Italy, being as such a model for practical solutions and implementation systems for other cities.	The framing of eco-citizenship, legislation, municipalities, parties, and good coordinators of the afferent financial loop can lead to reliable waste management schemes.	3R
Trombin et al. (2017)	The organic fraction full stream collection seems to be the only way to have a significant energy recovery.	From the financial point of view, the feasibility of this co-treatment option could count on specific opportunities for Romania within the EU context.	Reuse and Recycle

5. Discussion

Despite the importance of tourism as a catalyst for the global economy, it also causes significant environmental impacts and generates great pressure on local resources, producing negative externalities due to the current use of linear economy production models; hence, we need to change to CE production models. However, the literature on CE was developed mainly for the manufacturing sector, and there are few references on the tourism sector.

The purpose of this chapter was to describe and classify the scientific literature about CE and tourism. To this end, firstly a general review of circular economy in documents, conference proceedings and papers indexed in the Web of Science was carried out, followed by a literature review of specific articles only on CE and tourism in the social science citation index (Web of Science) and Scopus. The general review shows that the literature on CE was mainly developed for the manufacturing sector, it totals to 5696 scientific papers, and it mainly focuses on engineering and science technologies. For the specific review on tourism and CE, the keywords used are related to the tourism sector and circular economy, and the last search was made at the end of January 2020, providing a sample of 55 articles and books. Each contribution found was analysed and, according to its contents, classified into eight research streams. The main results and policy implications of all papers contained in each research stream are presented, as well as the 3R principles of CE dealt with in each paper.

Results show that:

- Stream 1 gathers 16.36% of total papers; analysis indicates that the implementation of CE actions in agriculture is vital to achieving sustainability in the sector. Agro-tourism is an effective way of developing circular practices in rural tourism.
- Stream 2 gathers 16.36% of all papers on CE and tourism; literature shows that renewable energy plays a key role in the transition towards a CE model in the tourism sector. Using renewable resources instead of conventional energy is an important aspect for the application of tourism circular economy.
- Stream 3 collects 7.27% of all papers. This stream shows that the promotion of CE principles in the rehabilitation and conservation of heritage initiatives is crucial for the sustainable continuity of cultural tourism.
- Stream 4 gathers 12.73% of all papers in CE and tourism; literature indicates that the application of CE principles can provide hotel companies with the necessary framework for business development and can help to create a more sustainable experience for all stakeholders by reducing the negative implications on social and environmental sustainability.
- Stream 5 collects 10.91% of all literature. Considering that debris accumulation leads to a decrease of tourism and subsequent income fall, the long-term sustainable solution to overcome this issue, especially microplastics, would be the adoption of a CE model. Solutions such as cutting down plastic waste at the source, beach clean-ups, use of the CE, education and a reduction in packaging should be implemented. On the other hand, CE model implementation helps to

achieve the sustainable development of seaport cities.

- Stream 6 gathers 9.09% of all papers studied; this stream leads to the conclusion that tourism has significant environmental impacts and uses a wide range of natural resources, and hence, it is crucial to use the resources taking into account CE principles in order to minimize the negative impact on the environment.
- Stream 7 represents 16.36% of all literature available on CE and tourism. The main conclusion is that tourism has the potential to contribute to all 17 Sustainable Development Goals (SDGs). It can represent a threat (because of its negative impacts), but at the same time, a starting point in the SDGs achievement; and, finally,
- Stream 8 gathers 10.91% of total papers. Regarding waste generation, tourism plays an important role, not only because of the large number of tourists worldwide but also because of the higher volume of waste per capita of tourists compared to the resident population. A smarter use of resources will help to preserve essential resources for current and future generations and to create synergies for industries dependent on it, such as tourism, agriculture and food manufacturing.

Additionally, most of the papers focus on the 3R principles: 21.82% on 2R of the 3R principles and 9.09% on only one of the 3R principles. This scientific production on CE and tourism mainly covers knowledge needs on the environment and business management. No knowledge is generated on the tourist, for example, on how to attract tourists to a circular hotel, circular tourist business or to a circular destination, or on the profile of the most sensitive customers to circular initiatives. Furthermore, no knowledge has been generated in this literature on developing circular certifications for hotels, tourism businesses or for a destination.

6. Conclusions

As previously mentioned, there are some gaps identified in the literature on CE and tourism, such as the lack of evidence on how to make the transition to a CE model in the tourism sector or the lack of knowledge generated on the tourist and CE. Literature mainly focuses on the construction, energy and water consumption, reutilization and new uses, and less on other relevant aspects, such as the need for a change in the business model, reuse of organic waste and synergies with agriculture, circularity of tourist destinations, the application of CE as a model to achieve sustainable development of the local economy through synergies with tourism or the use of CE as a model to achieve inclusive and sustainable tourism with local development.

CE is a crucial way to contribute to a more sustainable tourism industry. The tourism industry has a significant role to play because of its importance in the global economy. Therefore, it is urgent to have a joint and multidisciplinary response in order to achieve a successful transition to a CE model in the tourism sector. The involvement of all academics, tourists, resident population, public administrations and DMOs is required.

Regarding agriculture and rural tourism, we need to develop and to improve the

environmental performance of agro-tourism activities to relaunch and promote sustainable tourism in a new approach to the CE.

Governments should promote the development and use of renewable energies in order to achieve a more sustainable tourism, and policy strategies should aim at reducing the administrative burdens of bureaucracy. Governments, tourism firms and individuals need to participate actively, and information campaigns could increase the degree of social awareness in the sector for the transition to a CE model.

The hotel sector is a major consumer of resources and a generator of waste. Therefore, governments need to support circular tourism and focus on defining circular strategies and designing circular certifications for hotel establishments. In addition, tourists have to be aware of the importance of this transition to a CE model. Awareness programmes for tourists should be designed, and hotels should advertise their good environmental practices to their guests.

Waste generation is a very important aspect to take into account due to the large amount of waste generated by the tourist sector. Laws and common rules to reduce waste generation in the tourism sector need to be designed and implemented. Hotels can carry out some actions to reduce their waste generation, such as composting organic waste, prioritizing repair over replacement, or offering closed menus at restaurants to reduce food waste, among others. Focusing on the global issue of marine litter, an integrated and cooperative effort is required by all stakeholders in order to reduce its accumulation on the coasts.

To sum up, more research is needed about the tourism intersection with CE in order to generate possible solutions towards a more sustainable tourism industry. As we have seen, it is a relatively young field of research. The literature review shows that most studies have been conducted over the past 25 years. This is an emerging field of study, with increasing numbers of researchers focusing on it. Therefore, further empirical work and research is needed to improve our understanding of CE in tourism. Future research could focus on defining a global circular strategy that involves all tourism sector actors and areas, on how to attract tourists to a circular hotel or destination, or on identifying the profile of the most sensitive customers to circular initiatives. Furthermore, another future line of research could be the development of circular certifications for hotels, tourism businesses or for a destination.

Finally, the main limitations of this study are that we have considered only papers and studies published in English in the two databases analysed. Hence, some literature on CE and tourism published in another language is not considered. Moreover, conference papers (not indexed by Web of Science nor Scopus) or reports published from European projects on CE have not been included in this review, although they can provide important contributions to this relatively new field of research.

7. References

Agamuthu, P.; Mehran, S.B.; Norkhairah, A. and Norkhairiyah, A. (2019). Marine debris: A review of impacts and global initiatives. *Waste Management Resources*, 37, 987–1002.

Agell, E.; Ambatlle, F.; Borràs, G.; Cantos, G. and Samitier, S. (2016). *A Global Indicator of Climate Change Adaptation in Catalonia.* In Implementing Climate Change Adaptation in Cities and Communities; Springer: Cham, Switzerland, pp. 191–202.

Andersen, M.S. (2007). An introductory note on the environmental economics of the circular economy. *Sustainability Science*, 2, 133–140.

Benyus, J. (2008). *A Good Place to Settle: Biomimicry, Biophilia, and the Return of Nature's Inspiration to Architecture; Biophilic Design: The Theory, Science, and Practice of Bringing Buildings to Life*; Wiley: Hoboken, NJ, USA.

Benyus, J.M. (1997). *Biomimicry: Innovation Inspired by Nature*; William Morrow: New York, NY, USA, 1997; p. 308.

Boluk, K.A.; Cavaliere, C.T. and Higgins-Desbiolles, F. (2019). A critical framework for interrogating the United Nations Sustainable Development Goals 2030 Agenda in tourism. *Journal of Sustainable Tourism*, 27, 847–864.

Bonanno, S.; Amato, F.; Silluzio, C.; Trimarchi, E.G.; Matarazzo, A. and Bentivegna, G. (2018). Smart and circular economy applied to a Sicilian company as a sewage treatment model. *Procedia Environmental Science, Engineering and Management*, 5(1), 21–28.

Boulding, K.E. (1996). *The Economics of Coming Spaceship Earth. In Environmental Quality in a Growing Economy*; Jarrett, H., Ed.; John Hopkins Press: Baltimore, MD, USA, pp. 3–14.

Calvo, R. (2018). Thermal insulation role and possible exploitation of Posidonia oceanica detritus in the Mediterranean area. *Flora Mediterranea*, 28, 279–285.

Calvo, S.; Morales, A. and Zikidis, Y. (2017). *Social and Solidarity Economy: The World's Economy with a SOCIAL Face*; Routlege: London, UK.

Circle Economy (2018). *About Circular Economy*. Available online: https://www.circle-economy.com/ (accessed on 8 December 2019).

Cooper, T. (1999). Creating an economic infrastructure for sustainable product design. *Journal of Sustainable Prodruct Design*, 8, 7–18.

D'Amato, D.; Droste, N.; Allen, B.; Kettunen, M.; Lähtinen, K.; Korhonen, J.; Leskinen, P.; Matthies, B.D. and Toppinen, A. (2017). Green, circular, bio economy: A comparative analysis of sustainability avenues. *Journal of Cleaner Production*, 168, 716–734.

Deselnicu, D.C.; Militaru, G.; Deselnicu, V.; Zainescu, G. and Albu, L. (2018). Towards a Circular Economy—A Zero Waste Programme for Europe. *In Proceedings of the 7th ICAMS*, Bucarest, Romania, 18–20 October 2018; pp. 563–569.

Dong, Q. (2018). Study on the Development Strategy of Tourism Circular Economy Based on Renewable Energy Technology. *Journal of Advanced Oxidation Technologies*, 21, 2.

Dong, S.; Li, Y.; Li, Z.; Li, F.; Cheng, H.; Yang, Y.; Bilgaev, A.; Zheng, J. and Bazarzhapov, T. (2018). Ecological environment risks and green development modes of China-Mongolia-Russia economic corridor. *In Proceedings of the IOP Conference Series: Earth and Environmental Science*, Irkutsk, Russia, 20–26 August 2018; IOP Publishing: Bristol, UK, 2018; Volume 190, p. 012053.

EEA (2010). *European Environment, State and Outlook 2010*; EEA: Copenhagen, Denmark; ISBN 978-92-9213-155-5. Available online: http://www.ab.gov.tr/files/ardb/evt/1_avrupa_birligi/1_6_raporlar/1_3_diger/environment/ eea__2010_the_european_environment_synthesis.pdf (accessed on 9 January 2020).

Ellen MacArthur Foundation (2013a). *Towards the Circular Economy; Economic and Business Rationale for an Accelerated Transition*. Available online: https://www.ellenmacarthurfoundation.org/ (accessed on 20 November 2019).

Ellen MacArthur Foundation (2013b). *Towards the Circular economy, Opportunities for the Consumer Goods Sector*. Available online: https://www.ellenmacarthurfoundation.org/ (accessed on 20 November 2019).

Ellen MacArthur Foundationn (2014). *Accelerating the Scale-Up Across Global Supply Chains*. Available online: https://www.ellenmacarthurfoundation.org/ (accessed on 22 November 2019).

Ellen MacArthur Foundation (2015). *Circularity Indicators—An Approach to Measure Circularity*. Available online: https://www.ellenmacarthurfoundation.org/ (accessed on 28 November 2019).

European Commission (2014a). *Report on Critical Raw Materials for the EU*. Available online: https://ec.europa.eu/ info/index_en (accessed on 15 November 2019).

European Commission (2014b). *The Circular Economy—Connecting, Creating and Conserving Value*. Available online: https://ec.europa.eu/info/index_en (accessed on 15 November 2019).

European Commission (2015). *Circular Economy Strategy*. Available online: https://ec.europa.eu/info/index_en (accessed on 25 November 2019).

European Commission (2016). *Circular Economy: New Regulation to Boost the Use of Organic and Waste-Based Fertilisers.* Available online: https://ec.europa.eu/info/index_en (accessed on 25 November 2019).

Ezzat, A.M. (2016). Sustainable development of seaport cities through circular economy: A comparative study with implications to Suez Canal corridor project. *European Journal of Sustainable Development*, 5, 509–522.

Falcone, P.M. (2019). Tourism-Based Circular Economy in Salento (South Italy): A SWOT-ANP Analysis. *Social Sciences*, 8(7), 216.

Fang, X.; De-shan, T. and Ying-de, L. (2009). Study on the utilization model of infrastructure in declined mine based on the circular economy. *In Proceedings of the*

2009 International Conference on Sustainable Power Generation and Supply, Nanjing, China, 6–7 April 2009; pp. 1–4.

Fang, X. and Zhang, X. (2010). On Tourism Environment Protection for World Cultural Heritage Sites in China. *In Proceedings of the International Conference on Management and Service Science*, Wuhan, China, 24–26 August 2010; pp. 1–4.

Feng, W.J.; Mao, Y.R.; Chen, H. and Chen, C. (2007). Study on development pattern of circular economy in chemical industry parks in China. *Xiandai Huagong/Modern Chemical Industry*, 27(3), 7–10.

Florido, C.; Jacob, M. and Payeras, M. (2019). How to Carry out the Transition towards a More Circular Tourist Activity in the Hotel Sector. The Role of Innovation. *Administrative Sciences*, 9(2), 47.

Frosch, R.A. and Gallopoulos, N.E. (1989). Strategies for manufacturing. *Scientific American*, 261, 144–153.

Fuldauer, L.I.; Ives, M.C.; Adshead, D.; Thacker, S. and Hall, J.W. (2019). Participatory planning of the future of waste management in small island developing states to deliver on the Sustainable Development Goals. *Journal of Cleaner Production*, 223, 147–162.

Geissdoerfer, M.; Savaget, P.; Bocken, N.M. and Hultink, E.J. (2017). The Circular Economy–A new sustainability paradigm? *Journal of Cleaner Production*, 143, 757–768.

Geng, Y. and Doberstein, B. (2008). Developing the circular economy in China: Challenges and opportunities for achieving 'leapfrog development'. *The Internationl Journal of Sustainable Development & World Ecology*, 15(3), 231–239.

Ghisellini, P.; Cialani, C. and Ulgiati, S. (2015). A review on circular economy: The expected transition to a balanced interplay of environmental and economic systems. *Journal of Cleaner Production*, 114, 1–22.

Ghosh, S.K. and Agamuthu, P. (2018). Circular economy: The way forward. *Waste Management Resources*, 36, 481–482.

Girard, L.F. and Nocca, F. (2017). From linear to circular tourism. *Aestimum*, 70, 51–74.

Giurea, R.; Ioan, A.M.; Ragazzi, M. and Cioca, L.I. (2017). Focusing agro-tourism structures for environmental optimization. Quality-*Access to Success*, 18, 115–120.

González Camazón, C. (2016). *La Fiscalidad Verde. Creación de nuevos tributos sobre emisiones y residuos*. Bachelor's Thesis, University of Valladolid, Valladolid, Spain, 12 July 2016.

Greyson, J. (2007). An economic instrument for zero waste, economic growth and sustainability. *Journal of Cleaner Production*, 15, 1382–1390.

Hawken, P.; Lovins, A. and Lovins, L. (1999). *Natural Capitalism: Creating the Next Industrial Revolution*; Little, Brown and Co.: Boston, MA, USA.

Hens, L.; Block, C.; Cabello-Eras, J.J.; Sagastume-Gutierez, A.; Garcia-Lorenzo, D.; Chamorro, C.; Mendoza-Herrera, K.; Haeseldonckx, D. and Vandecasteele, C. (2018). On the evolution of "Cleaner Production" as a concept and a practice. *Journal of Cleaner Production*, 172, 3323–3333.

Hu, J.; Xaio, Z.; Deng, W.; Wang, M. and Ma, S. (2011). Ecological utilization of leather tannery waste with circular economy model. *Journal of Cleaner Production*, 19, 221–228.

Immacolata, V. (2018). Agriculture, rural tourism and circular paradigm. *Calitatea*, 19, 556–562.

Jacob, M.; Florido, C. and Payeras, M. (2014). Knowledge production in two mature destinations. *Annals of Tourism Research*, 48, 280–284.

Jaroszewska, M.; Chaja, P. and Dziadkiewicz, A. (2019). Sustainable energy management: Are tourism SMEs in Poland ready for circular economy solutions? Inte*rnational Journal of Sustainable Energy Planning and Management*, 24, 75–83.

Jia, Z.; Qin, A. and Jia, H. (2014). Research on the development of leisure agriculture tourism in Yi County based on circular economy. *Management & Engineering*, 15, 72.

Jones, P. and Wynn, M.G. (2019). The circular economy, natural capital and resilience in tourism and hospitality. *International Journal of Contemporary Hospitality Management*, 31, 2544–2563.

Kalmykova, Y.; Sadagopan, M. and Rosado, L. (2018). Circular economy–From review of theories and practices to development of implementation tools. *Resources Conservation and Recycling*, 135, 190–201.

Kirchherr, J.; Reike, D. and Hekkert, M. (2017). Conceptualizing the circular economy: An analysis of 114 definitions. *Resources Conservation and Recycling*, 127, 221–232.

Kupczyk, A.; Kołecka, K. and Gajewska, M.H. (2019). Solving the Beach Wrack Problems by On Site Treatment with Reed Beds Towards Fertilizer Amendments. *Journal of Ecological Engineering*, 20, 252–261.

Leontief, W. (1928). *Die Wirtschaft als Kreislauf*. ASwSp 1928, 60, 577–623.

Leow, B.T. and Tan, H.K. (2019). Technology-Driven Sustainable Aquaculture for Eco-tourism. *In Proceedings of the WCFS2019*, Singapore, 22–23 April 2019; pp. 209–218.

Liu, Q.; Li, H.-M.; Zuo, X.-L.; Zhang, F.-F. and Wang, L. (2009). A survey and analysis on public awareness and performance for promoting circular economy in China: A case study from Tianjin. *Journal of Cleaner Production*, 17, 265–270

Lyle, J.T. (1996). *Regenerative Design for Sustainable Development*; John Wiley & Sons: New York, NY, USA, 1996.

Ma, X.; Li, S.; Ai, Q. and Chen, K. (2016). Research on renewable energy systems used in tourism circular economy. *In Proceedings of the 2016 Chinese Control and Decision Conference*, Yinchuan, China, 28–30 May 2016; pp. 6203–6206.

Manniche, J.; Larsen, K.T.; Broegaard, R.B. and Holland, E. (2017). *Destination: A Circular Tourism Economy. A Handbook for Transitioning Toward a Circular Economy within the Tourism and Hospitality Sectors in the South Baltic Region*; Centre for Regional & Tourism Research (CRT): Bornholm, Denmark, 2017.

Margeta, J. (2019). A review of sustainable septage management strategies on the islands in Croatia. *Water Science and Technology*, 79(10), 1833–1843.

Martínez-Ribes, L.; Basterretxea, G.; Palmer, M. and Tintoré Subirana, J. (2007). Origin and abundance of beach debris in the Balearic Islands. *Science Maritime*, 71, 305–314.

Matarazzo, A.; Maugeri, E.; Gullo, E.; Romano, P.; Spedalieri, F. and Licciardello, A. (2018). The Bioeconomy in Sicily: New Green Marketing Strategies Applied to the Sustainable Tourism Sector. *In Proceedings of the Global Conference on Business, Hospitality, and Tourism Research (GLOSEARCH 2018)*, Ho Chi Minh City, Vietnam, 2–5 October 2018.

Mateu Sbert, J.; Ricci-Cabello, I.; Villalonga Olives, E. and Cabeza-Irigoyen, E. (2013). The impact of tourism municipal solid waste generation: The case of Menorca Island (Spain). *Waste Management*, 12, 2589–2593.

Mathews, J.A. and Tan, H. (2011). Progress towards a circular economy in China: The drivers (and inhibitors) of eco-industrial initiative. *Journal of Industrial Ecology*, 15, 435–457.

McDonough, W. and Braungart, M. (2010). *Cradle to Cradle: Remaking the Way We Make Things*; North Point Press: New York, NY, USA, 2010.

Menegaki, A.N. (2018). Economic aspects of cyclical implementation in Greek sustainable hospitality. *International Journal of Tourism Policy*, 8, 271–302.

Mentink, B. (2014). *Circular Business Model Innovation: A Process Framework and a Tool for Business Model Innovation in a Circular Economy*; Delft University of Technology: Delft, The Netherlands, 2014.

Murray, A.; Skene, K. and Haynes, K. (2017). The circular economy: An interdisciplinary exploration of the concept and application in a global context. *Journal of Business Ethics*, 140(3), 369–380.

Naydenov, K. (2018). Circular tourism as a key for eco-innovations in circular economy based on sustainable development. *In Proceedings of the International Multidisciplinary Scientific GeoConference: SGEM: Surveying Geology & Mining Ecology Management*, Albena, Bulgaria, 30 June 2018; Volume 18, pp. 135–141.

Nocca, F. (2017). The role of cultural heritage in sustainable development: Multidimensional indicators as decision-making tool. *Sustainability*, 9, 1882.

Noll, D.; Wiedenhofer, D.; Miatto, A. and Singh, S.J. (2019). The expansion of the built environment, waste generation and EU recycling targets on Samothraki, Greece: An island's dilemma. *Resources Conservation and Recycling*, 150, 104405.

Niñerola, A.; Sánchez-Rebull, M.V. and Hernández-Lara, A.B. (2019). Tourism research on sustainability: A bibliometric analysis. *Sustainability*, 11, 1377.

Padrón Fumero, N.; Castellanos Nieves, D. and Díaz Fariña, E. (2016). Los determinantes de la generación de residuos sólidos municipales en los municipios y destinos turísticos: El caso de la isla de Tenerife. *In Proceedings of the AECIT 2016*, Tenerife, Spain, 16–18 November 2016.

Pamfilie, R.; Firoiu, D.; Croitoru, A.G. and Ionescu, G.H.I. (2018). Circular Economy—A New Direction for the Sustainability of the Hotel Industry in Romania? *Amfiteatru Economic*, 20(48), 388–404.

Pan, S.Y.; Gao, M.; Kim, H.; Shah, K.J.; Pei, S.L. and Chiang, P.C. (2018). Advances and challenges in sustainable tourism toward a green economy. *Science of Total Environment*, 635, 452–469.

Patti, S. (2017). Circular economy and sharing consumption: Attitudes towards low-carbon tourism. *Economics and Policy of Energy and the Environment*, 16, 219–234.

Paulauskas, S. (2018). Blue Growth Circular Innovation. Trans*nav: International Journal of Marine Navigation and Safety of Sea Transportation*, 12(4), 813–818.

Pauli, G.A. (2010). *The Blue Economy: 10 Years, 100 Innovations, 100 Million Jobs*; Paradigm Publications: Taos, NM, USA, 2010.

Pearce, D. and Turner, R.K. (2003). *Economics of natural resources and the environment, Hemel Hempstead: Harvester Wheatsheaf.* In Natural Resource and Environmental Economics, 3rd ed.; Perman, R., Ma, Y., McGilvray, J., Common, M., Eds.; Longman: Harlow, UK, 2003.

Petit-Boix, A.; Devkota, J.; Phillips, R.; Vargas-Parra, M.V.; Josa, A.; Gabarrell, X.; Rieradevall, J. and Apul, D. (2018). Life cycle and hydrologic modeling of rainwater harvesting in urban neighborhoods: Implications of urban form and water demand patterns in the US and Spain. *Science of Total Environment*, 621, 434–443.

Plastics Europe (2020). *Plastics—The Facts. An Analysis of European Plastics Production, Demand and Waste Data*. Available online: https://www.plasticseurope.org/en (accessed on 15 November 2019).

Prideaux, B. and Yin, P. (2019). The disruptive potential of autonomous vehicles (AVs) on future low-carbon tourism mobility. *Asia Pacific Journal of Tourism Research*, 24(5), 459–467.

Ragazzi, M.; Fedrizzi, S.; Rada, E.C.; Ionescu, G.; Ciudin, R. and Cioca, L.I. (2017). Experiencing Urban Mining in an Italian Municipality towards a Circular Economy vision. *Energy Procedia*, 119, 192–200.

Rico, A.; Arenas-Sánchez, A.; Alonso-Alonso, C.; López-Heras, I.; Nozal, L.; Rivas-Tabares, D. and Vighi, M. (2019). Identification of contaminants of concern in the upper Tagus river basin (central Spain). Part 1: Screening, quantitative analysis and comparison of sampling methods. *Science of Total Environment*, 666, 1058–1070.

Robèrt, K.H. (1991). The physician and the environment. Reviews in Oncology. *European Organisation of Research and Treatment of Cancer*, 4(2), 1–3.

Rodríguez-Antón, J.M. and Alonso-Almeida, M.D.M. (2019). The Circular Economy Strategy in Hospitality: A Multicase Approach. *Sustainability*, 11, 5665.

Sauvé, S.; Bernard, S. and Sloan, P. (2016). Environmental sciences, sustainable development and circular economy: Alternative concepts for trans-disciplinary research. *Environmental Development*, 17, 48–56.

Scheepens, A.E.; Vogtländer, J.G. and Brezet, J.C. (2016). Two life cycle assessment (LCA) based methods to analyse and design complex (regional) circular economy systems. Case: Making water tourism more sustainable. *Journal of Cleaner Production*, 114, 257–268.

Shi, C. and Zhang, G. (2013). The ecological construction of scenic spots. *Biotechnology: An Indian Journal*, 8, 1306–1310.

Sørensen, F.; Bærenholdt, J.O. and Greve, K.A.G.M. (2019). Circular economy tourist practices. *Current Issues in Tourism*, 23(22), 2762-2765.

Stahel, W.R. and Reday, G. (1977). *The Potential for Substituting Manpower for Energy*; Report to DG V for Social Affairs; (Research Contract No. 760137 Programme of Research and Actions on the Development of the Labour Market), Study, (76/13); Commission of the EC: Brussels, Belgium, 1977.

Su, B.; Heshmati, A.; Geng, Y. and Yu, X. (2013). A review of the circular economy in China: Moving from rhetoric to implementation. *Journal of Cleaner Production*, 42, 215–227.

Su, H.; Tan, D.; Gao, Y. and Liu, J. (2012). Research on Eco-Industrial Development and league mechanism construction of Breeding Industry. *Journal of Convergence Information Technology*, 7, 19.

Suárez-Eiroa, B.; Fernández, E.; Méndez-Martínez, G. and Soto-Oñate, D. (2019). Operational principles of circular economy for sustainable development: Linking theory and practice. *Journal of Cleaner Production*, 214, 952–961.

Trombin, G.; Ragazzi, M.; Isarie, C.; Ciudin, R. and Torretta, V. (2017). Environmental assessment of the Sibiu County, Romania: Proposal for sewage sludge and OFMSW management. *In Proceedings of the MATEC Web Conference*, Sibiu, Romania, 7–9 June 2017; EDP Sciences: Les Ulis, France, 2017; Volume 121, p. 10006.

Uche-Soria, M. and Rodríguez-Monroy, C. (2019). An Efficient Waste-To-Energy Model in Isolated Environments. Case Study: La Gomera (Canary Islands). *Sustainability*, 11, 3198.

UNEP (2018). *Circular Economy: An Alternative Model for Economic Development*. United Nations Environment Programme. Available online: https://www.unenvironment.org/ (accessed on 10 December 2019).

Valls, J.F.; Mota, L.; Vieira, S.C.F. and Santos, R. (2019). Opportunities for Slow Tourism in Madeira. *Sustainability*, 11, 4534.

Van Dijk, S.; Tenpierik, M. and Van Den Dobbelsteen, A. (2014). Continuing the building's cycles: A literature review and analysis of current systems theories in comparison with the theory of cradle to cradle. *Resources Conservation and Recycling*, 82, 21–34.

Vargas-Sánchez, A. (2018). The unavoidable disruption of the circular economy in tourism. *Worldwide Hospitality and Tourism Themes*, 10, 652–661.

Viola, I.; Simonetti, B. and Öztürk, L. (2018). Sustainable jobs and tourism. *Rivista Di Studi Sulla Sostenibilita'*, 2, 45–56.

Von Bertalanffy, L. (1968). *General System Theory*; George Brazilier: New York, NY, USA, 1968; pp. 3–17.

Williams, A.T. and Rangel-Buitrago, N. (2019). Marine Litter: Solutions for a major environmental problem. *Journal of Coastal Research*, 35(3), 648–663.

World Tourism Organization (UNWTO) (2017). *Tourism Highlights. 2017 Edition*. Available online: https://www.unwto.org/ (accessed on 22 November 2019).

World Tourism Organization (UNWTO) (2018a). *Tourism and Culture Synergies*. Available online: https://www. unwto.org/ (accessed on 12 January 2020).

World Tourism Organization (UNWTO) (2018b). *Tourism and the Sustainable Development Goals*. Available online: https://www.unwto.org/ (accessed on 13 January 2020).

Wu, W. (2019). Modern urban planning and design based on low carbon economy concept. *Open House International*, 44, 108–111.

Xuan, L.I.; Baotong, D.E.N.G. and Hua, Y.E. (2011). The research based on the 3-R principle of agro-circular economy model-the Erhai lake basin as an example. *Energy Procedia*, 5, 1399–1404.

Yuan, Q. and Xue, X. (2009). The eco-industrial system study of circular small town. *In Proceedings of the 16th International Conference on Industrial Engineering and Engineering Management*, Beijing, China, 21–23 October 2009; pp. 1636–1639.

Yuan, Z.; Bi, J. and Moriguichi, Y. (2006). The circular economy: A new development strategy in China. *Journal of Industrial Ecology*, 10, 4–8.

Zhang, H.G. and Tang, X.Y. (2019). Study on optimized combination and utilization model of agricultural and animal husbandry resources in mountain ecotone. *In Proceedings of the Conference Series: Earth and Environmental Science*, Volume 346, 5th International Conference on Agricultural and Biological Sciences (ABS), Macau, China, 21–24 July 2019; Volume 346, p. 012031.

CHAPTER 2
Socioeconomic Profile of Tourists with a Greater Circular Attitude and Behaviour in Hotels of a Sun and Beach Destination

Socioeconomic Profile of Tourists with a Greater Circular Attitude and Behaviour in Hotels of a Sun and Beach Destination

Abstract: This work aims to analyse the attitude towards circular economy (CE) and the environmental behaviour and circular practices among tourists of a well-known mature sun and beach destination. The study was conducted on a sample of tourists who visited Gran Canaria and stayed at a hotel establishment. Findings show that: (a) Older tourists have a higher pro-environmental or circular attitude in hotel establishments than younger ones; (b) most tourists are willing to pay more for environmentally friendly or green hotels and this is related to socio-demographic variables; (c) the majority of tourists believe that it is important for the hotel to have an energy-saving policy; (d) tourists' attitude towards circular practices varies according to socio-economic profile; (e) the most common sustainable hotel practices carried out by tourists are the use of recycling bins and reusable towel and linen schemes; (f) women report a higher circular behaviour than men; and (g) 86.5% of tourists carry out the same CE practices on holidays as in their place of residence. Study findings could be useful to design the transition from a linear model to a circular model in the hotel industry of a destination as it identifies the areas that the industry must promote to reach this transition.

Keywords: circular economy; tourist behaviour; tourist attitude; hotel industry; sustainability; destination

1. Introduction

Since the end of the 20th century, different approaches related to sustainability have been developed, such as sustainable development, ecological growth, blue economy and green economy, but all of them are built upon a linear production–consumption model, based on the growth and scarcity of resources together with climate change and environmental degradation.

The circular economy (CE) agrees with these approaches focusing on the relationship of human beings with their environment but differs in that it is more radical. In fact, it requires a much wider and complete design of solutions throughout the life cycle of the product as it is based on the creation of value through the Restoration, Regeneration and Reuse of resources (Ellen MacArthur Foundation, 2015). The aim is to implement a new economy, based on circular production systems, generating new business models and forms of consumption that move away from property and that imply the existence of active users and passive non consumers. Hence, a radical change in the actual linear production models is needed to implement CE, and it also entails a radical change in the way companies, citizens and legislators behave.

However, the CE literature mainly focuses on the manufacturing sector with limited

references to tourism despite the tourism sector being characterised by huge energy and water consumptions, organic and plastic waste, traffic congestion and carbon dioxide emissions and air pollution.

Coastal regions and especially island destinations such as the Canary Islands rely on the coastline for the development of their economy and tourism industry, and the life quality of these regions (Jacob et al., 2010). Tourism represents 35.2% of GDP, 40.2% of employment and accounts for 35.3% of tax collection in the Canary Islands (Exceltur, 2018); however, tourism growth and development in the Canaries have altered the state of the coastal environment and have generated negative externalities on the environment such as seawater degradation, deterioration of fauna and flora, CO2 emissions and pollution, erosion and destruction of ecosystems or the depletion of natural resources, and have generated an excessive coastal urbanisation with associated problems such as the visual impact (Hunter and Green, 1995). In fact, the Canary Islands lead together with the Balearic Islands, another well-known mass tourism destination, the ranking of autonomous communities with the highest waste per capita generation indicator. Hence, the Canary Islands, due to its archipelago status, is a very vulnerable destination with very limited resources. One of the most serious problems associated with the development of tourist activity in the Canary Islands is, on the one hand, the consumption of high levels of resources and, on the other, the generation of waste.

The implementation of CE models and solutions is especially important at island destinations such as the Canary Islands where an adequate and sustainable management of resources seems to be a key element in current and future tourism policies for this destination. Tourism businesses and destinations can take advantage of many CE initiatives to reduce the consumption of natural resources, organic and plastic waste generation, and CO2 emissions; and reuse, recycle and recover products, services, waste, materials, water, and energy, but also to achieve greater profitability and increased revenues in services provision, for example, in the hotel sector.

In order to implement a transition towards a CE strategy at any destination, one must consider all the relevant actors: DMOs and key stakeholders, resident population, tourism businesses and tourists (Florido et al., 2019). In fact, tourists' attitude towards CE and their behaviour in terms of green, sustainable, and circular practices during their holidays are crucial for a transition to a circular economy model in the tourism sector and destination. Although the hotel establishments and the destination implement actions aimed at a change in a CE model, without an adequate circular behaviour and attitude on the part of tourists, the efforts made by hoteliers and administrations will not be entirely useful. Hence, the role of consumers is a significant factor in the transition and their behaviour needs to be seen as an important contributor to the solutions (Pulido-Fernández and López-Sánchez, 2016; Smol et al., 2018 and Halpenny, 2010). Sørensen and Baerenholdt (2020) indicate that tourists are co-producers of tourism experiences, and hence, the tourists' practices sustain the transition to a circular economy. According to Nedyalkova (2016), awareness rising among tourists is essential, because that is the weakest point in the value chain. It is essential to promote a conscious attitude of tourists about the consequences of their

consumption style at destinations (Giurea et al., 2018). In this sense, environmental education of tourists is important to make them aware of minimising their environmental impacts and the importance of not littering (Giurea et al., 2018). Tourists should receive more information on CE mechanisms through various marketing channels (Stein et al., 2020). The behaviour of tourists is also essential to avoid damaging the environmental commitment assumed by tourist accommodation; therefore, collaboration between tourists and staff is needed (Giurea, 2018).

One main research question arises regarding CE practices carried out by tourists: What socioeconomic variables affect the circular or environmentally sustainable attitude and behaviour of tourists at a mature destination? In addition, complementary research questions are raised, mainly the following: What are the most common circular practices that they carry out during their stay at the hotel? What are the most common circular practices that they carry out during their stay at a destination? This chapter analyses the data collected from a structured questionnaire to tourists visiting Gran Canaria (Canary Islands) and staying in hotel establishments.

The aim of this chapter is to study the attitude towards CE and the environmental behaviour and circular practices among tourists of a well-known mature sun and beach destination, Gran Canaria, with serious sustainability problems, especially in coastal municipalities. Hence, to identify the socioeconomic profile of tourists with a greater circular attitude and behaviour in Gran Canaria, we will analyse different aspects such as tourists' awareness and information and their interest or reluctance to change their practices while staying at the hotel; and the most common circular practices and those that the hotel industry must promote to reach this transition. The results could be useful to design how to move away from a linear model towards a circular model in the hotel industry of Gran Canaria and of the destination.

After the introduction, this chapter is organised as follows: Section 2 describes the CE background framework, and the main literature on tourists' attitude and behaviour towards sustainability and on circular practices carried out by tourists in hotel establishments. Section 3 outlines the main hypotheses to be tested throughout the manuscript and the underlying and supporting literature. Section 4 describes the research methodology. Section 5 shows the findings of the research; Section 5.1 shows the validity and reliability analysis; Section 5.2 describes tourist's profile; Section 5.3 presents tourist's travel characteristics and Section 5.4 provides information about circular practices during the tourist's stay at the hotel and on the island and circular practices carried out at the tourist's place of residence by testing the hypotheses outlined in Section 3. Section 6 discusses the main findings. Finally, the chapter concludes with a summary of future research fields and final remarks on the study`s contribution.

2. Theoretical Framework

2.1. Circular Economy

The CE concept aims to transform the current society to a sustainable one by moving away from the actual linear 'take, make and dispose' economy to a closed-loop

economy where there is zero waste (European Commission, 2014).

The Ellen MacArthur Foundation has been a pioneer in popularising the concept of CE, defining it 'as an industrial system that is restorative or regenerative by intention and design. It replaces the "end-of-life" concept with restoration, shifts towards the use of renewable energy, eliminates the use of toxic chemicals, which impair reuse, and aims for the elimination of waste through the superior design of materials, products, systems, and, within this, business models' (Ellen MacArthur Foundation, 2015).

CE has received increasing attention between policymakers and management staff over the last decade, being a policy priority in many countries worldwide. In order to achieve the resource efficiency agenda, set by the 2030 Agenda for Sustainable Development, the European Union (EU) is on its way of transitioning from the linear economy to a circular economy model. The use, implementation and regulation of the CE have been intensified in the EU in the past years, and a specific action for resource efficiency has been designed with the 'Resource Efficiency Roadmap' and also the 'Circular Economy Action Plan' (Domenech and Bahn-Walkowiak, 2019).

Given Europe's concern about resource scarcity and excessive waste generation, in March 2020, the New Circular Economy Action Plan (European Commission, 2020), for a cleaner and more competitive Europe, was published. In this Plan, the European Commission designs 'a future-oriented agenda for achieving a cleaner and more competitive Europe in co-creation with economic actors, consumers, citizens, and civil society organisations' (European Commission, 2015). The goal of this Plan is to accelerate the transition required by the European Green Deal, while developing at the same time CE actions that have been implemented since 2015. This plan will ensure that the CE collaborates and cooperates with European regions and cities, as well as their citizens, contributes to reach climate neutrality and makes use of all the potential of research, innovation, and this era of digitalisation.

The Circular Economy Action Plan also defines five priority areas (plastics, food waste, critical raw materials, construction and demolition, and biomass and bio-based products), which face specific challenges.

Waste generation and management are a crucial issue for a more sustainable economy. In fact, the Circular Economy Action Plan determines long-term objectives to reduce landfills and to increase the re-use and recycling of waste flows. Here, the tourism sector plays a very important role due to the greater volume of waste generated by tourists compared to the resident population. According to the European Environment Agency, tourism accounts for 6.8% of the waste generated in Europe (EEA, 2010). International tourists in Europe generate around 2.8 million tons of municipal solid waste (United Nations Enviornment Programme, 2003). In fact, a tourist generates twice as much garbage as a resident (González Camazón, 2016). In the Canaries, this percentage is even higher; in fact, considering a resident population of 2,106,624 persons and 14,981,113 tourists arriving to the archipelago with an average stay of 9.36 days, tourists account for 26.7% of the total waste generated on the islands (Rodríguez et al., 2020).

The Circular Economy Action Plan of the EU is a concrete and ambitious response to the challenges for the sustainable development and for the fight against climate change. It defines a clear strategy, as well as the actions to follow to contribute to the Aims of Sustainable Development and to the Agreement of Paris on Climate change. The transition towards a CE is an advantage for the EU, as it will foster competitiveness and sustainability, building an economic system more resilient and adaptable to the shortage of material and energy resources, and to the financial volatility, promoting the innovation and managerial efficiency, and changing in a radical way the production and consumption patterns.

Regarding the tourism sector, it has a high environmental impact and can create great pressure on local resources, especially at mature tourist destinations (González and León, 2001). To a large extent, all this is due to the economic model on which it is based: The linear model that prevails in today's economy based on access to large amounts of cheap and easily accessible resources (linear model focused on extract-make-use-throw). However, despite the fact that the literature recognises that there is a scarcity and limitation of resources and that this model is no longer viable, in general, tourist destinations do not show a proactive and action-oriented policy or strategy for a transition towards a more circular tourism model (Manniche at al., 2017).

Thus, to carry out the transition from a linear economy model to a circular model in the tourism sector, what is crucial, among other elements, is the awareness and knowledge of tourists, residents, and enterprises about what CE implies, as without them, change is impossible. A change in the behaviour of all the actors involved is necessary. Hence, the tourists' attitude and behaviour towards this new scenario are also important.

2.2. Tourists' Attitude and Behaviour towards Circular and/or Environmentally Sustainable Practices in Hotel Establishments

Environmental sustainability is a global objective for economic activity in general and for the tourism sector in particular. Tourism contributes significantly to environmental degradation and greenhouse gas emissions (Pang et al., 2013). The key to minimise environmental problems depends mainly on the number of people who intend to change their consumption behaviours and participate in more sustainable or circular practices with the environment. In fact, tourists' attitude, and behaviour when on holidays at a destination can help to reduce those negative impacts by making environmental decisions and behaving sustainably while staying at the destination (Juvan and Dolnicar, 2016). Thus, tourists may play a central role for developing circular economy principles in tourism and specifically in hotel establishments (Sørensen at al., 2019 and Alemão, 2019).

Moving towards more sustainable development forms and implementing sustainable practices to guarantee long-term sustainability are a priority at any destination but especially at island destinations, where it is crucial to consider the roles of all actors

involved in the destination's management and development (Florido et al., 2019). Thus, as Sørensen and Bærenholdt (2020) stated, tourists' images and subsequent demands for sustainable holidays and practices have to be supported by public and private actions that combine sustainable images and knowledge of CE practices in innovative solutions. These authors indicate that CE tourist practices can consist of different services and experiences and interactions with specific products/services, such as reducing water consumption while in a hotel, energy or fuel-efficient driving and food-waste recycling or minimisation. Other initiatives can also include tourists thinking in value circles, for example, by reusing, sharing, reselling, and recycling material products (Sørensen and Bærenholdt, 2020).

Numerous studies indicate that tourists show interest towards the environment as a key factor in their holiday experience quality (Goodwin and Francis, 2003; Jacobsen, 2007; Lübbert, 2001; Puhakka, 2011 and Horner and Swarbrooke, 2016). Hedlund (2011), based on data from a web-based questionnaire to Swedish respondents who travelled during June–August 2007, showed a significant relationship that universalism affects environmental concerns and that environmental concerns affect the intention to buy ecologically sustainable tourism alternatives. Similarly, Kim and Choi (2005) showed a positive relationship between environmentally sustainable attitude and green buying intentions. The results of Juvan and Dolnicar (2016) showed that the majority of tourists who choose green transportation options choose environmental certification tourism providers or refuse to participate in tourist activities that can harm the environment.

The results of Leonidou et al. (2015) show that tourist pro-environmental attitudes are key in shaping an eco-friendly behaviour; particularly, these green tourists are normally highly deontological, law-obedient, and politically active. In fact, their results show that these attributes developing positive attitudes towards the environment are especially important in women, older, highly educated and of high-income level. Additionally, they indicate that tourists from Western European countries are the most environmentally friendly. Han et al. (2017) found that tourists' behaviours related to green purchasing, recycling and resource conservation depend mainly on their ethical obligation to carry out these pro-environmental actions. In fact, Kvasova (2015) confirmed that personality plays a key role in shaping tourist eco-friendly behaviour.

Andereck (2009) studied tourists' perceptions of environmentally responsible practices carried out by tourism companies by analysing the attitudes of these tourists towards 'green' innovations in tourist sites, and he concluded that nature-oriented tourists had more positive views of environmentally responsible practices at tourist places and businesses than other tourists. Additionally, more than half of respondents believe that seeing environmentally responsible initiatives, such as recycling bins or products made from recycled materials, were really important.

On the other hand, towel and linen reuse in the hotel industry has been extensively investigated. Han and Hyun (2018) analysed the behaviour of guests in relation to this field, showing that the guests' intention to reuse towels is influenced by moral norms, social norms, anticipated feelings, and the behaviour of reusing towels in everyday life.

Robinot and Giannelloni (2010) found that customers considered the reuse of linens and towels as a basic attribute of hotels, and not carrying out this action was considered to have a negative effect on guest satisfaction.

Some researchers have analysed visitors' willingness to pay for conservation and protection (e.g., Powel and Ham, 2008 and Tisdell and Wilson, 2005) or willingness to pay for eco-friendly accommodations (Lee and Moscardo, 2005). Berezan et al. (2014) found that tourists normally prefer incentives for participating in a hotel's green practices rather than paying a premium for a green-friendly hotel. Additionally, available literature illustrates that guests' willingness to pay for environmentally friendly or green hotels is related to their socio-demographic profile, especially with age, sex and education (Laroche et al., 2001 and Mensah and Mensah, 2013).

Previous studies displayed that demographic differences (such as age, gender, education, nationality and income) play an important role in explaining tourists' attitude and behaviour towards environmentally sustainable and/or circular practices in hotel establishments. Many studies show that older tourists have a more circular attitude and behaviour than younger ones (Leonidou et al., 2015; Ayazlar and Gamze, 2017 and Dolnicar, 2010). Numerous studies have also demonstrated that women present higher pro-environmental behaviours than men (McIntyre et al., 1993; Banerjee and McKeage, 1994; Laroche et al., 2001 and Mensah, 2012). Finally, available literature indicates that environmentally friendly hotel practices are correlated with nationality (Baysan, 2001; Lübbert, 2001; Berezan et al., 2013; Berezan et al., 2014 and Leonidou et al., 2015) and education (Dolnicar et al., 2008; Berezan et al., 2014; Leonidou et al., 2015; Ramchurjee and Suresha, 2015 and Ayazlar and Gamze, 2017).

There has been an environmental increase in awareness among consumers, in order to carry out the demand for actions to preserve the environment (Paulraj, 2009). The hospitality industry is currently undergoing persistent demands from tourists to introduce environmentally friendly practices (Alemão, 2019). Several studies assume that those tourists with pro-environmental values and beliefs have a higher probability to behave environmentally sustainably when on vacation (Perkins and Brown, 2012).

3. Hypotheses

The survey design for the research has been selected in a hypothesis-driven manner based on previous results that have emerged from the tourism and social science literature about circular or pro-environmentally sustainable tourist attitude and behaviour. The literature examined indicates that the socio-economic profile of customers may determine their attitude and behaviour regarding sustainability and circular economy issues (e.g., Barr, 2007). Given this empirical evidence, the hypotheses raised for the data analysis are the following:

Hypothesis 1 (H1). *Older tourists have a more circular attitude than younger tourists.*

Many studies show that older tourists have a more circular attitude than younger ones: Ayazlar and Gamze (2017) found that older participants reported a more positive attitude towards green hotels than younger ones, Dolnicar (2010) showed that being older is one of the best predictors of pro-environmental behaviour of tourists, and Leonidou et al. (2015) found that tourists older in age are normally eco-friendlier than younger ones. As Han et al. (2009) stated, several studies showed that green consumers are older tourists (Samdahl and Robertson, 1989; Vining and Ebreo, 1990 and Roberts, 1996).

However, Andereck (2009) found a negative correlation between age and perceived value of green practices, indicating that younger tourists place more value on environmental practices. Similarly, Kiatkawsin and Han (2017) found that young people present a higher level of positive environmental attitude while Holmes et al. (2019) showed that sustainable tourists are typically younger.

Hypothesis 2 (H2). *Tourists are willing to pay more for environmentally friendly or green hotels. The older the tourist is, the greater the willingness to pay more.*

Berezan et al. (2014), Masau and Prideaux (2003) and Kelly et al. (2007) found positive evidence for consumers being willing to pay a premium for green hotel practices. In addition, Masau and Prideaux (2003) and Han et al. (2009) indicated that tourists were willing to pay more for environmentally friendly accommodations. Additionally, according to Bohdanowicz (2003), almost 25% of guests in Scandinavian hotels are willing to pay more for accommodation in an eco-certified facility. Similarly, Kang et al. (2012) found that those U.S. hotel guests that have a higher degree of environmental concern and awareness are more willing to pay premiums for green initiatives in hotels. A related result by Borden et al. (2017) indicates that the majority of guests showed a willingness to exchange something for behaving more environmentally friendly in terms of water consumption.

On the other hand, available literature suggests that tourists' willingness to pay for environmentally friendly or green hotels is related to their socio-demographic variables such as age, sex, and education. Laroche et al. (2001) proved that women were more environmentally conscious than men and were willing to pay more for green products. However, Kostakis and Sardianou (2012) found that men are more likely than women to be willing to pay extra money for green hotels.

Mensah and Mensah (2013) found in a sample of tourists in Ghana that most of them (83%) were willing to pay more to stay in an environmentally responsible hotel. They pointed out that only age was significantly correlated to the willingness to pay more but there were strong relationships between willingness to pay and level of education. Among people under 20 years old, 21.8% were not willing to pay more while only 9.4% were willing to pay more. However, among older people (50 years old and above), a greater percentage (10.1%) were willing to pay more compared to those who were not willing to pay (1.8%).

Other studies found different results, for example, Wehrli et al. (2011) showed that

respondents were not willing to pay a substantial premium for the inclusion of specific attributes. Similarly, Pulido-Fernández and Lopez-Sánchez (2016) indicated that sustainable tourists might not always be willing to pay more, as they found in their study of tourists visiting Spain, and Alemão (2019), Jauhari and Manaktola (2007), Lee et al. (2010), Baker et al. (2014) and Dimara et al. (2015) found that the majority of consumers were not willing to pay a premium for green practices.

Hypothesis 3 (H3). *There is a positive relationship between hotel category and tourists' awareness regarding circular economy practices.*

Larger and high-category hotels are at the frontline of environmental management in the hotel industry (Mensah, 2006). In fact, according to Kang et al. (2012), luxury and mid-priced hotel guests are more willing to pay premiums for hotels' green practices than economy hotel guests, so these high-category hotels can obtain higher returns from their environmental investments than low-category hotels.

Hypothesis 4 (H4). *Most tourists believe that it is important for the hotel to have an energy-saving policy.*

The transition towards a CE model in the tourism sector would not be possible without the implementation of renewable energies. Ma et al. (2016) argue that using renewable resources is an important element in the design of tourism circular economy. Renewable energies can be widely used in all tourism sectors (accommodation, sewage and rubbish stations, transportation, leisure, and recreation, etc.) and tourism enterprises, as well as in different tourist areas and destinations.

According to Dalton et al. (2008), 86% of a sample of tourists in Australian hotels supports the use of renewable energy in the hotel. Additionally, survey respondents to the Deloitte Consumer Survey (2008) identified the following green initiatives as the most important ones: Energy-efficient lighting (74%) and energy-efficient windows (59%), while in a study by Millar and Baloglu (2011), occupancy sensors and key cards that turn the power on and off were added to the list. Kasim (2004) showed that tourists were willing to accept rooms with energy-saving solutions.

In contrast, Zografakis et al. (2011) found that hotel managers consider that tourists did not take into account hotel energy efficiency as a factor to select the hotel; only 53.2% agree or fully agree that tourists select their hotel accommodation based on its environmental image.

Hypothesis 5 (H5). *Tourists' attitude towards circular practices varies according to socio-economic profile: Nationality, educational level and income level.*

Hypothesis 5a (H5a). *Western tourists or tourists from rich countries have a more circular or pro-environmentally sustainable attitude than tourists from developing countries and Eastern and Asian tourists.*

Environmentally friendly hotel practices and nationality are correlated (Berezan et al., 2014 and Mensah, 2012). Baysan (2001) suggested that German tourists seem to be

more aware of the environmental consequences of tourism. Similarly, Lübbert (2001) stated that about half of German tourists would consider an ecolabel when making travel decisions. Leonidou et al. (2015) showed that tourists from Western European countries have a more environmentally friendly attitude than those from Eastern European countries. Finally, Barr (2007) showed that nationality is a significant variable affecting the tourist attitude towards sustainability.

Hypothesis 5b (H5b). *There is a positive relationship between the tourists' educational level and the circular or pro-environmentally sustainable attitude of tourists.*

Berezan et al. (2014) suggested that environmentally friendly practices were significantly correlated with education. Environmental values and knowledge have significant and positive influences on the environmental behaviour intention of tourists (Rodríguez-Oromendía et al., 2013). In this sense, Dolnicar et al. (2008) found that environmentally friendly tourists are higher-educated people with an interest in learning.

Leonidou et al. (2015) and Ayazlar and Gamze (2017) evidenced that those tourists with higher educational levels have a more environmentally friendly attitude. Similarly, Ramchurjee and Suresha (2015) demonstrated that tourists who have a bachelor's degree and above (52.4%) had more environmentally friendly beliefs. Lita et al. (2014) found that highly educated tourists have a more positive attitude and behaviour towards green practices. However, Chia-Jung and Pei-Chun (2014) showed that having a higher level of education is associated with less green consumer behaviour. Similarly, Kollmuss and Agyeman (2002) showed that more education does not necessarily mean increased pro-environmental behaviour.

Hypothesis 5c (H5c). *There is a positive relationship between the tourists' income level and the circular or pro-environmentally sustainable attitude of tourists.*

According to Ayazlar and Gamze (2017), previous studies indicated that customers who have an environmental conscience are more likely to gain more. Leonidou et al. (2015) and Dolnicar et al. (2008) showed that those tourists who are higher-income earners have a more environmentally friendly attitude.

Similarly, Chia-Jung and Pei-Chun (2014) found that having a higher income is related to higher green consumer behaviour. The higher-income tourists were more willing to accept that personal toiletries were not provided in hotel rooms. Similarly, Kasperson et al. (1974) considered that tourists who accept the use of recycled water are characterised by having: High income, high levels of education and advanced age.

Kang et al. (2012) argued that other studies obtained different results; in fact, Power and Elster (2005), and UNDP (2006) showed that low-income people are more sensitive towards the environment because their quality of life is more influenced by environmental topics.

Hypothesis 6 (H6). *Recycling practices and reuse of towel and linen are the most common sustainable/circular hotel practices carried out by tourists.*

Reuse of towels or linens has received great attention in the literature (Goldstein et al., 2008; Mair and Bergin-Seers, 2010 and Shang et al., 2010). In fact, the most common sustainable hotel practices that customers value more are the use of recycling bins and reusable towel and linen schemes (Kim Lian Chan and Baum, 2007; Han and Kim, 2010 and Millar et al., 2012).

Berezan et al. (2014) stated that a towel reuse policy is one of the most widely recognised green practices, especially in the United States. Dimara et al. (2017) also found that 72% of the tourists in hotels in two Greek cities would adopt a towel reuse programme.

According to the Deloitte Consumer Survey (2008), survey respondents indicated the following green initiatives as the most important ones: Recycling, energy-efficient lighting, energy-efficient windows, in-room cards for indicating the option of not having sheets/towels changed daily and environmentally safe cleaning products. Similarly, in a study by Kasim (2004), tourists were willing to book rooms with water-saving technologies, recycling bins, energy-saving solutions, and information on local ecotourism attractions; and Andereck (2009) stated that more than half of tourists believed that environmentally responsible initiatives, such as recycling bins or products made from recycled materials, were extremely important.

However, Tartaglia and de Grosbois (2009) found out that the majority of respondents did not engage at all or only sometimes in the use of recycling bins, and the change of sheets and towels when necessary. Thus, tourists engaged strongly in energy and water conservation practices but not in the reuse of towels.

Hypothesis 7 (H7). *There are gender differences in tourists' circular practices in hotels.*

The environmental behaviour of tourists according to their gender has been extensively investigated. Several studies found that women tend to be more ecologically conscious than men (McIntyre et al., 1993 and Banerjee and McKeage, 1994).

According to Mensah (2012), women were more environmentally responsible than men. They had a greater tendency to switch off lights when leaving their rooms, to purchase local souvenirs and food, to recycle correctly and not to buy things not needed. Laroche et al. (2001) also proved that females were more environmentally conscious than males and were willing to pay more for green products. Similarly, Millar and Baloglu (2011) discovered that preferences for green attributes were higher for females than for males on eight out of the twelve attributes analysed, and that is an indicator of a higher pro-environmental behaviour of females.

For Mensah (2012), gender socialisation in women leads them to greater

environmental sensitivity, and hence, to higher pro-environmental behaviours than men (Karpiak and Baril, 2008; Mostafa, 2007 and Zelezney et al., 2000). However, other studies have not established significant differences in the pro-environmental behaviours of males and females (Clark et al., 2003 and Tindall et al., 2003).

Hypothesis 8 (H8). *There are differences between the circular practices carried out while on holidays in a hotel and those carried out at the tourist place of residence*.

There are studies that have investigated the differences between pro-environmental behaviour at home and on vacation. For example, Miao and Wei (2013) showed that tourists' active environmentalism while staying in a hotel is different from that in their household.

Other studies have shown that people tend to engage in pro-environmental behaviour at home more than when travelling (Dolnicar and Leisch, 2008a and Dolnicar and Leisch, 2008b). For these authors, tourists are felt more morally obligated to behave in an environmentally sustainable manner at home than when on vacation. In a study by Baker et al. (2014), about 60% of respondents recycled paper products at home while only 30% did so while at a hotel; 60% also conserved water at home and less than 40% did so at a hotel; and 80% of respondents conserved energy at home but only 40% who saved energy did so while staying at a hotel.

In addition, Dolnicar and Grün (2009) stated that good environmental behaviour decreases during vacations compared to the home context. Similarly, Ramchurjee and Suresha (2015) showed that tourists feel more responsible for the environment at home where they live and are willing to act in a more environmentally sustainable way in their immediate surroundings, and Holmes et al. (2019) found that the more actions residents did at home, the more they would engage when traveling.

4. Materials and Methods

In order to analyse and answer the hypotheses raised, specific fieldwork was carried out through a structured questionnaire which combined open and closed questions. Face-to-face and online surveys followed a structured questionnaire divided into four sections, as can be seen in Table 1:

- First section focuses on travel characteristics such as type of hotel, board type, length of stay, travel purpose and degree of agreement with different circular economy-related statements, among others.
- Second section focuses on sustainable and/or circular practices carried out during the tourist's stay at the hotel and on the island
- Third section focuses on sustainable and/or circular practices carried out at the tourist's place of residence related to waste, water and energy consumption.
- Fourth section gathers information on the profile of the surveyed tourist.

Table 1. Structure of the questionnaire.

Section	Objective
I.Travel characteristics	Collects information about hotel type, board type, length of stay, travel purpose, total expenditure during the holiday, etc.
II.Sustainable practices at the hotel and on the island	Identifies the sustainable practices carried out by tourists during their stay at the hotel and on the island and collects information about degree of agreement with different circular economy-related statements.
III.Sustainable practices at home	Collects information about sustainable practices carried out at the tourist`s place of residence (waste, water, energy, etc.).
IV.Profile of the respondent	Checks the profile of the respondent (age, gender, occupation, educational level, nationality, income level, etc.).

Section 1 contains open and closed questions and one item rated on a five-point Likert scale that ranges from strongly disagree (1) to strongly agree (5). Section 2 contains questions rated on a Likert scale of 5 points, where 1 = strongly disagree and 5 = strongly agree, or questions with a Likert scale where 1 = never and 5 = always, and one open question about the incentives offered by the hotel to carry out environmentally sustainable practices. Section 3 includes one item rated on a Likert scale of 5 points where 1 = never and 5 = always and some open and closed questions. Finally, Section 4 contains open and closed questions related to the profile of the respondent.

4.1. Population

Gran Canaria received 4,267,385 tourists in 2019, of which 3,620,371 were foreign tourists (Patronato Turismo Gran Canaria, 2019). Therefore, the population under study comprised tourists who visited Gran Canaria, and stayed at a hotel establishment. These tourists come from the main tourist-emitting countries: UK, Germany, Denmark, Finland, Norway, Sweden, the Netherlands, Italy, Belgium, France and Ireland; and also, national tourists arriving to the island in 2019 (in fact, they represent 15.16% of the total sample).

4.2. Sample Selection and Fieldwork

A total of 266 quantitative surveys, 211 face-to-face (79.32%) and 55 online (20.68%), containing 29 questions were collected considering the standard normal deviation set at 95% confidence level (1.96) and a margin of error ±6.009%. After information about the study was provided (i.e., topic, purpose and duration, confidentiality, or language of the questionnaire), people were asked whether they were willing to take part in the study. Respondents were then provided with a structured face-to-face or online questionnaire designed in English, German and Spanish and conducted with tourists in multiple locations in Gran Canaria to ensure a random sample of tourists (tourists from different nationalities, ages, income level, staying at different hotels, etc.). Data were collected on the beach, in restaurants and on the promenade of the island's main tourist areas from January to March 2020. For the face-to-face surveys, researchers were available to clarify meanings to ensure uniformity of responses as the respondents were of different nationalities. The survey took approximately 8–10 min

to complete and consisted of 29 closed and open questions distributed in four sections.

Tourists were classified attending to several characteristics such as age, gender, occupation, educational level, nationality, and residence country and income level. Table 2 shows the basic information of the tourists' profile.

Table 2. Tourists' profile.

Total Number of Tourists/Percentage		
Age	From 18 to 35	48/18
	From 36 to 55	74/27.8
	More than 55	144/54.1
Gender	Male	149/56
	Female	117/44
Nationality	Germany	34/12.8
	Spain	44/16.5
	United Kingdom	68/25.6
	Sweden	27/10.2
	Others	93/35
Occupation	Self-employed entrepreneur	29/10.9
	Senior management employee, etc.	34/12.8
	Middle management employee	62/23.3
	Employee with no qualification	11/4.1
	Student	7/2.6
	Retired	116/43.6
	Unemployed	2/0.8
	Others	5/1.9
Educational level	No studies	7/2.6
	Primary education	28/10.5
	Obligatory secondary education	33/12.4
	Upper-Secondary education	67/25.2
	University studies	119/44.7
	Prefer not to answer	12/4.5
Income level	Less than 2000 €	36/13.5
	2001–5000 €	138/51.9
	More than 5000 €	47/17.7
	NR/DK	45/16.9

4.3. Analysis of the Data

After completing the fieldwork, data were tabulated using the SPSS statistical analysis programme. Frequencies and correlation analysis were undertaken to obtain the tourist profile and to determine relationships and whether there were correlations between the different variables to be analysed.

5. Results

5.1. Validity and Reliability Analysis

To guarantee the scale's validity, a great amount of literature from related studies has been revised to define concepts, ideas and issues under study, and the survey has been developed based on studies related to CE and tourism, the topic of this chapter. Thus, the researchers were able to use an appropriate vocabulary in the questions, as well as to evaluate whether individual items appear to be appropriate measures of their respective constructs. On the other hand, the reliability of the scale's items was carried out by using Cronbach's alpha reliability coefficient that shows how well the items in a set are positively correlated to one another. Cronbach's alpha values for each of the survey's constructs are greater than 0.70 (Table 3), meaning all achieve an acceptable level, except the circular practices carried out during the tourists' stay on the island with a value of 0.696. According to Sekaran and Bougie (2016), reliabilities under 0.60 can be considered poor, while those in the 0.70 range can be considered acceptable. Additionally, the closer Cronbach's alpha coefficient is to 1.0, the greater the internal consistency of the items in the scale, considering a 0.70 range acceptable and those over 0.80, good (Gliem and Gliem, 2003).

Table 3. Reliability analysis and descriptive statistics (N = 266).

Construct	No. of Items	Cronbach´s Alpha	Mean	Variance
Tourists´ attitude towards circular economy practices in hotel establishments	13	0.907	4.034	0.108
Circular practices at the hotel	7	0.773	4.012	0.382
Circular practices on the island	7	0.696	3.5	0.390
Circular practices at the place of residence	25	0.888	3.745	0.484

5.2. Tourist's Profile

Descriptive statistics were performed to determine the tourist's demographic characteristics. According to the results, most of participants are male (56%), more than 55 years old (54.1%), with university studies (44.7%), retired (43.6%) and with an income level between 2001 and 5000 Euros per month. The majority of respondents come from the United Kingdom (25.6%), Spain (16.5%) and Germany (12.8%) (See Table 2).

5.3. Travel Characteristics

Regarding travel characteristics, 57.9% of the respondents stayed at resort hotels while 30.1% stayed at urban city hotels. Most of the tourists (41.4%) stayed at a 3-star hotel. Taking into account the board type hired by the tourists, 47% of them had only room, 24.4% bed and breakfast, 17.7% half board and only 10.9% hired an all-inclusive board type.

The tourist's length of stay on the island was 12 days on average in which 32% of them spent less than 500 Euros (meals, leisure, transportation, etc. included), 26.3% spent

between 501 and 1000 Euros and 20.3% between 1001 and 2000 Euros.

When asked how they hired the hotel, 51.9% of tourists booked it online through platforms like Booking, TripAdvisor and Hotels.com, while 21.1% booked it through a Tour Operator like TUI or Condor. The rest of the respondents booked the hotel with a travel agency or on the hotel website (13.5% each).

The vast majority of tourists (89.1%) travel to the island for leisure purposes. Additionally, 54.5% of the respondents travel to Gran Canaria as a couple, 18% with friends, 15.8% travel alone, 10.9% with family and only 0.8% travel with co-workers.

About 63.9% of tourists do not know if the hotel where they stayed has any environmental quality management system or environmental certification, 25.6% do not remember and only 10.5% know whether the hotel has an environmental management system. In addition, 35.7% of those who know if the hotel has any environmental quality management system or environmental certification say it has ISO 14001, 35% do not know which certification, 14.3% Ecolabel, and EMAS and Cradle to Cradle 7.1% each.

Finally, when the tourists were asked if they received environmental information, such as an environmental badge or environmental certificate, when booking the hotel, 72.6% of them replied that they did not receive any information, 20.3% did not remember it and only 7.1% were offered environmental information when booking.

5.4. Hypotheses Testing

5.4.1. Tourists' Attitude and Behaviour towards Circular Economy Practices in Hotel Establishments

Tourists were asked to indicate their degree of agreement with different statements related to CE in hotel establishments on a 5-point scale ranging from 1 (totally disagree) to 5 (totally in agreement). Table 4 shows that the statements with the highest agreement were the importance of tourist accommodation to carry out a responsible policy with the environment, the importance that hotels manage the way in which water is used to reduce consumption and/or maximise its reuse, and the importance that tourist accommodation reduces the volume of waste through recycling, reuse of waste or the sale of waste to a third company (mean = 4.41, 4.35 and 4.3, respectively). The statements that attracted the greatest disagreements were the importance of a hotel having a recycling and waste management policy, the willingness to pay more for a hotel with better environmental quality and the willingness to use collaborative platforms during their holidays (mean = 3.65, 3.71 and 3.36, respectively).

Table 4. Statements related to circular economy (CE) in hotel establishments.

Statements	N	Mean
For me it is important that tourist accommodation carry out a responsible policy with the environment	266	4.41
When I choose a tourist accommodation, for me it is important that it has some environmental quality certification	266	3.73
I am willing to pay more for a hotel with better environmental quality	266	3.71
For me it is important that a hotel has a recycling and waste management policy	266	3.65
For me it is important that a hotel has a water saving policy	266	4.2
For me it is important that a hotel has an energy saving policy	266	4.2
For me it is important that hotel staff have training in environmental issues (recycling, etc.)	266	4.22
For me it is important that hotels manage the way in which water is used to reduce consumption and/or maximize its reuse	266	4.35
For me it is important that tourist accommodation use renewable energy	266	4.15
For me it is important that tourist accommodation manage the use and consumption of energy to minimize its consumption.	266	4.29
I am willing that hotels offer closed menus in restaurants to reduce food waste	266	3.88
For me it is important that tourist accommodation reduce the volume of waste through recycling, reuse of waste or the sale of waste to a third company.	266	4.3
I would be willing to use collaborative platforms during my stay (BlaBlaCar, foodtogo, etc.) (if possible)	266	3.36

Hypothesis 1 (H1). *Older tourists have a more circular attitude than younger tourists.*

To test H1, an ANOVA test has been carried out and the sample was divided into 3 age groups: Between 18 and 35 years, 36 to 55. and over 55 years. Table 5 shows that there are significant differences between the different tourists' age groups in terms of attitude towards circular practices. In general, tourists over 55 years old have a more circular attitude than younger tourists. In fact, there are significant differences among the tourists' age groups when they choose tourist accommodations; older tourists tend to consider it important that the hotel has some environmental quality certification and uses renewable energy, a water and energy-saving policy, and that it provides training to staff in environmental issues. Additionally, for older tourists, reducing water consumption, using renewable energy, and having a waste management policy in hotel establishments are very important. However, tourists between 18 and 35 years old have a more positive attitude to be willing to use collaborative platforms during their stay than older ones.

Table 5. ANOVA test comparing attitude towards circular practices by age groups.

	df	Mean	F	Sig.
For me it is important that tourist accommodation carry out a responsible policy with the environment	2	4.41	2.022	0.134
When I choose a tourist accommodation, for me it is important that it has some environmental quality certification	2	3.73	12.020	0.000
For me it is important that a hotel has a recycling and waste management policy	2	3.65	0.450	0.638
For me it is important that a hotel has a water saving policy	2	4.2	6.592	0.002
For me it is important that a hotel has an energy saving policy	2	4.2	7.406	0.001
For me it is important that hotel staff have training in environmental issues (recycling, etc.)	2	4.22	7.345	0.001
For me it is important that hotels manage the way in which water is used to reduce consumption and/or maximize its reuse	2	4.35	6.649	0.002
For me it is important that tourist accommodation use renewable energy	2	4.15	5.826	0.003
For me it is important that tourist accommodation manage the use and consumption of energy to minimize its consumption.	2	4.29	6.267	0.002
I am willing that hotels offer closed menus in restaurants to reduce food waste	2	3.88	3.178	0.043
For me it is important that tourist accommodation reduce the volume of waste through recycling, reuse of waste or the sale of waste to a third company.	2	4.3	3.892	0.022
I would be willing to use collaborative platforms during my stay (BlaBlaCar, foodtogo, etc.) (if possible)	2	3.36	0.645	0.525

Hypothesis 2 (H2). *Tourists are willing to pay more for environmentally friendly or green hotels. The older the tourist is, the greater the willingness to pay more*.

Results (Table 6) indicate that 60.9% of tourists fully agree or agree to pay more for a hotel with better environmental quality, while only 4.9% totally disagree. In addition, there are only significant differences between tourists' age and nationality and the willingness to pay more to stay in an environmentally friendly or green hotel. Tourists over 55 years old and Swedish and German tourists are more willing to pay more than younger tourists and tourists from other nationalities.

Table 6. Willingness to pay more for environmentally friendly or green hotels.

	Frequency	Percentage	Accumulated Percentage
Totally disagree	13	4.9	4.9
2.00	15	5.6	10.5
3.00	76	28.6	39.1
4.00	94	35.3	74.4
Totally in agreement	68	25.6	100.0
Total	266	100.0	

Hypothesis 3 (H3). *There is a positive relationship between hotel category and tourists' awareness regarding circular economy practices.*

To test H3, tourists were divided according to 3 hotel category groups: 1 and 2 stars, 3 stars, and 4–5 stars. Results in Table 7 shows that there are no significant differences

between hotel category and tourists' awareness regarding circular economy practices. Only tourists who stay in 4- or 5-star hotels give greater importance to the recycling and waste management policy. The same result is obtained if we considered two groups (1–3 stars and 4–5 stars) or 5 groups according to stars.

Table 7. ANOVA test comparing attitude towards circular practices by hotel category groups.

	df	Mean	F	Sig.
For me it is important that hotels carry out a responsible policy with the environment	2	4.41	0.008	0.992
When I choose a tourist accommodation, for me it is important that it has some environmental quality certification	2	3.73	0.106	0.899
For me it is important that a hotel has a recycling and waste management policy	2	3.65	3.900	0.021
For me it is important that a hotel has a water saving policy	2	4.2	0.498	0.608
For me it is important that a hotel has an energy saving policy	2	4.2	0.182	0.834
For me it is important that hotel staff have training in environmental issues (recycling, etc.)	2	4.22	0.481	0.619
For me it is important that hotels manage the way in which water is used to reduce consumption and/or maximize its reuse	2	4.35	0.155	0.857
For me it is important that tourist accommodation use renewable energy	2	4.15	0.148	0.863
For me it is important that tourist accommodation manage the use and consumption of energy to minimize its consumption.	2	4.29	0.456	0.634
I am willing that hotels offer closed menus in restaurants to reduce food waste	2	3.88	0.261	0.770
For me it is important that tourist accommodation reduce the volume of waste through recycling, reuse of waste or the sale of waste to a third company	2	4.3	0.286	0.752
I would be willing to use collaborative platforms during my stay (BlaBlaCar, foodtogo, etc.) (if possible)	2	3.36	0.146	0.864

Hypothesis 4 (H4). *Most tourists believe that it is important for the hotel to have an energy-saving policy.*

To test this hypothesis, the questionnaire included a question where tourists were asked to rate the statement 'For me it is important that a hotel has an energy saving policy' (where 1 = strongly disagree and 5 = strongly agree); tourists showed a high level of agreement (mean = 4.2).

In order to analyse if there are differences in tourists' belief of the importance of a hotel to have an energy-saving policy according to gender, we have carried out an independent-samples t-test (Table 8).

As for age and nationality, an ANOVA test has been carried out (Table 9). Results show that there are no significant differences according to gender but there are differences at 10% between nationality and the belief that it is important for the hotel to have an energy-saving policy. Swedish and Spanish tourists are more aware of this aspect. However, there are significant differences at 5% by age; tourists over 55 years of age are those who give more importance to the hotel having an energy-saving policy, while tourists in the age group between 18 and 35 do not give it as much importance.

Hypothesis 5 (H5). *Tourists' attitude towards circular practices varies according to socio-economic profile: Nationality, educational level and income level.*

Hypothesis 5a (H5a). *Western tourists or tourists from rich countries have a more circular or pro-environmentally sustainable attitude than tourists from developing countries and Eastern and Asian tourists.*
Hypothesis 5b (H5b). *There is a positive relationship between the tourists' educational level and the circular or pro-environmentally sustainable attitude of tourists.*
Hypothesis 5c (H5c). *There is a positive relationship between the tourists' income level and the circular or pro-environmentally sustainable attitude of tourists.*

To test H5a, tourists have been divided into different groups based on their nationality: German, Spanish, UK, Swedish and other countries (mainly from Italy, Finland, Norway and The Netherlands). As can be seen in Table 10, there are significant differences between tourists' nationality and their attitude towards the circular practices carried out by the hotel establishment. German and Swedish tourists show a more circular attitude towards the environmental practices carried out by hotels. On the contrary, Spanish tourists give it less importance.

Tourists were divided according to their educational level to test H5b, taking into account the following levels: No studies, primary education, obligatory secondary education, Upper-Secondary education and University studies. According to results (Table 10), there is a positive relationship between tourist educational level and tourist's circular attitude; particularly, those tourists with higher educational level consider it important that the hotel establishment has some environmental quality certification, a recycling and waste management policy, and that they provide training in environmental issues to staff.

Finally, tourists were divided according to their income level to test H5c: Those who earn less than 2000 Euros per month, between 2001 and 5000 Euros and those who earn more than 5000. Results show that there are no significant differences between the circular attitudes of tourists according to their income level (Table 10). There are only significant differences in the importance that tourists give to hotels having recycling and waste management policies. Tourists with an income of more than 5000 Euros per month value this aspect more than the rest of tourists. On the other hand, there are significant differences at 10% in the importance that hotel staff have training in environmental issues (tourists who earn between 2001 and 5000 Euros per month give it greater importance) and the willingness to use collaborative platforms during the stay (tourists who earn less than 2000 Euros are more willing to use them).

Table 8. *t*-Test comparing the importance for the hotel to have an energy-saving policy by gender.

		Levene´s Test for Equality of Variances		*t*-test for Equality of Means						
		F	Sig.	T	Df	Sig.	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
For me it is important that a hotel has an energy saving policy	Equal variances assumed	2.815	0.095	–0.949	264	0.343	–0.10876	0.11456	–0.33432	0.11680
	Equal variances not assumed			–0.935	232.44	0.351	–0.10876	0.11634	–0.33798	0.12046

Table 9. ANOVA test comparing the importance for the hotel to have an energy-saving policy by nationality or age.

		df	Mean	F	Sig.
For me it is important that a hotel has an energy saving policy	**Nationality**	4	4.2	2.195	0.070
	Age	2	4.2	7.406	0.001

Table 10. ANOVA test comparing tourists' attitude towards circular practices according to socio-economic profile.

		df	Mean	F	Sig.
For me it is important that tourist accommodation carry out a responsible policy with the environment	Nationality	4	4.41	5.283	0.000
	Educational level	5	4.41	0.703	0.621
	Income level	3	4.41	0.808	0.490
When I choose a tourist accommodation, for me it is important that it has some environmental quality certification	Nationality	4	3.73	2.183	0.071
	Educational level	5	3.73	2.518	0.030
	Income level	3	3.73	1.270	0.285
For me it is important that a hotel has a recycling and waste management policy	Nationality	4	3.65	26.137	0.000
	Educational level	5	3.65	4.758	0.000
	Income level	3	3.65	9.264	0.000
For me it is important that a hotel has a water saving policy	Nationality	4	4.2	1.703	0.150
	Educational level	5	4.2	1.465	0.202
	Income level	3	4.2	1.096	0.351
For me it is important that a hotel has an energy saving policy	Nationality	4	4.2	2.195	0.070
	Educational level	5	4.2	0.953	0.447
	Income level	3	4.2	0.465	0.707
For me it is important that hotel staff have training in environmental	Nationality	4	4.22	2.081	0.084

issues (recycling, etc.)	Educational level	5	4.22	2.321	0.044
	Income level	3	4.22	2.621	0.051
For me it is important that hotels manage the way in which water is used to reduce consumption and/or maximize its reuse	Nationality	4	4.35	4.049	0.003
	Educational level	5	4.35	0.694	0.628
	Income level	3	4.35	0.826	0.481
For me it is important that tourist accommodation use renewable energy	Nationality	4	4.15	5.120	0.001
	Educational level	5	4.15	1.213	0.303
	Income level	3	4.15	1.004	0.392
For me it is important that tourist accommodation manage the use and consumption of energy to minimize its consumption.	Nationality	4	4.29	3.166	0.015
	Educational level	5	4.29	0.603	0.697
	Income level	3	4.29	1.022	0.383
I am willing that hotels offer closed menus in restaurants to reduce food waste	Nationality	4	3.88	6.192	0.000
	Educational level	5	3.88	1.402	0.224
	Income level	3	3.88	0.856	0.465
For me it is important that tourist accommodation reduce the volume of waste through recycling, reuse of waste or the sale of waste to a third company.	Nationality	4	4.3	2.058	0.087
	Educational level	5	4.3	0.861	0.508
	Income level	3	4.3	1.955	0.121
I would be willing to use collaborative platforms during my stay (BlaBlaCar, foodtogo, etc.) (if possible)	Nationality	4	3.36	6.700	0.000
	Educational level	5	3.36	1.164	0.327
	Income level	3	3.36	2.118	0.098

Hypothesis 6 (H6). *Recycling practices and reuse of towel and linen are the most common sustainable/circular hotel practices carried out by tourists.*

Tourists were asked how often they carried out different sustainable practices during their stay at the hotel and on the island based on a scale of 1–5; 1 = never, 2 = very rarely, 3 = sometimes, 4 = almost always, and 5 = always. Table 11 shows that the most common sustainable practices carried out during the tourist's stay at the hotel are showering instead of bathing and recycling if the hotel has recycling bins (mean = 4.59 and 4.45, respectively), while the least carried out practices are: Not turning the air conditioner thermostat below 22 ◦C and using the partial discharge tank (mean = 2.29 and 3.37, respectively). Asking for a change of sheets or towels only when necessary is also a common circular practice (mean = 4.21).

Table 11. Circular practices carried out by tourists at the hotel.

Circular practices at the hotel	N	Mean
I shower instead of bathing	266	4.59
I use the partial discharge tank	266	3.37
I turn off air conditioning and lights when I leave the room	266	4.29
Not turning the air conditioner thermostat below 22ºC	266	2.29
Recycle if the hotel has recycling bins	266	4.45
I try to reduce food waste in restaurants	266	4.26
I ask for a change of sheets or towels only when necessary	266	4.21

If we consider the sociodemographic profile, tourists' behaviour towards recycling practices and reuse of towel and linen only varies according to gender and nationality. As for gender, women recycle if the hotel has recycling bins and ask for a change of sheets or towels only when necessary, more than men. According to nationality, an ANOVA test has been carried out, and results indicate that tourists from Germany, Sweden and the United Kingdom ask for a change of sheets or towels only when necessary, while tourists from Spain and other countries ask for a change much more frequently.

Hypothesis 7 (H7). *There are gender differences in tourists' circular practices in hotels*.

The independent-samples t-test was carried to show if there are differences between the tourists' circular practices in hotels according to gender. Table 12 shows that there are significant gender differences in some of the tourists' circular practices in hotels. Specifically, women report a higher circular behaviour than men in not turning the air conditioning down below 22 ◦C, in recycling, trying to reduce food waste in restaurants and asking for a change of sheets or towels only when necessary.

Table 12. ANOVA test comparing tourists' circular practices in hotels by gender.

	df	Mean	F	Sig.
I shower instead of bathing	1	4.59	2.154	0.143
I use the partial discharge tank	1	3.37	1.738	0.189
I turn off air conditioning and lights when leaving the room	1	4.29	2.618	0.107
Not turning the air conditioner thermostat below 22 °C	1	2.92	4.292	0.039
Recycle if the hotel has recycling bins	1	4.45	4.942	0.027
I try to reduce food waste in restaurants	1	4.26	8.111	0.005
I ask for a change of sheets or towels only when necessary	1	4.21	10.862	0.001

Table 13 presents how often tourists carried out sustainable or circular practices during their stay in Gran Canaria. Results show that the circular practices they carry out more often are using reusable bags when buying and using public transport (mean = 4.18 and 3.97, respectively), while the practices they perform less frequently are participating in environmental recovery actions and carrying out environmentally sustainable leisure activities (hiking, bike routes, stargazing, visit natural parks, etc.) (mean = 2.37 and 3.00, respectively).

Table 13. Circular practices carried out by tourists on the island.

Circular Practices on the Island	N	Mean
I use public transport	266	3.97
I buy in small shops instead of big chains	266	3.68
I buy products with less packaging	266	3.82
I use reusable bags when buying	266	4.18
I carry out environmentally sustainable leisure activities (hiking, bike routes, stargazing, visit natural parks...)	266	3.00
I participate in environmental recovery actions (beach cleaning, tree planting...)	266	2.37
I am interested in knowing the environment of the island and its environmental problems	266	3.48

Additionally, tourists were asked if the hotel establishment where they stayed offered any type of incentives for the guest to carry out environmentally sustainable practices such as discounts for another stay, prizes, tickets to natural parks, etc. Results show that 90.6% of them did not receive any incentives while only 9.4% received it. The incentives that tourists received the most were tickets for leisure and natural parks (28%) and discounts for leisure activities (21%), while the least received incentives were beach cleaning activities (4%) and a basket of products without plastic (5%).

5.4.2. CE Practices Carried Out at the Tourist's Place of Residence

Tourists were asked to indicate how often they carry out different sustainable actions in their daily life in the country where they reside based on a scale of 1–5; 1 = never, 2 = very rarely, 3 = sometimes, 4 = almost always, and 5 = always. Practices were divided in three groups: Waste, water and energy and other types of sustainable actions. Table 14 shows that the most common sustainable waste-related practices carried out at the tourist's place of residence are recycling paper and cardboard and recycling plastic containers (both with a mean = 4.75), while the least carried out practices are buying/selling second-hand products (furniture, appliances, clothes, etc.) and keeping in mind that when buying clothes, it is environmentally sustainable (both with mean = 2.82). According to water and energy practices, the most common ones are trying to save water and energy and turning off air conditioning, heating and lights when leaving home (mean = 4.49 and 4.33, respectively), while the least carried out practices are using sustainable transport and using renewable energy sources (mean = 2.50 and 2.87, respectively). Finally, taking into account the other types of sustainable actions that tourists carry out at their place of residence, the most common one is promoting environmental awareness in the family (mean = 3.95) and the least carried out is using sharing platforms (mean = 2.80).

Hypothesis 8 (H8). *There are differences between the circular practices carried out while on holidays in a hotel and those carried out at the tourists' place of residence.*

The survey included a question related to H8 where tourists were asked to point out if they carry out the same circular practices in their place of residence as when travelling. Results indicate that 86.5% of tourists carry out the same environmentally sustainable practices. Additionally, tourists were asked to indicate how often they carry out the same circular practices in their place of residence as when travelling. Figure 1 shows that 53% carry out the same environmentally sustainable practices almost always and 24.3% do it always.

To test this hypothesis, an independent-samples *t*-test for gender and ANOVA test for age and nationality have been carried out. Results indicate that there are no significant differences by gender or nationality in the frequency of doing the same circular practices at home than when travelling; however, there are significant differences according to tourist's age. Tourists over 55 do the same circular practices at home as when traveling more frequently than younger tourists. Hence, older tourists have the same environmental behaviour at home than when on holidays and younger tourists behave differently in their place of residence than when travelling.

Table 14. Circular practices carried out at the tourist's place of residence.

Sustainable Practices at the Place of Residence (Waste)	N	Mean
I recycle glass	266	4.71
I recycle paper and cardboard	266	4.75
I recycle cooking oil	266	3.58
I recycle plastic containers	266	4.75
I recycle household appliances, printers, computers...	266	4.25
I separate the organic waste	266	4.09
I avoid wasting food	266	4.36
I try to repair before buying	266	3.95
I buy/sell second-hand products (furniture, appliances, clothes, etc.)	266	2.82
When I buy clothes, I notice that it is environmentally sustainable	266	2.82
I buy local and/or seasonal products	266	3.77
I buy organic products	266	3.07
I buy products with less packaging	266	3.84
I use reusable bags when buying	266	4.41
I avoid aluminium foil	266	3.10
Sustainable practices at the place of residence (Water and energy)		Mean
I try to save water and energy	266	4.49
I use renewable energy sources	266	2.87
I use public transport	266	3.70
I use sustainable transport (bicycle, electric car, etc.)	266	2.50
I turn off air conditioning, heating and lights when I leave home	266	4.33
Thermostat with time programming	266	3.76
I take into account the level of energy efficiency in the house	266	3.97
Sustainable practices at the place of residence (Other)	N	Mean
I do environmentally sustainable leisure activities (hiking, cycling, stargazing)	266	2.98
In the family we promote environmental awareness	266	3.95
I use shared platforms (if any).	266	2.80

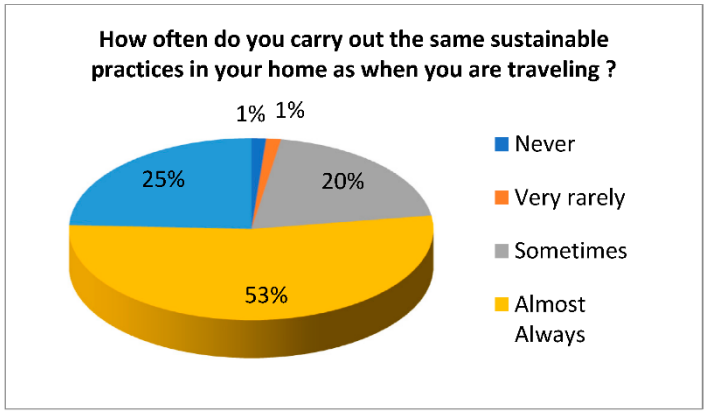


Figure 1. How often tourists carry out the same circular practices in their place of residence as when travelling.

6. Discussion

Our results support hypothesis H1 and are consistent with those of Leonidou et al. (2015), Ayazlar and Gamze (2017) and Dolnicar (2010), indicating that older tourists in Gran Canaria have a higher pro-environmental or circular attitude in hotel establishments than younger tourists.

Findings also indicate that most tourists (60.9%) are willing to pay more for environmentally friendly or green hotels. This result supports hypothesis H2, and confirms the results of Berezan et al. (2014), Masau and Prideaux (2003), Kelly et al. (2007) and Han et al. (2009). Our results also show that tourists' willingness to pay for more environmentally sustainable hotels is related to their socio-demographic profile. There are significant differences by tourists' age or nationality in their willingness to pay more for a hotel that is environmentally responsive. The older a tourist is, the greater the willingness to pay more; this result is consistent with that of Mensah and Mensah (2013) who pointed out that only age is significantly related to willingness to pay more. Furthermore, our results indicate that there is no gender or educational differences. However, Laroche et al. (2001) proved that females were more environmentally conscious than males and were willing to pay more, and Mensah and Mensah (2013) obtained that there were also strong relationships between the willingness to pay and the level of education.

On the other hand, our results show that there is no relationship between hotel category and tourists' awareness regarding circular economy practices; therefore, hypothesis H3 is not supported. These results do not match with those of Kang et al. (2012) who stated that luxury and mid-priced hotel guests are more willing to pay premiums for hotels' green practices than guests of lower-category hotels.

Results also show that most tourists believe that it is important for the hotel to have an energy-saving policy, supporting hypothesis H4. The results are in line with those of Dalton et al. (2008) and those of the Deloitte Consumer Survey (2008), which identified energy-efficient lighting and energy-efficient windows as the most important green initiatives for tourists. However, they are opposite to those of Zografakis et al. (2011) who argued that tourists do not consider hotel energy efficiency as a factor to select the hotel.

Additionally, our results indicate that tourists´ attitude towards circular practices varies according to socio-economic profile. First, there are significant differences between tourists' nationality and their attitude towards the circular practices carried out by the hotel establishment; therefore, hypothesis H5a is supported. This result is consistent with those of Leonidou et al. (2015), Berezan et al. (2013) and Berezan et al. (2014) who showed that tourists from Western European countries have a more environmentally friendly attitude than those from Eastern European countries. Second, there is a positive relationship between tourist educational level and tourist's circular attitude, so hypothesis H5b is also supported. These results are in line with Berezan et al. (2014) who suggested that environmentally friendly practices were significantly correlated with education. In this sense, Dolnicar et al. (2008) found that environmentally friendly tourists are people with higher educational levels and with an interest in learning. Similarly, Leonidou et al. (2015) and Ayazlar and Gamze (2017) evidenced that those tourists with higher educational levels have a more environmentally friendly attitude. Third, results show that there are no significant differences between the circular attitudes of tourists according to their income level; therefore, the results do not support hypothesis H5c. Thus, these results do not match with the results of numerous authors such as Leonidou et al. (2015), Ayazlar and

Gamze (2017), Dolnicar et al. (2008) and Chia-Jung and Pei-Chun (2014) who found that those tourists who are higher-income earners have a more environmentally friendly attitude.

On the other hand, findings also support hypothesis H6 and are consistent with those of Kim Lian Chan and Baum (2007), Han and Kim (2010) and Millar et al. (2012) who stated that the most common sustainable hotel practices carried out by tourists are the use of recycling bins and reusable towel and linen schemes. Similarly, Berezan et al. (2014) stated that one of the most widely recognised green practices, especially in the United States, is the towel reuse policy. Additionally, results show that tourists' behaviour towards recycling practices and reuse of towel and linen only varies according to gender or nationality. Specifically, women recycle and ask for a change of sheets or towels only when necessary, while men change them more frequently, and tourists from Germany, Sweden and the United Kingdom ask for a change of sheets or towels only when necessary, while tourists from Spain and other countries are less aware and change them more often.

Additionally, women also report a higher circular behaviour than men in not turning the air conditioning down below 22 ◦C and trying to reduce food waste in restaurants. This result supports hypothesis H7 and is consistent with those of Mensah and Mensah (2013) and Laroche et al. (2001) who proved that women were more environmentally conscious than men. Similarly, Millar and Baloglu (2011) found that preferences for green attributes were higher for women than for men on eight out of twelve attributes, indicating a higher pro-environmental behaviour of females.

Finally, this work investigated if there were differences between the circular practices carried out while on holidays in a hotel and those carried out at the tourist place of residence. Results indicate that 86.5% of tourists carry out the same environmentally sustainable practices; therefore, hypothesis H8 is not supported. However, if we analyse how often they carry out the same circular practices in their place of residence as when travelling according to socio-demographic factors, results indicate that there are no significant differences by gender or nationality in the frequency of doing the same circular practices at home as when travelling. However, there are significant differences according to tourists' age. Tourists over 55 years old do the same circular practices at home as when traveling more frequently than younger tourists. These results do not match with those of Ramchurjee and Suresha (2015), Dolnicar and Leisch (2008), Miao and Wei (2013) and Dolnicar and Grün (2009) who found that good environmental behaviour decreases during vacations compared to the home context.

7. Conclusions

Tourism is an important contributor to economic growth, employment and GDP in many countries and regions, especially in the Canary Islands where it represents 35.2% of GDP and 40.2% of employment (Exceltur, 2019). Nevertheless, tourism growth and development in the Canaries have altered the state of the coastal environment and have generated negative externalities on the environment. The implementation of CE models and solutions is especially important at island destinations to reduce

environmental impacts generated by tourism activity. Tourism businesses and destinations can take advantage of many CE initiatives to reduce the trend but also to achieve greater profitability, increasing revenues in the provision of services, for example, in the hotel sector (Rodríguez et al., 2020). In this sense, the aim of this chapter was to analyse the attitude towards CE and the environmental behaviour and circular practices among tourists of a well-known mature sun and beach destination, Gran Canaria, in order to design the transition from a linear model to a circular model in the hotel industry of this destination.

The first objective of the study was to analyse the attitude of tourists towards CE in hotel establishments. The results indicate first that tourists' attitude towards circular practices varies according to socio-economic profile: Nationality, educational level and income level. Specifically: German and Swedish tourists and those tourists with higher educational level show a more circular attitude towards the environmental practices carried out by hotels than the rest of the tourists. However, there are no significant differences in the circular attitudes of tourists according to their income level; there are only significant differences in the importance that tourists give to hotels having recycling and waste management policies. Second, older tourists have a higher pro-environmental or circular attitude in hotel establishments than younger ones. Findings also show that most tourists (60.9%) are willing to pay more for environmentally friendly or green hotels and believe that it is important for the hotel to have an energy-saving policy. Therefore, these results indicate which type of tourists, according to socio-economic profile, hotels, and destinations, should place greater emphasis on conveying the message of the importance of having a circular attitude during their holidays. Hence, the objective was to identify the tourists who have a more circular attitude and behaviour at a mature destination (Gran Canaria) according to their socio-economic profile.

The second objective was to analyse the environmental behaviour and circular practices carried out by tourists. Results show that the most common sustainable hotel practices carried out by tourists are the use of recycling bins and reusable towel and linen schemes, and that women report significantly higher pro-environmental behaviours than men. Consequently, hotel managers should consider having recycling bins in their establishments and guests should be offered information about the change of towels and sheets only when necessary, as these two aspects are quite well received by tourists

Furthermore, results indicate that 86.5% of tourists carry out the same CE practices on holidays as in their place of residence and there are only significant differences according to tourists' age in the frequency of doing the same circular practices at home as when travelling. Tourists over 55 years old carry out more frequently the same circular practices at home as when traveling than younger tourists. Additionally, tourists were asked about the circular practices they carry out at their place of residence, and findings show that the most common practices are recycling paper and cardboard and plastic containers, trying to save water and energy, and turning off air conditioning, heating and lights when leaving home. Destinations and hotels should take this into account to promote these types of practices during the tourist's stay.

The COVID-19 pandemic has obviously enormous negative economic consequences in the tourism sector, especially at island destinations such as Gran Canaria, but it also poses challenges and opens up new opportunities for the tourism sector. It has shown that tourist businesses need to be flexible and ready for change. Many businesses will look for an increase in brand image while reducing the cost associated, and them moving away from a linear economy model towards the CE in tourism is the possible solution (Aryal, 2020). As Zhang and Tian (2014) stated, in order to increase the competitiveness of the tourism industry, circular tourism must be the solution. Therefore, environmental information and education by hotels to their guests are of great importance in order to achieve a change in the behaviour of tourists with respect to the CE. The tourism industry should focus on investing in training, innovation, analysis, research, and resources to achieve the transition to a CE model in the sector.

To sum up, more research is needed on how to generate CE solutions towards a more environmentally sustainable tourism industry. Therefore, future research could focus on defining CE strategies and initiatives for hotels, tourism business and destinations to attract tourists who are more aware about the CE issue. Another future line of research could be the investigation of circular practices carried out by hotels and those that have to be implemented or promoted to achieve the change to a circular model in the tourism industry.

Finally, this study faces various limitations that could reduce the generalisation of its results. On the one hand, the study analyses the attitude towards CE and the environmental behaviour and circular practices among tourists of a well-known mature sun and beach destination, Gran Canaria. Thus, further empirical studies should be carried out for results to be representative for all sun and beach tourist destinations. On the other hand, results may be different at other types of tourist destinations, such as an urban or rural tourist destination; future research may involve this type of destinations and results comparison.

8. References

Alemão, C.P. (2019). *Environmental Sustainability Practices in the Supply Chain of Hotels and the Consumers' Perception*. Ph.D. Thesis, Católica Porto Business School, Porto, Portugal, July 2019.

Andereck, K.L. (2009). Tourists' perceptions of environmentally responsible innovations at tourism businesses. *Journal of Sustainable Tourism*, 17, 489–499.

Aryal, C. (2020). Exploring Circularity: A Review to Assess the Opportunities and Challenges to Close Loop in Nepali Tourism Industry. *Journal of Tourism & Adventure*, 3(1), 142–158.

Ayazlar, A.P.D.R.A. and Gamze, G.Ü.N. (2017). The Attitudes of Customers towards Green Hotels. *In Proceedings of the 1st International Sustainable Tourism Congress*, Kastamonu, Turkey, 23–25 September 2017; pp. 152–160.

Baker, M.A.; Davis, E.A. and Weaver, P.A. (2014). Eco-friendly attitudes, barriers to participation, and differences in behavior at green hotels. *Cornell Hospitality Quarterly*, 55, 89–99.

Banerjee, B. and McKeage, K. (1994). How green is my value: Exploring the relationship between environmentalism and materialism. *ACR North American Advances*, 21, 147–152.

Barr, S. (2007). Factors influencing environmental attitudes and behaviours: A UK case study of household waste management. *Environment and Behavior*, 39, 435–473.

Baysan, S. (2001). Perceptions of the environmental impacts of tourism: A comparative study of the attitudes of German, Russian and Turkish tourists in Kemer, Antalya. *Tourism Geographies*, 3(2), 218–235.

Berezan, O.; Millar, M. and Raab, C. (2014). Sustainable hotel practices and guest satisfaction levels. *International Journal of Hospitality and Tourism Administration*, 15, 1–18.

Berezan, O.; Raab, C.; Yoo, M. and Love, C. (2013). Sustainable hotel practices and nationality: The impact on guest satisfaction and guest intention to return. *International Journal of Hospitality Management*, 34, 227–233.

Bohdanowicz, P. (2003). *A Study of Environmental Impacts, Environmental Awareness and Pro-Ecological Initiatives in the Hotel Industry*. Ph.D. Thesis, Royal Institute of Technology, Stockholm, Sweden.

Borden, D.S.; Coles, T. and Shaw, G. (2017). Social marketing, sustainable tourism, and small/medium size tourism enterprises: Challenges and opportunities for changing guest behaviour. *Journal of Sustainable Tourism*, 25, 903–920.

Chia-Jung, C. and Pei-Chun, C. (2014). Preferences and willingness to pay for green hotel attributes in tourist choice behavior: The case of Taiwan. *Journal of Travel and Tourism Marketing*, 31, 937–957.

Clark, C.F.; Kotchen, M.J. and Moore, M.R. (2003). Internal and external influences on pro-environmental behavior: Participation in a green electricity program. *Journal of Environmental Psychology*, 23, 237–246.

Dalton, G.J.; Lockington, D.A. and Baldock, T.E. (2008). A survey of tourist attitudes to renewable energy supply in Australian hotel accommodation. *Renewable Energy*, 33, 2174–2185.

Deloitte Consumer Survey (2008). *The Staying Power of Sustainability*. Available online: https: //www.expoknews.com/wp-content/uploads/2010/02/us_cb_sustainability_1906081.pdf (accessed on 15 August 2020).

Dimara, E.; Manganari, E. and Skuras, D. (2015). Consumers' willingness to pay premium for green hotels: Fact or Fad. *In Proceedings of the International Marketing Trends Conference*, Paris, France, 23–24 January 2015; pp. 22–24.

Dimara, E.; Manganari, E. and Skuras, D. (2017). Don´t change my towels please: Factors influencing participation in towel reuse programs. *Tourism Management*, 59, 425–437.

Dolnicar, S. (2010). Identifying tourists with smaller environmental footprints. *Journal of Sustainable Tourism,* 18, 717–734.

Dolnicar, S.; Crouch, G.I. and Long, P. (2008). Environment-friendly tourists: What do we really know about them? *Journal of Sustainable Tourism*, 16, 197–210

Dolnicar, S. and Grün, B. (2009). Environmentally friendly behavior: Can heterogeneity among individuals and contexts/environments be harvested for improved sustainable management? *Environment and Behavior,* 41(5), 693–714.

Dolnicar, S. and Leisch, F. (2008a). An investigation of tourists' patterns of obligation to protect the environment*. Journal of Travel Research*, 46(4), 381–391.

Dolnicar, S. and Leisch, F. (2008b). Selective marketing for environmentally sustainable tourism. *Tourism Management*, 29, 672–680.

Domenech, T. and Bahn-Walkowiak, B. (2019). Transition towards a resource efficient circular economy in Europe: Policy lessons from the EU and the member states. *Ecological Economics*, 155, 7–19.

EEA (2010). European Environment, State and Outlook 2010; EEA: Copenhagen, Denmark, 2010; ISBN 978-92-9213-155-5. Available online: http://www.ab.gov.tr/files/ardb/evt/1_avrupa_birligi/1_6_raporlar/1_3_diger/environment/ eea__2010_the_european_environment_synthesis.pdf (accessed on 22 July 2020).

Ellen MacArthur Foundation (2015). *Towards a Circular Economy: Business Rationale for an Accelerated Transition*. Available online: https://www.ellenmacarthurfoundation.org/ (accessed on 25 July 2020).

European Commission (2020). *A New Circular Economy Action Plan. For a Cleaner and More Competitive Europe*. Available online: https://eur-lex.europa.eu/resource.html?uri=cellar:9903b325-6388-11ea-b735-01aa75ed71a1.0017.02/DOC_1&format=PDF (accessed on 9 July 2020).

European Commission (2015). *Closing the Loop- an EU Action Plan for the Circular Economy*. Available online: https://ec.europa.eu/transparency/regdoc/rep/1/2015/EN/1-2015-614-EN-F1-1.PDF (accessed on 8 July 2020).

European Commission (2014). *The Circular Economy-Connecting, Creating and Conserving Value*. Available online: https://www.eesc.europa.eu/resources/docs/the-circular-economy.pdf (accessed on 8 July 2020).

Exceltur (2019). *Impactur Canarias*. Available online: https://www.exceltur.org/wp-content/uploads/2019/12/ IMPACTUR-Canarias-2018.pdf (accessed on 27 July 2020).

Florido, C.; Jacob, M. and Payeras, M. (2019). How to Carry out the Transition towards a More Circular Tourist Activity in the Hotel Sector. The Role of Innovation. *Administrative Science*, 9, 47.

Giurea, R. (2018). *Contributions Regarding the Research of the Sustainable Development in Agro-Tourism from a Circular Economy Perspective*. Ph.D. Thesis, University of Trento, Trento, Italy, 2018.

Giurea, R.; Precazzini, I.; Ragazzi, M.; Achim, M.I.; Cioca, L.-I.; Conti, F.; Torretta, V. and Rada, E.C. (2018). Good Practices and Actions for Sustainable Municipal Solid Waste Management in the Tourist Sector. *Resources*, 7, 51.

Gliem, J.A. and Gliem, R.R. (2003). Calculating, interpreting, and reporting Cronbach's alpha reliability coefficient for Likert-type scales. *In Proceedings of the Midwest Research-to-Practice Conference in Adult, Continuing, and Community Education*, Columbus, OH, USA, 8–10 October 2003.

Goldstein, N.J.; Cialdini, R.B. and Griskevicius, V. (2008). A room with a viewpoint: Using social norms to motivate environmental conservation in hotels. *Journal of Consumer Research*, 35(3), 472–482.

González Camazón, C. (2016). *La Fiscalidad Verde. Creación de Nuevos Tributos Sobre Emisiones y Residuos*. Bachelor's Thesis, University of Valladolid, Valladolid, Spain, 12 July 2016.

González, M. and León, C. (2001). The adoption of environmental innovations in the hotel industry of Gran Canaria. *Tourism Economics*, 7, 177–190.

Goodwin, H. and Francis, J. (2003). Ethical and responsible tourism: Consumer trends in the UK. *Journal of Vacation Marketing*, 9, 271–284.

Halpenny, E.A. (2010). Pro-environmental behaviours and park visitors: The effect of place attachment. *Journal of Environmental Psychology*, 30(4), 409–421.

Han, H.; Hsu, L.-T. and Lee, J.-S. (2009). Empirical investigation of the roles of attitudes toward green behaviours, overall image, gender, and age in hotel customers' eco-friendly decision-making process. *International Journal of Hospitality Management*, 28, 519–528.

Han, H. and Hyun, S.S. (2018). What influences water conservation and towel reuse practices of hotel guests? *Tourism Management*, 64, 87–97.

Han, H.; Kim, W. and Kiatkawsin, K. (2017). Emerging youth tourism; fostering Young travelers' conservation intentions. *Journal of Travel and Tourism Marketing*, 34, 905–918.

Han, H. and Kim, Y. (2010). An investigation of green hotel customers' decision formation: Developing an extended model of the theory of planned behavior. *International Journal of Hospitality Management*, 29, 659–668.

Hedlund, T. (2011). The impact of values, environmental concern and willingness to accept economic sacrifices to protect the environment on tourists' intentions to buy ecologically sustainable tourism alternatives. *Tourism and Hospitality Research*, 11(4), 278–288.

Holmes, M.R.; Dodds, R. and Frochot, I. (2019). At home or abroad, does our behavior change? Examining how everyday behavior influences sustainable travel behavior and tourist clusters. *Journal of Travel Research*, 60(1), 102-116.

Horner, S. and Swarbrooke, J. (2016). *Consumer Behaviour in Tourism*; Routledge: London, UK, 2016.

Hunter, C. and Green, H. (1995). *Tourism and the Environment: A Sustainable Relationship?* Routledge: London, UK, 1995; ISBN 0415085241.

Jacob, M.; Florido, C. and Aguiló, E. (2010). Research note: Environmental innovation as a competitiveness factor in the Balearic Islands. *Tourism Economics*, 16, 755–764.

Jacobsen, J.K.S. (2007). Monitoring motoring: A study of tourists' viewpoints of environmental performance and protection practices. *Scandinavian Journal of Hospitality and Tourism*, 7(2), 104–119.

Jauhari, V. and Manaktola, K. (2007). Exploring consumer attitude and behaviour towards green practices in the lodging industry in India. *International Journal of Contemporary Hospitality Management*.

Juvan, E. and Dolnicar, S. (2016). Measuring environmentally sustainable tourist behavior. *Annals of Tourism Research*, 59, 30–44.

Kang, K.H.; Stein, L.; Heo, C.Y. and Lee, S. (2012). Consumers' willingness to pay for green initiatives of the hotel industry. *International Journal of Hospitality Management*, 31, 564–572.

Karpiak, C.P. and Baril, G.L. (2008). Moral reasoning and concern for the environment. *Journal of Environmental Psychology*, 28(3), 203–208.

Kasim, A. (2004). Socio-environmentally responsible hotel business: Do tourists to Penang Island, Malaysia care? *Journal of Hospitality and Leisure Marketing*, 11, 5–28.

Kasperson, R.E.; Baumann, B.; Dworkin, D.; McCauley, D.; Reynolds, J. and Sims, J.H. (1974). *Community Adoption Water Reuse System in the United States*; Office of Water Resources Research: Washington, DC, USA, 1974.

Kelly, J.; Haider, W.; Williams, P.W. and Englund, K. (2007). Stated preferences of tourists for eco-efficient destination planning options. *Tourism Management*, 28, 377–390.

Kiatkawsin, K. and Han, H. (2017). Young traveler's intention to behave pro-environmentally: Merging the value-belief-norm theory and the expectancy theory. *Tourism Management*, 59, 76–88.

Kim Lian Chan, J. and Baum, T. (2007). Motivation factors of ecotourists in ecolodge accommodation: The push and pull factors. *Asia Pacific Journal of Tourism Research*, 12, 349–364.

Kim, Y. and Choi, S.M. (2005). Antecedents of green purchase behavior: An examination of collectivism, environmental concern, and PCE. *ACR North American Advances*, 32, 592–599.

Kollmuss, A. and Agyeman, J. (2002). Mind the gap: Why do people act environmentally and what are the barriers to pro-environmental behavior? *Environmental Education Research*, 8(3), 239–260.

Kostakis, I. and Sardianou, E. (2012). Which factors affect the willingness of tourists to pay for renewable energy? *Renewable Energy*, 38(1), 169–172.

Kvasova, O. (2015). The big five personality traits as antecedents of eco-friendly tourist behavior. *Personality and Individual Differences*, 83, 111–116.

Laroche, M.; Bergeron, J. and Barbaro-Forleo, G. (2001). Targeting consumers who are willing to pay more for environmentally friendly products. *Journal of Consumer Marketing*, 18, 503–520.

Lee, J.-S.; Hsu, L.T.; Han, H. and Kim, Y. (2010). Understanding how consumers view green hotels: How a hotel's green image can influence behavioural intentions. *Journal of Sustainable Tourism*, 18, 901–914.

Lee, W.H. and Moscardo, G. (2005). Understanding the impact of ecotourism resort experiences on tourists' environmental attitudes and behavioural intentions. *Journal of Sustainable Tourism*, 13, 546–565.

Leonidou, L.C.; Coudounaris, D.N.; Kvasova, O. and Christodoulides, P. (2015). Drivers and outcomes of green tourist attitudes and behavior: Sociodemographic moderating effects. *Psychology & Marketing*, 32, 635–650.

Lita, R.P.; Surya, S.; Ma'Ruf, M. and Syahrul, L. (2014). Green attitude and behavior of local tourists towards hotels and restaurants in West Sumatra, Indonesia. *Procedia Environmental Sciences*, 20, 261–270.

Lübbert, C. (2001). *Tourism Ecolabels Market Research in Germany*. In Tourism Ecolabelling. Certification and Promotion of Sustainable Management; Font, X., Buckley, R.C., Eds.; CABI Publishing: Wallingford, UK, 2001; pp. 71–85.

Ma, X.; Li, S.; Ai, Q. and Chen, K. (2016). Research on renewable energy systems used in tourism circular economy. *In Proceedings of the 2016 Chinese Control and Decision Conference (CCDC)*, Yinchuan, China, 28–30 May 2016; pp. 6203–6206.

Mair, J. and Bergin-Seers, S. (2010). The effect of interventions on the environmental behaviour of Australian motel guests. *Tourism and Hospitality Research*, 10, 255–268.

Manniche, J.; Larsen, K.T.; Broegaard, R.B. and Holland, E. (2017). *Destination: A Circular Tourism Economy a Handbook for Transitioning toward a Circular Economy within the Tourism and Hospitality Sectors in the South Baltic Region*; Centre for Regional & Tourism Research (CRT): Bornholm, Denmark, 2017.

Masau, P. and Prideaux, B. (2003). Sustainable Tourism: A Role for Kenya's Hotel Industry. *Current Issues in Tourism*, 6, 197–208.

McIntyre, G.; Inskeep, E. and Hetherington, A. (1993). *Desarrollo Turístico Sostenible: Guía Para Planificadores Locales;* Organización Mundial del Turismo: Madrid, Spain, 1993.

Mensah, I. (2006). Environmental management practices among hotels in the greater Accra region. *International Journal of Hospitality Management*, 25, 414–431.

Mensah, I. (2012). Environmental education and environmentally responsible behavior: The case of international tourists in Accra hotels. *International Journal of Tourism Sciences*, 12(3), 69–89.

Mensah, I. and Mensah, R.D. (2013). International tourists' environmental attitude towards hotels in Accra. *International Journal of Academic Research in Business and Social Sciences*, 3(5), 444–455.

Miao, L. and Wei, W. (2013). Consumers' pro-environmental behaviour and the underlying motivations: A comparison between household and hotel settings. *International Journal of Hospitality Management*, 32, 102–112.

Millar, M. and Baloglu, S. (2011). Hotel guests' preferences for green guest room attributes. *Cornell Hospitality Quarterly,* 52, 302–311.

Millar, M.; Mayer, K.J. and Baloglu, S. (2012). Importance of green hotel attributes to business and leisure travelers. *Journal of Hospitality Marketing & Management*, 21, 395–413.

Mostafa, M.M. (2007). Gender differences in Egyptian consumers' green purchase behaviour: The effects of environmental knowledge, concern and attitude. *International Journal of Consumer Studies*, 31(3), 220–229.

Nedyalkova, S. (2016). Applying circular economy principles to sustainable tourism development. *In Proceedings of the PM4SD European Summer School-Abstract and Conference Proceedings*, Akureyri, Iceland, 5–9 October 2016; pp. 38–44.

Pang, S.F.; McKercher, B. and Prideaux, B. (2013). Climate change and tourism: An overview. *Asia Pacific Journal of Tourism Research*, 18, 4–20.

Patronato Turismo Gran Canaria (2019). *Situación del Sector Turístico año 2019*. Available online: https: //www.grancanaria.com/turismo/es/ (accessed on 10 June 2020).

Paulraj, A. (2009). Environmental motivations: A classification scheme and its impact on environmental strategies and practices. *Business Strategy and the Environment*, 18(7), 453–468.

Perkins, H.E. and Brown, P.R. (2012). Environmental values and the so-called true ecotourist. *Journal of Travel Research*, 51(6), 793–803.

Powell, R.B. and Ham, S.H. (2008). Can ecotourism interpretation really lead to pro-conservation knowledge, attitudes and behaviour? Evidence from the Galapagos Islands. *Journal of Sustainable Tourism*, 16, 467–489.

Power, A. and Elster, J. (2005). *Environmental Issues and Human Behaviour in Low-Income Areas in the UK*; Economic and Social Research Council: London, UK, 2005.

Puhakka, R. (2011). Environmental concern and responsibility among nature tourists in Oulanka PAN Park, Finland. *Scandinavian Journal of Hospitality and Tourism*, 11(1), 76–96.

Pulido-Fernández, J.I. and López-Sánchez, Y. (2016). Are tourists really willing to pay more for sustainable destinations? *Sustainability*, 8, 1240.

Ramchurjee, N.A. and Suresha, S. (2015). Are tourists' environmental behavior affected by their environmental perceptions and beliefs? *Journal of Environmental and Tourism Analyses*, 3(1), 26–44.

Roberts, J.A. (1990). Green consumers in the 1990s: Profile and Implications for Advertising. *Journal of Business Research*, 36, 217–231.

Robinot, E. and Giannelloni, J.L. (2010). Do hotels' "green" attributes contribute to customer satisfaction? *Journal of Services Marketing*, 24, 157–169.

Rodríguez, C.; Florido, C. and Jacob, M. (2020). Circular Economy Contributions to the Tourism Sector: A Critical Literature Review. *Sustainability*, 12, 4338.

Rodríguez-Oromendía, A.; Reina-Paz, M.D. and Sevilla-Sevilla, C. (2013). Environmental awareness of tourists. *Environmental Engineering and Management Journal*, 12(10), 1941–1946.

Samdahl, D.M. and Robertson, R. (1989). Social determinants of environmental concern: Specification and test of the model. *Environment and Behavior*, 21(1), 57–81

Sekaran, U. and Bougie, R. (2016). *Research Methods for Business: A Skill Building Approach*; John Wiley & Sons: Hoboken, NJ, USA, 2016.

Shang, J.; Basil, D.Z. and Wymer, W. (2010). Using social marketing to enhance hotel reuse programs. *Journal of Business Research*, 63, 166–172.

Smol, M.; Avdiushchenko, A.; Kulczycka, J. and Nowaczek, A. (2018). Public awareness of circular economy in southern Poland: Case of the Malopolska region. *Journal of Cleaner Production*, 197, 1035–1045.

Sørensen, F.; Bærenholdt, J.O. and Greve, K.A.G.M. (2019). Circular economy tourist practices. *Current Issues in Tourism*, 1–4.

Sørensen, F. and Bærenholdt, J.O. (2020). Tourist practices in the circular economy. *Annals of Tourism Research*, 85, 103027.

Stein, N.; Spinler, S.; Vanthournout, H. and Blass, V. (2020). Consumer perception of online attributes in circular economy activities. *Sustainability*, 12, 1914.

Tartaglia, S. and De Grosbois, D. (2009). Comparison of tourists' environmental beliefs and environmental behaviour. *In Proceedings of the Administrative Sciences Association Canada*, Niagara Falls, ON, Canada, 6–9 May 2009.

Tindall, D.B.; Davies, S. and Mauboules, C. (2003). Activism and conservation behavior in an environmental movement: The contradictory effects of gender. *Society & Natural Resources*, 16, 909–932.

Tisdell, C. and Wilson, C. (2005). Perceived impacts of ecotourism on environmental learning and conservation: Turtle watching as a case study. *Environment Development and Sustainability*, 7(3), 291–302.

UNDP. (2006). *Human Development Report 2006: Beyond Scarcity: Power, Poverty and the Global Water Crisis*, New York: UNDP. Available online: https://www.undp.org/content/undp/en/home/librarypage/hdr/humandevelopment-report-2006.html (accessed on 18 November 2020).

United Nations Environment Programme (2003). *A Manual for Water and Waste Management: What the Tourism Industry Can Do to Improve its Performance.* Available online: https://www.unep.org/ (accessed on 8 December 2020).

Vining, J. and Ebreo, A. (1990). What makes a recycler? A comparison of recyclers and nonrecyclers. *Environment and Behavior*, 22, 55–73.

Wehrli, R., Schwarz, J. and Stettler, J. (2011). Are tourists willing to pay more for sustainable tourism? -a choice experiment in Switzerland. *ITW Working Paper Series-Institut für Tourismuswirtschaft, Hochschule Luzern*, (3/2011).

Zelezny, L.C.; Chua, P.P. and Aldrich, C. (2000). New ways of thinking about environmentalism: Elaborating on gender differences in environmentalism. *Journal of Social Issues*, 56(3), 443–457.

Zhang, Y. and Tian, L. (2014). The sustainable development of circular economy under the perspective of ecological tourism. *Advanced Materials Research*, 1010–1012, 2090–2093.

Zografakis, N.; Gillas, K.; Pollaki, A.; Profylienou, M.; Bounialetou, F. and Tsagarakis, K.P. (2011). Assessment of practices and technologies of energy saving and renewable energy sources in hotels in Crete. *Renewable Energy*, 36, 1323–1328.

CHAPTER 3
Factors Affecting the Adoption of Circular Practices in Hotel Establishments: A Pilot Study in a Mature Island Destination

Factors Affecting the Adoption of Circular Practices in Hotel Establishments: A Pilot Study in a Mature Island Destination

Abstract: The tourism industry and more specifically the hotel sector needs to make a transition to a Circular Economy (CE). This work aims to investigate first, the commitment to circular economy by hotels in a sun and beach destination, and second, the factors affecting the implementation of circular practices by those hotel establishments. The study uses data collected from hotel managers or department heads through the use of a structured questionnaire in a mature sun and beach destination in Spain, Gran Canaria. The main findings show that the key factors affecting the adoption of CE practices by hotels are hotel size, category, chain affiliation and having an environmental certification. Results also identify the most common circular practices related to waste, water, energy, and Corporate Social Responsibility (CSR) and main barriers and reasons to implement those practices. The results have implications for the design of a circular strategy in hotel establishments of a sun and beach destination.

Keywords: hotel industry; circular economy; circular practices; tourism; sun and beach destination.

1. Introduction

Tourism is an activity of undoubted importance in many economies around the world. Prior to the COVID-19 pandemic, the tourism industry accounted for 10.4% of all new jobs created worldwide and contributed to 10.3% of global GDP (WTTC, 2020). Tourism is an essential activity for the Spanish economy, and especially for tourism-based economies such as the Canary Islands. 15.11 million tourists arrived to the Canary Islands in 2019 and generated a total income of 15.070 million Euros (Promotur, 2020). According to Exceltu (2019), tourism accounts for 35.2% of the Gross Domestic Product and 40.4% of employment in the Canary Islands.

However, the impacts of tourism go beyond its economic dimension. Parallel to tourism growth, its environmental negative impacts have also been increasing. Tourism has generated important ecological disorders. In addition to land use, it requires resources such as water, energy, and food, producing large amounts of waste (solid waste and sewage), as well as congestion on roads, CO_2 emissions and pollution, etc. (Rico et al., 2019). These negative impacts of tourism are mainly due to the linear model of production and consumption. In this sense, Circular Economy (CE) implies a radical change of model, as according to Kirchherr et al. (2017), “it describes an economic system, based on business models which replace the end-of-life concept by reducing, reusing, recycling, and recovering materials in production/distribution and consumption to accomplish sustainable development, which implies creating environmental quality, economic prosperity, and social equity for the benefit of current and future generations”. In this sense, the ‘end-of-life’ concept refers to the end of a product's useful life and ensures the longest-lasting circulation of resources in

the society in form of products, components, and materials (Atlason et al., 2017).

The COVID-19 pandemic has both brought challenges but also opportunities for the tourism sector. It is the perfect opportunity to choose a new path, keep moving forward but in a more circular way. Furthermore, guests are already demanding more circular services in the tourism sector, and they have an increasingly circular attitude and behaviour (e.g. Jones et al., 2016; Pamfilie et al., 2018 and Rodríguez et al., 2020b). By incorporating environmental conservation steps, tourism sector can attract customers who are inclined to protect the environment (Sinha and Fukey, 2020).

According to the World Business Council for Sustainable Development (2017), moving towards a circular economy can help companies get ahead of upcoming policy, regulations, pricing of externalities and potential changes in taxation models. In this sense, the CE principles can be implemented in the tourism sector by operationalising business models based on sustainable principles and transitioning to a CE model (Costa et al. 2020). Within the tourism industry, the hospitality industry accounts for 1% of the global carbon dioxide emissions, a number expected to increase as this sector is likely to continue to experience growth and demand (UNWTO, 2019). Hence, the hospitality industry needs to commit to sustainable initiatives and to initiate a transition path to the CE. In fact, the Hotel Global Decarbonisation Report (2017) indicates that the accommodation sector needs to reduce greenhouse gas emissions per room, 66% from 2010 levels by 2030, and 90% by 2050 to meet the goals of the Paris Climate Agreement.

Rodríguez-Antón and Alonso-Almeida (2019) indicate that the hospitality industry is gradually incorporating CE practices and developing some previously sustainable practices already adopted into more innovative ones, especially in three main areas: energy, water and waste. However, CE principles and strategies are not adopted to a high degree yet, even in the largest hotel chains worldwide. This article argues that the tourism industry, and especially the hotel sector, holds great potentials for a transition to a CE model. CE could become a central concept to reconfigure the services offered by hotels and the practices they implement.

Several research questions arise regarding circular economy practices carried out by hotels, mainly the following: What are the most common circular practices carried out by the hotels? What are the main reasons and objectives pursued with the implementation of CE measures? What are the main barriers found in the implementation of these measures? This article analyses the data collected from a structured questionnaire addressed to managers or department heads of hotels in the island of Gran Canaria (Canary Islands).

The aim of this chapter is to analyse the attitude and commitment of hotel managers towards CE management measures in the hotel industry and to identify the factors affecting the implementation of circular practices by hotel establishments of a well-known mature sun and beach destination, Gran Canaria. Different aspects will be analysed such as the most common circular practices, the factors affecting the

adoption of circular or environmentally friendly practices or the main reasons and barriers to implement these CE measures in the hotel. The results could be useful to design the transition from a linear model to a circular model in the hotel industry of Gran Canaria and of the destination.

The study is divided into six sections. After the introduction, this research is structured as follows: Section 2 presents the state of the art of CE in the tourism sector, and the main literature on environmental and/ or CE practices in the hotel industry to support the hypotheses to be tested. Section 3 outlines the research methodology. In Section 4, main findings and results of hypotheses testing are described. Section 5 presents the discussion of the main results and finally, Section 6, outlines the conclusion of the study with a summary of future fields of research and final remarks on the study´s contribution.

2. Theoretical Framework

2.1. Circular Economy and tourism

The environment is an input of tourism activity and at the same time, the tourism activity generates negative externalities on the environment (Jacob et al., 2010). In fact, Hunter and Shaw (2007) state that tourism is a resource-intensive sector that generates an important footprint on the environment while Williams and Ponsford (2009) indicate that tourism sectors use environmental resources as primary ingredients. Bohdanowicz (2006) states that the main environmental impacts of hotels come from the huge and unlimited consumption of non-durable resources (water, food, energy, paper and others) and the emissions of pollutants and other non-recyclable or non-disposable goods to the local environment. Hence, hotel managers have developed several innovative approaches to minimize these negative environmental impacts (Aboelmaged, 2018).

Meanwhile, the hospitality industry has been identified as the most polluting sector within the tourism industry. The environmental impact of hotels is more visible in coastal areas where the sun and beach tourism model is dominant (Drius et al., 2019; Tovar-Sánchez et al., 2019).

At the same time, the economic benefits of hotels are interrelated with the demand of a more ecological and environmental conscious consumer. Tourists are already demanding more circular services in the tourism sector. In this sense, Rodríguez et al. (2020b) stated that numerous studies indicate that tourists show interest towards the environment as a key factor in their holiday experience quality and they proved that most tourists (60.9%) were willing to pay more for environmentally friendly or green hotels. Additionally, around 62% of tourists worry about the environmental problem when deciding to stay in a hotel, almost 87% of guests are aware of the importance to stay in an ecological or environmentally friendly hotel and over 80% consider themselves environmentally conscious clients (Han et al., 2018).

Therefore, in response to serious environmental concerns, the tourism industry and more specifically the hotel sector needs to make a transition towards a CE model. This model aims at building a sustainable society through changing the current linear ‘take,

make and dispose' economy to a closed loop society where no waste exists (European Commission, 2014), as the Ellen MacArthur Foundation (2013) states "replacing the 'end-of-life' concept with restoration, the use of renewable energy, reuse, and the elimination of waste through the superior design of materials, products, systems, and business models".

The transition of the hotel industry to CE will lead to consider the sector "as a set of circular flows of interconnected, more or less closed materials, permitting a cascade demonstration of the resources between activities or services like accommodation, restaurants, well-being and leisure, etc." (Manniche et al., 2017).

Pamfilie et al. (2018) indicate that applying the circular economy principles will deliver firms in the tourism and in the hotel industry in particular with the necessary framework for business development and, additionally, will facilitate the creation of a more sustainable experience for all stakeholders as a result of the reduction of the negative effects on social and environmental sustainability.

2.2. Environmental and/ or CE practices in the hotel industry

The objectives of the 2030 Agenda for Sustainable Development indicate the need to rethink the current economic growth regarding social and environmental needs in development (Saarinen, 2020). Although sustainability is widely accepted as a mega trend in the current tourism and hotel industry the acceptance of this attitude does not always translate into the development of sustainable practices (McCool et al., 2013). According to Musavengane (2019), understanding responsible tourism does not directly translate into practicing it.

In the hotel industry, efforts towards greater sustainability can be grouped into three main areas: energy, water conservation and waste management (Abdou et al., 2020 and Berezan et al., 2013). These areas are concerned about the shortage of non-renewable products and resources in potential areas where hotels can increase their profits by implementing ecological practices (Kirk, 1995). The accommodation sector, especially hotels, consumes huge amounts of fossil fuel energy and electricity. In countries like France, the total energy consumption in the hotel sector represents 18% of the total energy demand in the tertiary sector (Zografakis et al., 2011), and in Spain it represents 35% of total energy demand in the service sector (Dascalaki and Balaras, 2004). In this sense, energy reduction has been recognized as one of the most significant areas of environmental management in the hotel industry (Abdou et al., 2020) and an adequate use of renewable energy sources could lead to hotels generating zero CO2 emissions, which would attract environmentally conscious and economically profitable tourists (Vourdoubas, 2016). Regarding waste management, the hotel industry generates around 45% of all municipal solid waste among municipal facilities in the commercial sector (Han et al., 2018) and according to Sinha and Fukey (2020), hotels only recycle an extremely limited amount of this waste allocating the rest to landfills. In this sense, the Balearic Islands and the Canary Islands, two of the main tourism-based regions in Spain, lead the generation of waste per capita (INE, 2020). On the other hand, tourism-related water consumption per capita is higher than

that of the resident population (Pérez et al., 2020). Destinations that consume more water are those on the coast (De León and De León, 2020). For example, Deyà-Tortella et al. (2016) showed that in Palma de Mallorca a tourist staying in a hotel needs 440 litres of water per day. Abdou et al. (2020) stated that it is crucial that hotels incorporate water and energy conservation practices and waste management measures into their operational plans to achieve sustainable development goals. In this sense, Rodríguez-Antón and Alonso-Almeida (2019) highlight the main CE practices implemented by the hotel industry, distinguishing between: energy saving practices (e.g. energy efficient lamps, LED technology or room temperature control); water saving practices (e.g. reducing the amount of water used for showers, toilets, kitchens and laundry; installing efficient devices and equipment in showers, toilets ...); waste management (e.g. soap and shampoo dispensers, recycling, digital and non-paper information); reduction in the use of ecologically dangerous cleaning agents; and training of employees on environmental measures. Similarly, Girard and Nocca (2017) suggested that the majority of the initiatives carried out by hotel establishments are mainly related to energy and water consumption and waste reduction, without considering environmental and socio-cultural issues. Abdou et al. (2020) identified using low-flow toilets and showerheads, using energy-efficient light bulbs, separating waste by using clearly labelled and coloured bins and implementing advanced technologies to track energy consumption as the most adopted environmentally sustainable practices. These small changes add significant resource savings without interrupting guest satisfaction levels.

Most of the previous studies focused on environmental or sustainable practices but CE practices go further and include a broader range of initiatives. Thus, the importance of this research is that it identifies the circular practices already implemented by the hotel sector in a mature island destination, dividing them into different groups according to the type of initiatives carried out. Therefore, to identify those firms where more policy effort should be made to reach a CE transition in the hotel industry.

The participation and commitment of employees play an important role in the success of the ecological practices adopted by hotels. Sustainable practices such as energy conservation and waste reduction are essentially related to employee involvement (Kim and Choy, 2011). Authors such as Cantor et al. (2012) and Chan et al. (2014) found a strong interrelation between employee participation in green initiatives and the level of interest and involvement in the hotel's environmental policies. Likewise, the work of Kim and Choy (2011) emphasize the importance and impact that employee perception can have on the organization regarding the success of implementing sustainable practices. In this sense, Bohdanowicz (2005) found that when employees were proud of the organization, they were more favourable to participate in green initiatives. Furthermore, involvement of staff and tourists is the key for success of responsible tourism initiatives (Musavengane, 2019; Zengeni et al., 2013). Constant communication of environmental information to employees encourages them to become more involved while increasing their environmental awareness (Abdou et al., 2020).

From an environmental protection concept, the introduction of Corporate Social

Responsibility (CSR) into sustainability strategies by hotel operators focus on natural resources consumption reduction and waste management and account for the social and economic impacts of hospitality actors and activities (Fabrice and Sivarajah, 2021). Hospitality businesses can mitigate their environmental and social impact, and the reduction of social inequalities in local communities through the implementation of CSR initiatives (Guzzo et al., 2020). Thus, corporate strategic initiatives focusing on enhancing their social and environmental responsibility are increasing (Valdivieso, 2019) and according to Gligor-Cimpoieru et al. (2017) CSR activities related to environmental protection are among the most appreciated CSR initiatives in the tourism sector. Additionally, in a review research by Serra-Cantallops et al. (2018), it was stated that CSR practices within hotels could be classified in three dimensions: economic, social, and environmental and identified 38 concrete actions with a clear predominance of the economic practices (16) followed by the social practices (12) and, finally, the environmental practices (10). However, De Grosbois (2012) argued that while many large hotels report an engagement to CSR goals, only a small number of them actually provide specific details of the initiatives carried out and even less report which CSR performance was actually achieved. Similarly, Serra-Cantallops et al. (2018) argued that hotel firms talk about the CSR concept but only a very few have really integrated it into their organizational practices, processes, and strategies. In this sense, this chapter is intended to fill this gap by identifying the CSR initiatives related to CE that hotel establishments implement in a mature sun and beach destination.

2.2.1. Factors affecting the adoption of circular or environmentally friendly practices

The CE practices adopted by a hotel are largely dependent on the age, size, hotel category, operations management techniques, stakeholder environmental pressures and chain affiliations. In fact, Gil et al. (2001), Molina-Azorín et al. (2009) and Mensah and Blankson (2013) suggested that the affiliation of the hotel to a chain has an impact on the environmental practices carried out. Bohdanowicz (2005) discovered that hotels belonging to a chain showed a greater knowledge in environmentally-friendly initiatives than the independent establishments. This may be because chain affiliation allows hotels to access information on environmental protection measures as well as sharing resources and taking advantage of economies of scale (Gil et al., 2001) and they are often subjected to higher social and environmental standards, due to additional pressures from international stakeholders (Zyglidopoulos, 2002) and have easier access to cost-effective pollution prevention technology (Christmann and Taylor, 2001). Similarly, Jacob et al. (2010) stated that independent tourism firms are less environmentally innovative than firms belonging to a chain and firms show a higher rate of environmental innovation when the scale of operations increases.

On the other hand, different studies have shown that hotel`s age and size can influence the adoption of environmentally sustainable or circular practices in hotel establishments. The size of the hotel is directly proportional to the environmental practices adopted by the chain (Sinha and Fukey, 2020). According to Pham Phu et al. (2018) larger establishments are under the stakeholders' pressure to adopt environmental practices. Another reason that explains why larger establishments seem to adopt sustainable practices more frequently compared to smaller hotels is because

management is centralized and there are funds to start new and better practices (Sinha and Fukey, 2020). Additionally, Mensah and Blankson (2013) stated that large hotels have more financial and technical resources. Similarly, Fernández-Robin et al. (2019) found that hotel´s size affects the organizational behaviour with respect to environmental practices, where large and medium sized hotels are more committed to the environment and its care. On the other hand, Radwan et al. (2012) building on previous work on solid waste management issues in small Welsh hotels, show that most of them are not very in favour of the implementation of more sustainable solid waste management alternatives. However, the results of a recent study by Manniche et al. (2021) show that even small tourism businesses can implement and develop a great number of CE solutions, small size is not necessarily a barrier to implement CE practices. Similarly, the results of Kularatne et al. (2019) show that hotel's size has a negative impact on environmental efficiency while hotel's age has a positive relationship with environmental performance. Martínez-Martínez et al. (2019) proved that the modern establishments carry out a greater number of good environmental practices compared to the old-age hotels. Similarly, Roberts (1992) stated that younger firms are more active than older ones in environment protection. This may be caused by the use of new technology, since they tend to be more eco-efficient (Gil et al., 2001) or because for older hotels it is more expensive to achieve a high level of environmental performance (Shadbegian and Gray, 2006). However, Fernández-Robin, et al. (2019) stated that age of hotels is not a decisive factor that determines their organizational behaviour in terms of environmental or circular practices.

Numerous studies also show that the introduction of environmental or CE practices depend on the hotel´s category. According to Mensah (2006), Gil et al. (2001) and Molina-Azorín et al. (2009), the higher the category of a hotel, the greater the level of implementation of environmental or CE practices. Similarly, Ivanov et al. (2014) stated that category seems to have a statistically significant impact on the environmental practices applied, and as an example, they showed that higher category establishments are more likely to buy separated waste. However, Sangeetha and Rebecca (2019) argue that the star of a hotel has no relevance in the implementation of green and sustainable practices.

It has been shown that having environmental certifications influences the circular practices that hotels carry out. According to Geerts (2014) environmental certifications have three objectives: they promote the voluntary implementation of sustainable practices among hospitality providers, improve the profitability of certified hotels and provide guests with more precise information on the environmental performance of hotels during the booking. Therefore, tourism industry must design and apply environmentally sustainable management tools and systems such as ISO 14001 certification (Bonilla et al., 2011; Chan and Ho, 2006; Chan, 2009; Rodriguez-Antón et al., 2012) in order to reduce consumption of resources and recycle and reuse those resources. Yilmaz et al. (2019) found that ecological certifications have a significant impact on the implementation of environmentally friendly practices in the accommodation sector and Segarra-Oña et al. (2012) show that there is a difference in economic performance between those hotels with an ISO 14001 as an environmental management tool and those that did not have it. Finally, Zhang et al. (2014) stated that eco-certified hotels have higher resource efficiency on operator and customer factors

and Ayuso (2007) explains that, when some type of environmental certification is implemented in hotels, it considerably improves the environmental and sustainable performance of the company.

Therefore, this research evaluates if these characteristics (size, age, category, etc.) affect the implementation of circular practices in the hotel sector of a mature island destination, filling a gap in the literature as most of the research has been carried out in urban hotels and/or non-island or non-mature destinations (e.g., Berezan et al., 2013; Geerts, 2014; Ivanov et al., 2014; Pham Phu et al., 2018 and Sangeetha and Rebecca, 2019). In addition, most of the studies focus mainly on environmentally friendly practices while CE practices go further and include a broader range of initiatives, which will be analysed in this study.

2.2.2. Main motivations and barriers in implementing CE practices in hotels

Due to increase social awareness of environmental issues and the dynamics of current regulation and competition, the firms' involvement towards sustainability issues is increasing (Fraj et al., 2015). Laing and Mair (2011) found that in the context of the organization, internal and external drivers and catalysts can influence the level of adoption of sustainable practices in a tourism business context. In fact, the main reasons or motivations of hotels to implement CE or environmental practices are cost savings and to improve firm's image (Mittal and Dhar, 2016; Pamfilie et al., 2018; Slocum et al., 2018 and Fernández-Robin et al., 2019). Hotel green practices can increase their reputation and brand differentiation from competitors (Han, et al., 2011). At the same time, Girard and Nocca (2017) stated that hotels units actively participate in sustainability edges, but the primary focus is on commercial aspect to gain competitive advantages focusing more on energy reduction, water consumption and waste generated, whereas the environmental and socio-cultural aspects are often forgotten. In this regard, Graci and Dodds (2008) and Leonidou et al. (2013) argued that the savings in financial or internal costs associated with the implementation of an environmentally sustainable program or certification are the main reasons to introduce CE practices. Álvarez and Céspedes (2008) showed that the commitment to quality and green practices influences hotel performance while Molina-Azorín et al. (2009) indicate that those environmentally proactive hotels or green hotels present a better economic performance and a positive relationship between environmental management and hotel performance. On the other hand, Mak and Chang (2019) showed first, that government policy and regulation is an important driving force in affecting green strategy adoption in hotels; second, hotel management or owner's environmental awareness and attitude is very important for determining the level of green strategy adoption; and third, customer education and awareness is another important driving force. Tzschentke et al. (2008) highlighted the importance of personal ethics, especially personal values and management beliefs in driving behavior for environmental management. Leonidou et al. (2013) classified these as altruistic factors that affect the adoption of ecological practices by the company. A study by Garay and Font (2012) also finds altruism as an important determinant in the adoption of "responsible" programs in the accommodation services sector.

On the other hand, there are many barriers that can prevent hotels from implementing an environmental strategy or carrying out circular practices in their establishments. Chan (2009) found that many hoteliers perceive implementation and maintenance cost, lack of knowledge and skills and lack of resources as an important barrier to have an environmental strategy in the organization. As Mak and Chang (2019) suggested, another restraining force to adopt CE measures is the opposition to change within the hotel. On the other hand, Fernández-Robin et al. (2019) stated that the environment in which the hotel is located influences the adoption of environmental or circular practices, mainly sociocultural barriers and excessive bureaucracy. Mair and Jago (2010) identified as barriers the lack of regulations, time, resources, knowledge or skills and operational deadline while Kasim (2007) identified three main barriers that would affect the adoption of environmental programs by hotels, especially those categorized as small and medium-sized companies. Those barriers are the difficulty associated with integrating environmental considerations into the core functions of a hotel, audit and implementation related costs and the uncertainty surrounding the global tourism industry. Additionally, according to Parker et al. (2009), for small and medium enterprises (SMEs) the adoption of a sustainable business model is especially critical because they have to overcome barriers related to their traditional cultural organization, managerial approach and limited environmental commitment such as limited resources, knowledge or technical skills. Additionally, the SME will have to increase its investments in financial and/or human capital. Finally, Khan et al. (2021) found that the main factors that prevent the implementation of green or CE practices in tourism SMEs are lack of funds and skilled employees to adopt these practices.

This chapter will analyse if these motivations and barriers to implement circular practices that have previously been supported by other authors in urban hotels and/or non-island destinations are the same as those in the hotel sector of a mature island destination highly dependent on the tourism sector.

Therefore, based on the literature analysis about circular or environmental practices implemented in the hotel industry, the following research hypotheses are proposed:

H1: Hotel companies in a mature destination are more likely to introduce circular practices if the company has a CSR policy.
H2: There is a positive relationship between chain affiliation and the adoption of circular and/or environmental practices.
H3: Type of ownership system affects the rate of implementation of circular and/or environmental practices.
H4: As hotel size increases, the hotel introduces more circular and/or environmental practices.
H5: Younger hotels have a higher implementation of circular practices than older
H6: There is a positive relationship between hotel category and the adoption of circular and/or environmental practices
H7: There is a positive relationship between hotels having environmental certifications and the implementation of CE practices.

H8: Main reasons to adopt CE practices are to increase brand image and to save costs

H9: Main barriers to implement CE practices are the high cost, lack of knowledge or skills and excessive bureaucracy.

3. Methodology

Specific fieldwork was carried out through a structured questionnaire which combined open and closed questions. Collection of data was a combination of online and face-to-face surveys. As Table 1 shows surveys followed a structured questionnaire divided into five sections:

Table 1. Structure of the questionnaire.

	Section	Objective
I.	**Circular Economy and Innovation**	Identifies the sustainable practices or CE measures carried out by hotels and collects information about reasons pursued and barriers found in the introduction of these CE-innovation measures.
II.	**Circular Economy: Water and energy**	Collects information on the frequency with which the hotel carries out a series of CE measures related to water and energy and their degree of commitment to water and energy management
III.	**Circular Economy and waste management**	Collects information on the frequency with which the hotel recycles different materials, the frequency it carries out a series of CE measures related to waste management and identifies the degree of agreement with a series of CE and waste related statements
IV.	**Circular economy: human resources policy and CSR**	Identifies the frequency with which the hotel carries out some CSR and human resources policy activities related to CE and their degree of commitment to CSR in the establishment.
V.	**Hotel information and respondent profile**	Gathers information on the hotel (size, age, category, type, etc.) and the profile of the person interviewed (age, position in the hotel, educational level, etc.).

Section 1 contains open and closed questions and items rated on a five-point Likert scale that ranges from strongly disagree (1) to strongly agree (5). Section 2 contains questions rated on a Likert scale of 5 points, where 1 = strongly disagree and 5 = strongly agree, or questions with a Likert scale where 1 = never and 5 = always, and one open question about good hotel practices in water and / or energy management that are applied in the establishment. Section 3 includes two items rated on a Likert scale of 5 points where 1 = never and 5 = always, questions rated on a Likert scale of 5 points, where 1 = strongly disagree and 5 = strongly agree and one open question about good hotel recycling practices that are applied in the establishment. Section 4 contains one question rated with a Likert scale where 1 = never and 5 = always and an open question about good practices in human resources policy and CSR applied in the hotel. Finally, Section 5 contains open and closed questions related to the profile of the respondent and basic hotel information.

3.1. Data/ Study area

The study was undertaken in the island of Gran Canaria (Canary Islands), a mature sun and beach destination with serious sustainability problems caused by the development

of tourist activity. The population of this study comprised hotel establishments, since 74.59% of the 4,267,385 tourists received on the island in 2019 stayed in this type of accommodation (Patronato Turismo Gran Canaria, 2019). Due to the start of the covid-19 pandemic, tourist´s arrivals data corresponding to 2019 has been selected.

3.2. Sample selection and fieldwork

According to the official data of 2020, there are 82 hotels (2-5 stars) open in Gran Canaria (ISTAC, 2020). After carrying out the data collection, a total of 55 quantitative surveys (67.07% of the total population of 2-, 3-, 4- and 5-star hotels), 12 face-to-face (21.82%) and 43 (78.18%) online were collected. This should be considered as a pilot sample due to sampling difficulties derived from COVID-19 pandemic and the fact, that not all hotel establishments were open in 2020.

Table 2. Hotels´ characteristics.

		Number	Percentage
Size	Number of beds	1-50	21/21.8
		51-100	4/7.3
		101-250	12/21.8
		251-500	11/20
		501-750	10/18.2
		751-1000	3/5.5
		More than 1000	3/5.5
	Number of rooms	1-25	11/20
		26-50	5/9.1
		51-125	12/21.8
		126-250	13/23.6
		251-375	8/14.5
		376-500	5/9.1
		More than 500	1/1.8
Hotel Age		Before 1980	15/27.3
		1980-1989	9/16.4
		1990-2000	2/3.6
		2001-2010	10/18.2
		2011-2020	19/34.5
Independent/Chain		Independent	20/36.4
		Belonging to a chain	35/63.6
Ownership or Operating system		Ownership	37/67.3
		Management contract	18/32.7
Category		5 stars	5/9.1
		4 stars	25/45.5
		3 stars	18/32.7
		2 stars	7/12.7
Hotel type		Resort hotel	33/60
		Urban city hotel	19/34.55
		Rural hotel	3/5.45

The survey was conducted from April 2020 to January 2021 when personal calls were made, and emails sent to the randomly selected hotels to request their participation in the study.

After information about the study was provided (i.e., topic, purpose and duration or confidentiality), respondents were asked whether they were willing to take part in the study. Questionnaires were conducted with managers or department heads of the hotels that were willing to participate. Hotels were classified attending to several characteristics such as hotel size, age, chain affiliation, hotel ownership system, category, and hotel type. Table 2 above shows basic information of the hotel.

3.3. Analysis of the Data

After completing the sample selection and fieldwork, data was tabulated using the Statistical Package for the Social Sciences (SPSS) version 27.0 for Windows. Descriptive analyses were undertaken to analyse hotels' profile and Kruskal-Wallis H tests and Mann-Whitney U tests were used to determine relationships and whether there were statistically significant differences between the different hotels according to its characteristics.

4. Results

4.1. Validity and Reliability Analysis

The validity and the reliability of perceptual measures were assessed. Content validity is assured by an extensive review of the literature from related studies and the survey was designed based on studies related to CE or environmental practices in the hotel industry. Therefore, the questionnaire uses appropriate vocabulary and items were evaluated to see if they were appropriate measures of their constructs. Then, the reliability of the scale's items was carried out by using Cronbach's alpha reliability coefficient. Cronbach's alpha values for each of the survey's constructs are greater than 0.70 (Table 3), all achieve an acceptable level, over 0.80, meaning that they are positively correlated to one another (Nunnally, 1978).

Table 3. Reliability analysis and descriptive statistics (N=255).

Construct	No. of items	Cronbach´s alpha	Mean	Variance
Circular economy and innovation	24	0.827	3.506	0.146
Water and energy practices	26	0.860	3.307	0.550
Waste management practices	27	0.888	3.662	0.600
Human resources policy and CSR practices	14	0.892	3.106	0.414

4.2. Circular or environmentally friendly practices: descriptive analysis

Hotel managers were asked to indicate how often they carry out different circular practices related to water, energy, waste management and CSR, based on a scale of 1–5; where 1 = never, 2 = very rarely, 3 = sometimes, 4 = almost always, and 5 = always. Table 4 (See Appendix) shows that the most common circular practices related to water are to have cisterns with double pulsation or partial discharge and energy-efficient showers in the rooms (mean= 4.22 and 3.6, respectively), while the least carried out practices are collecting grey water for gardens and to purify sewage water and use it for watering gardens (mean=1.55 and 1.65, respectively). According to energy practices, hotels make the most of natural light and use of energy saving lamps more frequently (mean=4.55 and 4.47, respectively), while only a few of the hotels use

the standby generator to suppress electricity spikes and use of revolving doors at the hotel entrance (mean=2.2 and 1.64, respectively). As can be seen in Table 6 (See Appendix), the most common waste related practices are packaging reduction and buying products in bulk (mean=4.16 and 4.07, respectively) and the least implemented practices are using of incentives or prizes to encourage recycling amongst hotel guests and composting of organic waste (mean=1.71 and 2.13, respectively). Table 6 also indicates that the most frequently recycled products are batteries, computers, and printers, while the least recycled ones are organic waste from gardens and kitchen. Finally, the data presented in Table 7 (See Appendix) reveals that the CSR-related practices that hotels most commonly carry out are to prioritize the relationship with local suppliers and producers and to purchase local products (mean=4.02 and 3.75, respectively). Reward employees for environmental responsibility and carry out fundraising for environmental actions are the least common practices (mean=1.93 and 2.35, respectively).

The respondents were also asked to point out their degree of agreement with different statements related to waste management in hotel establishments on a 5-point scale ranging from 1 (totally disagree) to 5 (totally agree). As shown in Table 5 (See Appendix) the statements with the highest agreement were that they don't recycle more because they already recycle everything that can be recycled and there is no recycling service provided by the City Council (mean = 3.49 and 3.44, respectively). The statements that attracted the greatest disagreements were that they don't recycle more because the tour operators do not request it, clients do not request it or value it and because of its high cost (mean=2.33, 2.44 and 2.44, respectively). In addition, the majority of the respondents strongly agreed that the administration should offer them incentives to apply circular practices in their establishments and to have a fifth container to recycle organic waste with an average mean of 4.62 and 4.49 respectively.

When the hotel managers were asked about the degree of commitment to circular economy distinguishing by commitment to water and energy management, recycling and human resources and CSR policy, results show a high environmental commitment of hotels, especially in water and energy management and waste recycling (Table 8). However, this high environmental commitment to waste recycling seems to correspond to the circular practices actually implemented, as the waste recycling are the most popular measures implemented (global mean is 4,12).

Table 8. Degree of commitment.

Degree of commitment to…	N	Mean	SD
… water and energy management	55	3.8182	.96400
… waste recycling	55	3.8909	.91637
… HR and CSR policy	55	3.6364	.96922
… General environmental commitment of the hotel	55	3.9091	.86651

4.3. Hypotheses Testing

The proposed hypotheses have already been supported in previous research where

most of the studies on the topic focus on urban hotels and/or in non-island or non-mature destinations. Therefore, the added value of the study is that it analyses hotel establishments of a mature island sun and beach destination. To test the proposed hypotheses non-parametric tests, such as Kruskal-Wallis H test and Mann-Whitney U test were used due to the sample size. The tables shown below only indicate the items in which there are significant differences for each of the hypotheses. The tables with all the items used for the analysis are shown in the Appendix.

Hypothesis 1 (H1): *Hotel companies in a mature destination are more likely to introduce circular practices if the company has a CSR policy.*

To test this hypothesis, the questionnaire included a question where hotel managers were asked to indicate if they have carried out the measure 'Training for human resources in circular practices and CSR' (where 1 =no action is planned in this regard; 2=they are being planned; 3=actions in this regard have already been planned and are now being implemented and 4= actions have been carried out in this regard).

A Kruskal-Wallis H test has been carried out in order to analyse if there are significant differences in the implementation of CE practices between those hotels with a CSR policy and those without it (Table 9). Results show that there are statistically significant differences between those hotels that have carried out actions in training for human resources in circular practices and CSR and those that have not. Specifically, hotels with a CSR policy carry out the following measures more frequently than those without one: to measure the energy consumption of all hotel departments and carry out regular monitoring of them, to use energy control systems, participation in environmental recovery actions, to develop relationship with associations for environmental purposes, to publicize company´s good environmental practices among its staff and clients, to make suppliers aware of the company's environmental policy and training of employees on CE practices and environmental awareness.

Table 9. Kruskal-Wallis H test comparing circular practices by CSR policy.

HR training and CSR related to CE	Sig.
Measure the energy consumption of all hotel departments and carry out regular monitoring of them	.002
Use of energy control systems	.000
Training of employees on circular economy practices and environmental awareness	.000
Make suppliers aware of the company's environmental policy	.021
Publicize company´s good environmental practices among its staff and clients	.001
Develop relationships with associations for environmental purposes	.028
Participation in environmental recovery actions	.002

Hypothesis 2 (H2): *There is a positive relationship between chain affiliation and the adoption of circular and/or environmental practices.*
Hypothesis 3 (H3): *Type of ownership system affects the rate of implementation of circular and/or environmental practices.*

To test hypothesis H2, hotels were divided into those belonging to a chain and those independent hotels. Results (Table 10) show that there are only significant differences between chain affiliation and the introduction of energy and CSR practices, those hotels belonging to a chain carry out the following activities more frequently than independent hotels: to measure the energy consumption of all hotel departments and carry out regular monitoring of them, use energy control systems, use of the standby generator to suppress electricity spikes, carry out fundraising for environmental actions, develop relationship with associations for environmental purposes and participation in environmental recovery actions. Hence, those firms belonging to a chain are more active in the introduction of circular practices.

To test H3, hotels were grouped into those in property and those with a management contract. Regarding the ownership system, there are only significant differences with a few CE practices as can be seen in Table 11. Specifically, those hotels with a management contract collect rainwater for garden irrigation, use greywater for gardens, encourage the use of more sustainable transport and compost the organic waste more frequently than hotels in property.

Table 10. Mann-Whitney U test comparing circular practices by chain affiliation.

	Sig.
Measure the energy consumption of all hotel departments and carry out regular monitoring of	.007
them	.002
Use of energy control systems	.002
Use of the standby generator to suppress electricity spikes	.016
Carry out fundraising for environmental actions	.023
Develop relationships with associations for environmental purposes	.010
Participation in environmental recovery actions	

Table 11. Mann-Whitney U test comparing circular practices by type of ownership system.

	Sig.
Collect rainwater for garden irrigation	.040
Use of greywater for gardens	.000
Composting of organic waste	.005
Encourage the use of more sustainable transport	.024

Hypothesis 4 (H4). *As hotel size increases, the hotel introduces more circular and/or environmental practices.*
Hypothesis 5 (H5). *Younger hotels, have a higher implementation of circular practices than older*

To test hypothesis H4, hotels were classified into small, medium and large hotels as in Table 2. Results show that there are also significant differences between larger and medium sized hotels in the introduction of CSR and water practices, supporting H4.

Large hotels (those with more rooms and/or more beds) carry out more circular practices in CSR and water management. Specifically, hotels with more than 250 rooms and more than 500 beds carry out the following CSR practices more frequently than smaller hotels: employees receive training on CE practices and environmental awareness, the company publicize company´s good environmental practices among its staff and clients, the company develop relationship with associations for environmental purposes and participate in environmental recovery actions. On the other hand, regarding water practices larger hotels implement the following practices more often: purify sewage water and use it for watering gardens, use drip, exudative, or sprinkler irrigation systems, water during hours of low isolation, use of ecological pool chlorination system and daily pool cleaning.

Table 12. Kruskal-Wallis H test comparing circular practices by hotel´s size.

	Size (rooms) Sig.	Size (beds) Sig.
Purify sewage water and use it for watering gardens	.048	.016
Use drip, exudative, or sprinkler irrigation systems	.000	.000
Water during hours of low isolation	.015	.007
Daily pool cleaning	.000	.000
Use of ecological pool chlorination system	.045	.049
Training of employees on circular economy practices and environmental awareness	.020	.024
Publicize company´s good environmental practices among its staff and clients	.004	.003
Develop relationship with associations for environmental purposes	.009	.008
Participation in environmental recovery actions	.003	.001

To test H5, hotels were divided according to age as in Table 2. As can be seen in Table 13, there are significant differences according to hotel age in CSR and water practices. Hotels created between 1980 and 1989 participate more in circular practices related to water and other CSR practices, specifically participation in environmental recovery actions, use drip, exudative or sprinkler irrigation systems, use of ecological pool chlorination and use of sufficient solar panels for electricity and water heating more frequently than recently created hotels. Hence, results do not support H5, as it seems that older hotels are more engaged in circular practices.

Table 13. Kruskal-Wallis H test comparing circular practices by hotel´s age.

	Sig.
Use drip, exudative, or sprinkler irrigation systems	.010
Use of ecological pool chlorination system	.012
Use of sufficient solar panels for electricity and water heating	.000
Participation in environmental recovery actions	.034

Hypothesis 6 (H6). *There is a positive relationship between hotel category and the introduction of circular practices*

As can be seen in Table 14, there are significant differences between those high (4-5 stars) and low (2-3 stars) category hotels in the introduction of water and energy practices. As star category increases, hotels introduce more frequently water and energy circular practices, supporting H6. 5-stars hotels carry out energy and water practices more often than hotels with lower categories. Particularly, 5-star hotels do the following CE practices more frequently: to adapt the heating water temperature according to the outside temperature, to maintain and clean energy facilities, use drip, exudative or sprinkler irrigation systems and daily pool cleaning.

Table 14. Kruskal-Wallis H test comparing circular practices by hotel´s category.

	Sig.
Use drip, exudative, or sprinkler irrigation systems	.004
Daily pool cleaning	.005
Adapt the heating water temperature according to the outside temperature	.046
Maintenance and cleaning of energy facilities	.023

Hypothesis 7 (H7): There is a positive relationship between hotels having environmental certifications and the implementation of CE practices.

To test this hypothesis, hotel managers were asked if the establishment has any environmental certification or environmental quality management system and if so, to indicate which certification they have among ISO 14001, EMAS, Cradle to Cradle, Ecolabel, Travelife or other. Results of Table 15 show that there are significant differences between those hotels with an environmental certification and those without it in terms of the implementation of various circular practices. In general, hotels with an ISO 14011, Travelife and those with several certifications carry out the practices shown in Table 15 more frequently than hotels without certification. Additionally, 57.89% of the largest hotels (those with more than 250 rooms), have some type of environmental certification or environmental quality management system, while only 27.78% of smaller hotels have some type of environmental certification. Results show that as the size of the hotel increases and has some type of environmental certification, the implementation of circular practices increases**.**

Table 15. Kruskal-Wallis H test comparing circular practices by environmental certification.

	Sig.
Purify sewage water and use it for watering gardens	.001
Use of ecological pool chlorination system	.022
Use of sufficient solar panels for electricity and water heating	.020
Opt for reusable packaging	.035
Cell-activated or timed flow taps	.017
Use of incentives or prizes to encourage recycling amongst hotel guests	.023
Publicize company´s good environmental practices among its staff and clients	.001
Carry out fundraising for environmental actions	.010
Develop relationships with associations for environmental purposes	.001
Encourage customers to engage in environmentally sustainable leisure activities	.020

Hypothesis 8 (H8): *Main reasons to adopt CE practices are to increase brand image and to save costs*
Hypothesis 9 (H9): *Main barriers to implement CE practices are the high cost, lack of knowledge or skills and excessive bureaucracy*

To test hypotheses H8 and H9, the questionnaire included a question where hotels managers were asked to indicate the main reason that motivated them to carry out CE practices and the main barriers found in the implementation of these CE measures. Based on a 5-point scale, Table 16 shows that the main reasons to adopt CE practices were to increase hotel´s brand image and to save costs (mean=4.18 and 4.13, respectively), while the reason that attracted the greatest disagreement was that it was a tour-operator requirement (mean=2.8); findings then support H8. On the other hand, the main barriers to implement CE practices in the hotel were the high cost of implementing these actions and meeting standards, excessive bureaucracy, and financing difficulties (mean=3.73, 3.53 and 3.36, respectively), supporting H9.

Table 16. Reason and barriers to adopt CE practices.

Reasons to adopt CE practices	***N***	***Mean***
Tour-Operator requirement	55	2.8
Increase the brand image	55	4.18
Respond to customer demand	55	3.69
Save costs	55	4.13
Corporate strategy	55	4.07
Other	55	3.00
Barriers to implement CE practices		**Mean**
Lack of human resources.	55	3.05
Lack of experience in the staff to implement these activities / actions	55	3.22
Bureaucracy to implement these actions.	55	3.53
High cost of implementing these actions and meeting standards.	55	3.73
Financing difficulties	55	3.36
Others	55	2.84

When we control for firm size in hypothesis H8 and H9 there are not significant differences in terms of the reasons and barriers for adopting circular practices, smaller and large hotels have similar reasons and barriers. The same result is obtained independently of the variable used to measure firm size: number of beds or number of rooms. There are also no significant differences when we control by hotel affiliation.

However, when we control for chain affiliation when testing hypothesis H9, findings show (Table 17) that independent hotels give greater importance to excessive bureaucracy, high cost and financing difficulties as main barriers than hotels belonging to a chain, supporting H9 especially for independent hotels.

Table 17. Mann-Whitney U test comparing barriers to adopt CE practices by hotel affiliation.

	Sig.
Lack of human resources	.196
Lack of experience in the staff to implement activities/ actions	.056
Bureaucracy to implement these actions.	.018
High cost of implementing these actions and meeting standards.	.001
Financing difficulties to carry them out	.005
Others	.860

5. Discussion

Our results show that hotels with a CSR policy are more likely to introduce circular practices than those without it, therefore hypothesis H1 is supported. This result is consistent with those of Stoyanova (2019) who found that many companies carry out environmental initiatives in line with a CSR strategy. However, in a study by De Grosbois (2012) it was demonstrated that while many hotels report an engagement to CSR only a small number of them provide details of the initiatives carried out.

On the other hand, findings indicate that the adoption of circular or environmentally friendly practices in the hotel industry varies according to different factors. First, hotel affiliation is a factor that enhances the implementation of circular practices; hence, hotels belonging to a chain are more active in the introduction of circular practices than independent hotels. This result supports hypothesis H2 and is in line with those of Gil et al. (2001), Molina-Azorín et al. (2019), Mensah and Blankson (2013) and Bohdanowicz (2005) who pointed out that hotels belonging to a chain showed a greater knowledge in environmentally-friendly initiatives than the independent establishments. Second, those hotels with a management contract are more proactive in the adoption of circular practices supporting hypothesis H3. Third, large hotels carry out more circular practices in CSR and water management than smaller hotels, so hypothesis H4 is supported. These results are consistent with those of Sinha and Fukey (2020), Pham Phu et al. (2018), Mensah and Blankson (2013), Jacob et al. (2010) and Fernández-Robin et al. (2019) who showed that the hotel size is directly proportional to the circular or environmental practices adopted due to various reasons, so that there is a positive relationship between firm size and the implementation of circular and/or environmental practices. However, Manniche et al. (2021) show that small size is not necessarily a barrier to implement CE practices. Fourth, age is not a factor affecting the circular behaviour of hotels; in fact, results show that hotels created between 1980 and 1989 carry out ore circular practices than the rest of hotels; hence, findings do not support H5. Additionally, our results do not match with those of Martínez-Martínez et al. (2019) and Roberts (1992) who proved that younger establishments are more active in the implementation of environmental practices but are in line with those of Fernández-Robin, et al. (2019) who argued that age of hotels is not a decisive factor in terms of the adoption of environmental or circular practices. Fifth, results show that there is a positive relationship between hotel category and the introduction of circular practices, as star category increases; hotels introduce more frequently water and energy circular practices. Therefore, hypothesis H6 is supported and is in line with the results of numerous authors such as Mensah (2006), Gil et al. (2001) and Molina-Azorín et al. (2009) who found that category have a statistically significant impact on the environmental practices carried out. Finally, results show that there are only significant differences between having environmental certification and the implementation of CSR practices. In general, hotels with an ISO 14011, Travelife and those with several certifications carry out several circular practices more frequently than hotels without one. Therefore, hypothesis H7 is partially supported and as Ayuso (2007) explained, when some type of environmental certification is established in hotels, it considerably improves the environmental and sustainable performance of the establishment.

Finally, the study provides information on the main motivations and barriers to implement circular practices. Results show that main reasons to adopt CE practices were to increase hotel´s brand image and to save costs, and in the case of hotels belonging to a chain, also because corporate strategy, while the reason that attracted the greatest disagreement was because of tour-operator requirements. This result supports hypothesis H8 and is consistent with those of Mittal and Dhar (2016), Pamfilie et al. (2018), Slocum et al. (2018), Fernández-Robin et al. (2019), Graci and Dodds (2008) and Leonidou et al. (2013). Results also indicate that the main barriers to implement CE practices in the hotel are the high cost of implementing these actions and meeting standards, excessive bureaucracy, and financing difficulties to carry them out, so hypothesis H9 is also supported especially for independent hotels. These findings are in line with Chan (2009) and Khan et al. (2021) who found that many hoteliers perceive implementation and maintenance cost, lack of knowledge and skills and lack of resources as an important barrier. Also, Fernández-Robin et al. (2019) and Mair and Jago (2010) identified the excessive bureaucracy as one of the main barriers.

6. Conclusions

As mentioned above, tourism is an activity of great importance for the Spanish economy, and especially for the Canary Islands. On the islands, tourism generates numerous jobs and contributes significantly to GDP. However, its environmental impacts are also quite significant, such as the large generation of waste, the contamination of soil and water or the destruction of ecosystems. These impacts are increased in coastal destinations such as the Canary Islands, where mass tourism of sun and beach prevails and where the hotel industry is the most polluting sector. Therefore, the tourism industry and more specifically the hotel sector needs to make a transition to a CE. In this sense, tourism enterprises and destinations can take advantage of many CE initiatives to reduce the trend, for example, in the hotel sector (Rodríguez et al., 2020a). Hence, the aim of this chapter was to analyse the circular practices carried out and the main reasons and barriers to implement these CE measures by hotel establishments of a well-known mature sun and beach destination, Gran Canaria. This study provides useful information for both academics and professionals in the tourism industry by analysing the adoption of CE practices in the hotel sector. The added value of the study is that it analyses hotel establishments of a mature sun and beach island destination while most of the research on the topic focuses on urban hotels and/or on non-island or non-mature destinations. Additionally, the implementation of CE solutions is especially important at island destinations such as Gran Canaria, where there are high levels of resources consumption and large amount of waste generation. Switching to a CE model in island destinations should be a key element in current and future tourism policies and therefore, the importance of this research to provide evidence of firm characteristics that lead to a higher implementation of circular practices in hotels and to identify those firms where more policy effort should be made in this CE transition.

Results show that the most common circular practices related to water are to have cisterns with double pulsation or partial discharge and energy-efficient showers in the

rooms. According to energy practices, hotels make the most of natural light and use of energy saving lamps more frequently. Additionally, the most common waste related practices are to reduce packaging and to buy products in bulk. Finally, findings indicate that the CSR-related practices that hotels most commonly carry out are to prioritize the relationship with local suppliers and producers and to purchase local products. Results also show which are the least implement circular practices by the hotel sector. Therefore, hotel managers should consider gradually starting to apply these other practices and continue to maintain the practices they already carry out.

Furthermore, results indicate that there are several factors affecting the adoption of circular or environmentally friendly practices in the hotel establishments. It has been shown that the CE practices adopted by hotels are dependent on hotel size, category, chain affiliation and having an environmental certification.

Regarding the main reasons and barriers to implement CE measures, results show that the main reasons to adopt CE practices are to increase hotel´s brand image and to save costs while the main barriers to introduce these practices are the high cost of implementing them and meeting standards, excessive bureaucracy, and financing difficulties to carry them out. Consequently, public sector and DMOs must provide an adequate framework to encourage hoteliers to change their behaviour for a transition to a CE model. They should make bureaucracy more flexible and promote incentives for hotels to carry out more circular practices and provide financial funds to apply circular strategies especially for SMEs and independents hotels.

To sum up, this research can work as a guideline to help hoteliers in the transition to a CE and to design policy measures to promote hotel SMEs in this transition. Hence, more research is needed to identify new CE practices to support this transition and to define CE strategies and actions not only for the hotel sector but for the whole tourism value chain.

Finally, the study has some limitations that should be mentioned. First, the study analyses the circular practices implemented by the hotel sector of a mature sun and beach island destination, Gran Canaria. Therefore, future research should focus on other sun and beach destinations and other type of tourist destinations, for example urban destinations, to compare results. Second, the research only provides information of a pilot sample of 2-5-star hotel establishments open in year 2020 during the COVID pandemic. Hence, more studies should be carried out in other types of tourist establishments such as pensions, apartments, or holiday rentals and during a year with no pandemics.

7. References

Abdou, A. H., Hassan, T. H., Dief, E., and Moustafa, M. (2020). A Description of Green Hotel Practices and Their Role in Achieving Sustainable Development. *Sustainability*, 12(22), 9624.

Aboelmaged, M. G. (2018). Direct and indirect effects of eco-innovation, environmental orientation and supplier collaboration on hotel performance: An empirical study. *Journal of Cleaner Production*, 184, 537-549.

Álvarez, M.J. and Céspedes, J.J. (2008). An analysis of environmental management organizational context and performance of Spanish hotels. *Omega,* 29 (6), 457-471.

Atlason, R. S., Giacalone, D., and Parajuly, K. (2017). Product design in the circular economy: Users' perception of end-of-life scenarios for electrical and electronic appliances. *Journal of Cleaner Production*, *168*, 1059-1069.

Ayuso, S. (2007). Comparing voluntary policy instruments for sustainable tourism: The experience of the Spanish hotel sector. *Journal of Sustainable Tourism*, 15(2), 144-159.

Berezan, O., Raab, C., Yoo, M., and Love, C. (2013). Sustainable hotel practices and nationality: The impact on guest satisfaction and guest intention to return. *International Journal of Hospitality Management*, 34, 227-233.

Bohdanowicz, P. (2005). European hoteliers' environmental attitudes – greening the business. *Cornell Hotel and Restaurant Administration Quarterly*, 46(2), 188–204

Bohdanowicz, P. (2006). Environmental awareness and initiatives in the Swedish and Polish hotel industries—survey results. *International Journal of hospitality management*, 25(4), 662-682.

Bonilla Priego, M. J., Najera, J. J., and Font, X. (2011). Environmental management decision-making in certified hotels. *Journal of Sustainable Tourism*, 19(3), 361-381.

Cantor, D. E., Morrow, P. C., and Montabon, F. (2012). Engagement in environmental behaviors among supply chain management employees: An organizational support theoretical perspective. *Journal of Supply Chain Management*, 48(3), 33-51.

Chan, E. S., Hon, A. H., Chan, W., and Okumus, F. (2014). What drives employees' intentions to implement green practices in hotels? The role of knowledge, awareness, concern and ecological behaviour. *International Journal of Hospitality Management*, 40, 20-28. doi: 10.1016/j.ijhm.2014.03.001

Chan, W. W., and Ho, K. (2006). Hotels' environmental management systems (ISO 14001): creative financing strategy. *International Journal of Contemporary Hospitality Management*, 18(4): 302–316.

Chan, W. W. (2009). Environmental measures for hotels' environmental management systems: ISO 14001. *International Journal of Contemporary Hospitality Management*, 21 (5), 542-560.

Christmann, P., and Taylor, G. (2001). Globalization and the environment: Determinants of firm self-regulation in China. *Journal of International Business Studies*, 32(3), 439-458.

Costa, B. J. F., Rodrigues, S. C. S. F., and Pacheco, P. M. (2020). Circular Economy and

the Tourism Industry. Journal of Global Business and Technology, 16(1), 45-61.

Dascalaki, E., and Balaras, C. A. (2004). XENIOS—a methodology for assessing refurbishment scenarios and the potential of application of RES and RUE in hotels. *Energy and Buildings*, 36(11), 1091-1105.

De Grosbois, D. (2012). Corporate social responsibility reporting by the global hotel industry: Commitment, initiatives and performance. *International Journal of Hospitality Management*, 31(3), 896-905.

De León, E. E. S., and De León, G. S. (2020). Consumo de agua en establecimientos hoteleros de México. *Estudios y perspectivas en turismo*, 29(1), 120-136.

Deyà-Tortella, B., Garcia, C., Nilsson, W., and Tirado, D. (2016). The effect of the water tariff structures on the water consumption in Mallorcan hotels. *Water Resources Research*, *52*(8), 6386-6403.

Drius, M., Bongiorni, L., Depellegrin, D., Menegon, S., Pugnetti, A., and Stifter, S. (2019). Tackling challenges for Mediterranean sustainable coastal tourism: An ecosystem service perspective. *Science of the Total Environment*, 652, 1302-1317.

Ellen MacArthur Foundation (2013). *"Towards the Circular Economy – economic and business rationale for an accelerated transition".*

European Commission (2014). *The Circular Economy - Connecting, creating and conserving value*. Available online: <http://www.eesc.europa.eu/resources/docs/the-circulareconomy.pdf>. (Accessed on 27 March 2021).

Exceltur (2019). *Estudio del Impacto Económico del Turismo sobre la Economía y el Empleo de las Islas Canarias.* Available online: https://www.exceltur.org/2019/ (accessed on 15 May 2021).

Fabrice, S., and Sivarajah, U. (2021). Exploring Circular economy in the hospitality industry: empirical evidence from Scandinavian hotel operators. *Scandinavian Journal of Hospitality and Tourism*, 1-21.

Fernández-Robin, C.; Celemin-Pedroche, M.S.; Santander-Astorga, P. and Alonso-Almeida, M.D. (2019). Green practices in Hospitality a Contingency Approach. *Sustainability*, 11 (13).

Fraj, E., Matute, J., and Melero, I. (2015). Environmental strategies and organizational competitiveness in the hotel industry: The role of learning and innovation as determinants of environmental success. *Tourism Management*, 46, 30-42.

Garay, L., and Font, X. (2012). Doing good to do well? Corporate social responsibility reasons, practices and impacts in small and medium accommodation enterprises. *International Journal of Hospitality Management*, 31, 329–337. doi: 10.1016/j.ijhm.2011.04.013.

Geerts, W. (2014). Environmental certification schemes: Hotel managers' views and perceptions. *International Journal of Hospitality Management*, 39, 87-96.

Gil, M. A., Jiménez, J. B., and Lorente, J. C. (2001). An analysis of environmental management, organizational context and performance of Spanish hotels. *Omega*, 29(6), 457-471.

Girard, L. F., and Nocca, F. (2017). From linear to circular tourism. *Aestimum*, 70.

Gligor-Cimpoieru, D. C., Munteanu, V. P., Nițu-Antonie, R. D., Schneider, A., and Preda, G. (2017). Perceptions of future employees toward CSR environmental practices in tourism. *Sustainability*, 9(9), 1631.

Graci, S., and Dodds, R. (2008). Why go green? The business case for environmental commitment in the Canadian hotel industry. *Anatolia*, 19(2), 251-270.

Guzzo, R. F., Abbott, J., and Madera, J. M. (2020). A micro-level view of CSR: A hospitality management systematic literature review. *Cornell Hospitality Quarterly*, *61*(3), 332-352.

Han, H; Hsu, L.T.J.; Lee, J.S. and Sheu, C. (2011). Are lodging customers ready to go green? An examination of attitudes, demographics, and eco-friendly intentions. *International Journal of Hospitality Management*, 30, 345-355.

Han, H., Lee, J. S., Trang, H. L. T., and Kim, W. (2018). Water conservation and waste reduction management for increasing guest loyalty and green hotel practices. *International Journal of Hospitality Management*, 75, 58-66.

Hotel Global Decarbonisation Report (2017). Available online: https://buildingtransparency-live-87c7ea3ad4714-809eeaa.divio-media.com/filer_public/c4/9c/c49c0756-d91b-43b6-9819-6f4a2215052b/wc_am-hoteldecarbonizationreportpdf.pdf (accessed on 5 May 2021).

Hunter, C. and Shaw, J. (2007). The ecological foorprint as a key indicator of sustainable tourism. *Tourism Management*, 28 (1), 46-57.

INE (2021). *Estadística sobre recogida y tratamiento de residuos*. Available online: https://www.ine.es/dyngs/INEbase/es/categoria.htm?c=Estadistica_P&cid=1254735570567 (accessed on 25 June 2021).

ISTAC (2020). *Instituto Canario de Estadística. Encuesta de Alojamiento Turístico en Establecimientos Hoteleros*. Available online: http://www.gobiernodecanarias.org/istac/ (accessed on 8 January 2021).

Ivanov, S. H., Ivanova, M. G., and Iankova, K. (2014). Sustainable tourism practices of accommodation establishments in Bulgaria: an exploratory study. *Tourismos,* 9(2), 175-205.

Jacob, M., Florido, C., and Aguiló, E. (2010). Research note: Environmental innovation as a competitiveness factor in the Balearic Islands. *Tourism Economics*, 16(3), 755-764.

Jones, P., Hillier, D., and Comfort, D. (2016). Sustainability in the hospitality industry: Some personal reflections on corporate challenges and research agendas. *International Journal of Contemporary Hospitality Management*, 28, 36–67.

Kasim, A. (2007). Towards a wider adoption of environmental responsibility in the hotel sector. *International Journal of Hospitality & Tourism Administration*, 8(2), 25–49.doi:10.1300/J149v08n02_02

Khan, O., Marrucci, L., Daddi, T., and Bellini, N. (2021). Adoption of Circular Economy and Environmental Certifications: Perceptions of Tourism SMEs. *Journal of Management and Sustainability*, 11 (1), 218 doi:10.5539/jms.v11n1p218

Kim, S., and Choy, Y. (2011). Hotel employees' perception of green practices. *International Journal of Hospitality Tourism and Administration*, 14(2), 157–178. doi:10.1080/15256480.2013.782220

Kirchherr, J., Reike, D., and Hekkert, M. (2017). Conceptualizing the circular economy: An analysis of 114 definitions. *Resources, Conservation and Recycling*, 127, 221-232.

Kirk, D. (1995). Environmental management in hotels. *International Journal of Contemporary Hospitality Management*, 7(6), 3–8. doi:10.1108/09596119510095325

Kularatne, T.; Wilson, C.; Mansson, J.; Hoang, V., and Lee, B. (2019). Do environmental sustainable practices make hotels more efficient? A study of major hotels in Sri Lanka. *Tourism Management,* 71, 213-225.

Laing, J., and Mair, J. (2011). Exploring the role of'greening'in festival planning and management. In *CAUTHE 2011: National Conference: Tourism: Creating a Brilliant Blend* (p. 1162). University of South Australia. School of Management.

Leonidou, L. C., Leonidou, C. N., Fotiadis, T. A., and Zeriti, A. (2013). Resources and capabilities as drivers of hotel environmental marketing strategy: Implications for competitive advantage and performance. *Tourism Management*, 35, 94–110. doi: 10.1016/j.tourman.2012.06.003.

Mair, J., and Jago, L. (2010). The development of a conceptual model of greening in the business events tourism sector. *Journal of Sustainable Tourism*, 18(1), 77–94. doi:10.1080/09669580903291007

Mak, A. H., and Chang, R. C. (2019). The driving and restraining forces for environmental strategy adoption in the hotel industry: A force field analysis approach. *Tourism Management*, 73, 48-60.

Manniche, J., Broegaard, R. B., and Larsen, K. T. (2021). The circular economy in tourism: transition perspectives for business and research. *Scandinavian Journal of Hospitality and Tourism*, 1-18.

Manniche, J.; Larsen, K.T.; Broegaard, R.B., and Holland, E. (2017). *Destination: A Circular Tourism Economy A Handbook for Transitioning Toward a Circular Economy within the Tourism and Hospitality Sectors in the South Baltic Region*; Centre for Regional & Tourism Research (CRT): Bornholm, Denmark, 2017.

Martinez-Martinez, A.; Cegarra-Navarro, J-A. and Garcia-Perez, A. (2019). Knowledge agents as drivers of environmental sustainability and business performance in the hospitality sector. *Tourism Management*, 70, 381-389.

McCool, S., Butler, R., Buckley, R., Weaver, D., and Wheeller, B. (2013). Is concept of sustainability utopian: Ideally perfect but impracticable? *Tourism Recreation Research*, 38(2), 213-242.

Mensah, I. (2006). Environmental management practices among hotels in the greater Accra region. *International Journal of Hospitality Management*, 25(3), 414-431.

Mensah, I., and Blankson, E. J. (2013). Determinants of hotels' environmental performance: Evidence from the hotel industry in Accra, Ghana. *Journal of Sustainable Tourism*, 21(8), 1212-1231.

Mittal, S., and Dhar, R. L. (2016). Effect of green transformational leadership on green

creativity: A study of tourist hotels. *Tourism Management*, 57, 118-127.

Molina-Azorín, J. F., Claver-Cortés, E., Pereira-Moliner, J., and Tarí, J. J. (2009). Environmental practices and firm performance: an empirical analysis in the Spanish hotel industry. *Journal of Cleaner Production*, 17(5), 516-524.

Musavengane, R. (2019). Small hotels and responsible tourism practice: Hoteliers' perspectives. *Journal of Cleaner Production,* 220, 786-799.

Nunnally, J. C. (1978). *Psychometric theory* (2nd edit.). New York.

Pamfilie, R., Firoiu, D., Croitoru, A. G., and Ionescu, G. H. I. (2018). Circular Economy–A New Direction for the Sustainability of the Hotel Industry in Romania. Amfiteatru Economic, 20(48), 388-404.

Parker, C. M., Redmond, J., and Simpson, M. (2009). A review of interventions to encourage SMEs to make environmental improvements. *Environment and planning C: Government and policy*, 27(2), 279-301.

Patronato Turismo Gran Canaria (2019). *Situación del Sector Turístico año 2019*. Available online: https: //www.grancanaria.com/turismo/es/ (accessed on 10 June 2020).

Pérez, D. M. G., Martín, J. M. M., Martínez, J. M. G., and Sáez-Fernández, F. J. (2020). An Analysis of the Cost of Water Supply Linked to the Tourism Industry. An Application to the Case of the Island of Ibiza in Spain. *Water*, 12(7), 2006.

Pham Phu, S. T., Hoang, M. G., and Fujiwara, T. (2018). Analyzing solid waste management practices for the hotel industry. *Global Journal of Environmental Science and Management*, 4(1), 19-30.

Promotur (2020). *Perfil del turista que visita Islas Canarias 2019*. Available online: https://turismodeislascanarias.com/es/ (accessed on 8 April 2021).

Radwan, H. R., Jones, E., and Minoli, D. (2012). Solid waste management in small hotels: a comparison of green and non-green small hotels in Wales. Journal of Sustainable Tourism, 20(4), 533-550.

Rico, A., Martínez-Blanco, J., Montlleó, M., Rodríguez, G., Tavares, N., Arias, A., and Oliver-Solà, J. (2019). Carbon footprint of tourism in Barcelona. *Tourism Management*, *70*, 491-504.

Roberts, R.W. (1992). Determinants of corporate social responsibility disclosure: An application of stakeholder theory. *Accounting, Organizations & Society*, 17, 595–612.

Rodríguez-Antón, J. M., and Alonso-Almeida, M. D. M. (2019). The circular economy strategy in hospitality: A multicase approach. *Sustainability*, 11(20), 5665.

Rodríguez-Antón, J. M., Alonso-Almeida, M.D.M., Celemín, M. S., and Rubio, L. (2012). Use of different sustainability management systems in the hospitality industry. The case of Spanish hotels. *Journal of Cleaner Production*, 22(1), 76-84.

Rodríguez, C., Florido, C., and Jacob, M. (2020a). Circular economy contributions to the tourism sector: A critical literature review. *Sustainability*, 12(11), 4338.

Rodríguez, C., Jacob, M., and Florido, C. (2020b). Socioeconomic profile of tourists with a greater circular attitude and behaviour in hotels of a sun and beach

destination. *International Journal of Environmental Research and Public Health*, 17(24), 9392.

Saarinen, J. (Ed.). (2020). *Tourism and sustainable development goals: Research on sustainable tourism geographies*. Routledge.

Sangeetha, R., and Rebecca, J. (2019). Perceptions of the Employees on Green and Sustainable Practices in the Hotel Industry and its Implications: Empirical Evidence from the Selected Star Hotels. *International Journal of Civil Engineering and Technology (IJCIET)*, 10(1).

Segarra-Oña, M. D. V., Peiró-Signes, Á., Verma, R., and Miret-Pastor, L. (2012). Does environmental certification help the economic performance of hotels? Evidence from the Spanish hotel industry. *Cornell Hospitality Quarterly*, 53(3), 242-256.

Serra-Cantallops, A., Peña-Miranda, D. D., Ramón-Cardona, J., and Martorell-Cunill, O. (2018). Progress in research on CSR and the hotel industry (2006-2015). *Cornell Hospitality Quarterly*, *59*(1), 15-38.

Shadbegian, R., and Gray B. (2006). Assessing multidimensional performance: Environmental and economic outcomes. *Journal of Productivity Analysis*, 26, 213–234.

Sinha, M., and Fukey, L. *Circular Economy: Assessing a progress of resources efficient practices in hotel industry*. In Book Circular Economy for the Management of Operations; Kumar, A., Garza-Reyes, J. A., & Khan, S. A. R. Eds.; CRC Press, Florida, USA, 2020, pp. 89-117.

Slocum, S. L., Jin, N. P., and Cho, I. S. (2018). Willingness to Pay for Sustainable Food in the Meeting Planning Sector. *Culinary Science & Hospitality Research*, 24(7), 153-161.

Stoyanova, T. (2019). CSR Strategies Applied in Terms of Circular Economy. *Economic Alternatives*, 2, 263-274.

Tovar-Sánchez, A., Sánchez-Quiles, D., and Rodríguez-Romero, A. (2019). Massive coastal tourism influx to the Mediterranean Sea: The environmental risk of sunscreens. *Science of the Total Environment*, 656, 316-321.

Tzschentke, N. A., Kirk, D., and Lynch, P. A. (2008). Going green: Decisional factors in small hospitality operations. *International Journal of Hospitality Management*, 27, 126–133. doi: 10.1016/j.ijhm.2007.07.010

World Tourism Organization (UNWTO) (2019). *International tourism Highlights*. Available online: https://www.e-unwto.org/doi/pdf/10.18111/9789284421152 (accessed on 3 March 2021).

Valdivieso, J. C. (2019). Stakeholders' motivation to adopt corporate social responsibility practices in the lodging industry in an island destination: Balearic Islands case study. *International Journal of Tourism Policy*, 9(2), 79-98.

Vourdoubas, J. (2016). Energy consumption and use of renewable energy sources in hotels: A case study in Crete, Greece. *Journal of Tourism and Hospitality Management*, 4(2), 75-87.

Williams, P.W. and Ponsford, I.F. (2009). Confronting tourism's environmental paradox: Transitioning for sustainable tourism. *Futures* 41, 396-404.

World Business Council for Sustainable Development (2017). *CEO Guide to the Circular Economy*. Available online: https://www.wbcsd.org/Programs/Circular-Economy/Factor-10/Resources/CEO-Guide-to-the-Circular-Economy (accessed on 12 April 2021).

WTTC (2020). *Travel and Tourism. Global Economic Impact & Trends 2020*. World Travel & Tourism Council website. Available online: https://wttc.org/Research/Economic-Impact (accessed on 15 April 2021).

Yılmaz, Y., Üngüren, E., and Kaçmaz, Y. Y. (2019). Determination of Managers' Attitudes Towards Eco-Labeling Applied in the Context of Sustainable Tourism and Evaluation of the Effects of Eco-Labeling on Accommodation Enterprises. *Sustainability*, 11(18), 5069.

Zengeni, N., Zengeni, D. M. F., and Muzambi, S. (2013). Hoteliers' Perceptions of the Impacts of Green Tourism on Hotel Operating Costs in Zimbabwe: The Case of Selected Harare Hotels. *Australian Journal of Business and Management Research*, 2(11), 64.

Zhang, J. J., Joglekar, N., Heineke, J., and Verma, R. (2014). Eco-efficiency of service co-production: connecting eco-certifications and resource efficiency in US hotels. *Cornell Hospitality Quarterly*, 55(3), 252-264.

Zografakis, N., Gillas, K., Pollaki, A., Profylienou, M., Bounialetou, F., and Tsagarakis, K. P. (2011). Assessment of practices and technologies of energy saving and renewable energy sources in hotels in Crete. *Renewable energy*, 36(5), 1323-1328.

Zyglidopoulos, S. C. (2002). The social and environmental responsibilities of multinationals: Evidence from the Brent Spar case. *Journal of Business Ethics*, 36(1), 141-151.

8. Appendix

Table 4. Water and energy practices.

Water practices	N	Mean	SD
Energy efficient showers in the rooms	55	3.6000	1.71702
Cisterns with double pulsation or partial discharge	55	4.2182	1.34290
Cell-activated or timed flow taps	55	2.9455	1.62638
Collect rainwater for garden irrigation	55	1.8182	1.37559
Purify sewage water and use it for watering gardens	55	1.6545	1.22048
Use drip, exudative, or sprinkler irrigation systems	55	3.0909	1.83861
Use of native or rainfed plants in gardens	55	3.4545	1.56132
Use of greywater for gardens	55	1.5455	1.19905
Water during hours of low insolation	55	3.5091	1.74136
Use of ecological pool chlorination system	55	2.5818	1.81242
Daily pool cleaning	55	3.4545	1.92275
Global mean		**2.8975**	
Energy practices	N	Mean	SD
Measure the energy consumption of all hotel departments and carry out regular monitoring of them.	55	3.7818	1.47436
Use of energy control systems	55	3.8727	1.47892
Lights with detection systems that turn on and off automatically	55	4.0000	1.24722
Rooms equipped with a card to turn off the power when the guest is not in the room	55	4.1818	1.50420
Use of energy saving lamps	55	4.4727	1.01570
Use of air conditioning and / or heating systems that can be turned off by customers	55	4.2000	1.52023
Use of revolving doors at the hotel entrance	55	1.6364	1.33837
Use of sufficient solar panels for electricity and water heating	55	2.7273	1.79974
To have good ventilation and thermal insulation	55	3.8000	1.35264
Do not lower the air conditioning thermostat below 22ºC	55	3.2909	1.53566
Use of the standby generator to suppress electricity spikes	55	2.2000	1.59164
Make the most of natural light	55	4.5455	.95874
Avoid excessive outdoor lighting	55	4.2182	1.30087
Adapt the heating water temperature according to the outside temperature	55	2.8545	1.63773
Maintenance and cleaning of energy facilities	55	4.2364	1.20129
Global mean		**3.6012**	

Table 5. Waste management statements.

Statements	N	Mean	SD
No more recycling in the hotel establishment because …			
…We cannot recycle any more, we already recycle everything that can be recycled	55	3.4909	1.37265
…I do not have nearby containers provided by the City Council	55	3.2909	1.59481
…There is no recycling service provided by the City Council	55	3.4364	1.52466
…I think that in the end they collect all the waste, and it is not recycled	55	2.7273	1.45875
…Clients do not request / value it	55	2.4364	1.46267
…The tour operators we work with do not request it	55	2.3273	1.40178
…High cost	55	2.4364	1.37118
We would like there to be a fifth container to recycle organic waste	55	4.4909	.92040
We would like the City Council to provide more recycling services	55	4.4364	.87694
We would like the administration to offer incentives to apply circular practices (tax breaks, aid for the implementation of eco-innovation measures, etc.)	55	4.6182	.91269

Table 6. Waste management practices.

Waste Reduction/Reutilization	N	Mean	SD
Use of white or recycled paper	55	4.0727	1.05153
Avoid aluminium foil	55	3.6545	1.05792
Avoid using single-use products	55	3.8545	.86961
Buying products in bulk	55	4.0727	.83565
Packaging reduction	55	4.1636	.78796
Opt for reusable packaging	55	3.7818	1.10035
Using compostable waste bags	55	2.7091	1.46152
Prioritize the purchase of natural cleaning products	55	2.8000	1.11222
Use of natural pesticides	55	2.9636	1.31886
Oil and grease separation	55	3.8727	1.34790
Offer set menus in restaurants to reduce food waste	55	2.9636	1.47778
Prioritize repair over replacement	55	3.9818	1.29802
Prioritize equipment rental over purchase	55	2.9091	1.14298
Composting of organic waste	55	2.1273	1.12307
Use of recycling bins	55	3.9455	1.45829
Use of incentives or prizes to encourage recycling amongst hotel guests	55	1.7091	1.08308
Global Mean		**3.3488**	
Waste Recycling	N	Mean	SD
Glass	55	4.3636	1.22268
Paper and paperboard	55	4.4727	.95945
Oil	55	4.3091	1.24533
Plastic bottles	55	4.1455	1.22351
Organic kitchen waste	55	3.2364	1.67734

Organic waste from gardens	55	2.9455	1.70422
Bed linen, towels	55	3.9273	1.39913
Batteries	55	4.7455	.61518
Home appliances	55	4.4727	.97856
Computers, printers	55	4.5091	.90006
Furniture and fixtures	55	4.1636	.99561
Global Mean	55	**4.12**	

Table 7. HR and CSR practices.

HR and CSR	N	Mean	SD
Training of employees on circular economy practices and environmental awareness	55	2.9636	1.29047
Encourage employees to participate in the environmental policy	55	3.6727	1.24803
Purchase of local products	55	3.7455	1.00403
Prioritize the relationship with local suppliers and producers	55	4.0182	.82756
Make suppliers aware of the company's environmental policy	55	3.5091	1.28917
Publicize company´s good environmental practices among its staff and clients	55	3.6000	1.31375
Carry out fundraising for environmental actions	55	2.3455	1.30835
Develop relationships with associations for environmental purposes	55	2.4182	1.31503
Encourage customers to engage in environmentally sustainable leisure activities	55	2.5636	1.24370
Encourage the use of more sustainable transport	55	2.9818	1.32624
Availability of parking for customers	55	3.4727	1.81409
Participation in environmental recovery actions	55	2.6364	1.26730
Customers receive information about the environment	55	3.6364	1.20744
Reward employees for environmental responsibility	55	1.9273	1.16832
Global Mean	55	**3.1065**	

III. CONCLUSIONS

The present thesis, structured in three related chapters, goes in depth into the circular economy in the tourism sector focusing on analysing first, the state of the art on CE in the tourism field; second, on investigating the behaviour and attitude of tourists in relation to circular practices in an island destination, Gran Canaria, and third, on studying the implementation of circular practices by hotel establishments in a mature island destination, Gran Canaria, and the factors that influence their implementation. Until now, circularity in tourism has not received much attention. This makes this topic an interesting field of study since it is a relatively young field of research. Hence, the main thesis values are that it is one of the first research including an analysis of the importance of the CE literature in tourism classifying all this scientific literature available into research streams according to its content and CE principle dealt with. Additionally, Chapters 2 and 3 focus on data from tourists and hotel managers in a mature sun and beach island destination while most of the papers on the topic focus on urban hotels or in non-island or non-mature destinations. In this sense, the implementation of CE solutions is especially important at island destinations such as Gran Canaria, where there are high levels of resources consumption and large amount of waste generation. Switching to a CE model in island destinations should be a key element in current and future tourism policies. Therefore, the importance of this thesis to provide evidence of firm characteristics that lead to a higher implementation of circular practices in hotels and to identify those firms where more policy effort should be made in this CE transition, as well as those tourists with a greater circular attitude and behaviour. The transition to a circular model represents a great opportunity for the Canarian tourism industry, especially in these times of change as a result of the crisis caused by the COVID-19 pandemic.

The most relevant conclusions of each chapter, as well as the main implications and future lines of research are presented below.

In Chapter 1 the importance of tourism in the CE literature and the current research trends and possible gaps in the literature on CE and tourism are analysed. Specifically this chapter presents, first, a bibliometric review on the circular economy in all fields of research, analysing the importance of CE in the literature, the main journals publishing research on CE and the research fields where this scientific production is published; second, an analysis of the importance of the literature of CE in tourism classifying all this scientific literature available on the circular economy and tourism into research streams according to its content and CE principle dealt with; and third, a model to identify the knowledge areas in tourism that this scientific production on CE and tourism cover and to indicate the areas where new knowledge is needed. This study showed that more research is needed about the tourism intersection with CE in order to generate possible solutions towards a more sustainable tourism industry. In this sense, further empirical work and research are needed to improve our understanding of CE in tourism. Future research could focus on defining a global circular strategy that involves all tourism sector actors and areas, on how to attract tourists to a circular hotel or destination.

The second Chapter identifies the socioeconomic profile of tourists with a greater circular attitude and behaviour in Gran Canaria by analysing different aspects such as

tourists' awareness and information and their interest or reluctance to change their practices while staying at the hotel; and the most common circular practices and those that the hotel industry must promote to reach this transition. The results from Chapter 2 point out that tourists' attitude towards circular practices varies according to socio-economic profile: Nationality, educational level and income level; older tourists have a higher pro-environmental or circular attitude in hotel establishments than younger ones; the most common sustainable hotel practices carried out by tourists are the use of recycling bins and reusable towel and linen schemes, and women report significantly higher pro-environmental behaviours than men. Thus, the results obtained from this chapter could be useful to design the transition from a linear model to a circular model in the hotel industry of a destination as it identifies the type of tourist with a higher circular attitude that the industry must attract to reach this transition and those circular practices where tourists make less effort and tourism businesses must promote to help in this transition.

Chapter 3 focuses on analysing the circular economy practices implemented by hotel establishments in Gran Canaria, the factors affecting the implementation of these practices, as well as the main reasons and barriers to implement these CE measures in the hotels. Results from this chapter show that the key factors affecting the adoption of CE practices by hotels are hotel size, category, chain affiliation and having an environmental certification. Results also identify the most common circular practices related to waste, water, energy, and Corporate Social Responsibility (CSR) and main barriers and reasons to implement those practices. Additionally, this chapter also shows which the least implemented circular practices are. Therefore, hotel managers should consider gradually starting to apply these other practices and continue to maintain the practices they already carry out. These findings have implications for the design of a circular strategy in hotel establishments of a sun and beach destination.

Finally, it is important to note that this thesis has certain limitations that should be mentioned. On the one hand, even though a rigorous bibliometric analysis of publications on circular economy in the tourism sector has been carried out (Chapter 1), only papers and studies published in English in the two databases analysed have been considered. Hence, literature on CE and tourism published in another language has not been reviewed. Moreover, conference papers (not indexed by Web of Science nor Scopus) or reports published from European projects on CE have not been included in this review, although they can provide important contributions to this relatively new field of research. On the other hand, the thesis analyses the attitude towards CE and the environmental behaviour and circular practices among tourists (Chapter 2) and the circular practices implemented by the hotel sector (Chapter 3) of a well-known mature sun and beach destination, Gran Canaria. Thus, further empirical studies should be carried out for results to be representative for all sun and beach tourist destinations and other type of tourist destinations, for example urban destinations, to compare results. Additionally, Chapter 3 only provides information of a pilot sample of 2-5-star hotel establishments in a mature island destination and data collection was carried out during COVID-19 pandemic when many hotels did not open. Hence, first, the results on hotels should be considered with caution, the sample of hotels should be expanded to confirm these results in a tourist season without COVID-

19; and second, more studies should be carried out on other types of tourist establishments such as pensions, apartments or holiday rentals and other types of tourist destinations and in a year without a pandemic.

Considering all the above-mentioned and the results of this thesis, future research direction should move towards the analysis of other important actors to reach a CE transition in the tourism sector, such as DMOs and public sector and the resident population of the destination. DMOs and the public sector must provide an adequate framework to encourage hoteliers to change their behaviour to switch to a CE model. Additionally, bureaucracy should be more flexible and incentives for hotels to carry out more circular practices should be promoted, also they should provide financial funds to apply circular strategies especially for SMEs and independents hotels. On the other hand, the resident population represents another important actor to reach the transition. In this sense, it is proposed to analyse their attitudes and perceptions regarding the circular economy in the tourism industry.

The conclusions and future lines of research discussed in this doctoral thesis are the beginning of a research line in the field of circular economy in the tourism sector.

IV. SUPPLEMENTARY MATERIAL

Questionnaire 1

This questionnaire was designed in English, German and Spanish and conducted with tourists in multiple locations in Gran Canaria to ensure a random sample of tourists (tourists from different nationalities, ages, income level, staying at different hotels, etc.)

QUESTIONNAIRE ABOUT CIRCULAR PRACTICES CARRIED OUT BY TOURISTS IN GRAN CANARIA

A group of researchers from the University of Las Palmas de Gran Canaria are carrying out a study on environmental practices in hotels within the European project INTERREG - MAC 2014-2020 entitled "R+D+i towards aquaponic development in the UP islands and the Circular Economy-Islandap".

Please answer taking into account the last time you visited the island and only if you stayed at a hotel establishment

HELP US BY ANSWERING THESE BRIEF QUESTIONS.

The questionnaire is TOTALLY ANONYMOUS and will take you only FIVE MINUTES of your time.

Thank you for your cooperation

WE ARE CARRYING OUT A STUDY ABOUT ENVIRONMENTAL PRACTICES IN HOTELS. HELP US BY ANSWERING THESE BRIEF QUESTIONS

Q0. Are you staying in a hotel? ☐1 Yes ☐2 No --> **END OF QUESTIONNAIRE**

Q1. Name of hotel (if you don't remember it, name the town where the hotel is located)

_____

Q2. Type of hotel

☐1 Resort Hotel ☐2 Urban City Hotel ☐3 Agrotourism Establishment
☐4 Rural Hotel ☐5 Other, specify: _____

Q3. Hotel category:

☐1 5 stars ☐2 4 stars ☐3 3 stars
☐4 2 stars ☐5 1 star ☐6 Other, specify: _____

Q4. Board type

☐1 Only Room ☐2 Bed and breakfast
☐3 Half board ☐4 All inclusive

Q5. Length of stay (days): _____

Q6. The information you provide from now on payments made, how many people are you going to refer to?

☐1 Only to you
☐2 To you and other people --> Number of people participating in the expense _____ (including you)

Q7. Please indicate whether you hired a tour package and, if so, the amount paid and the services included in it

☐1 Yes--> Amount paid _____ (currency) Services: _____
☐2 No

Q8. Approximate total expenditure during your stay on the island (meals, leisure, transportation, etc.) _____ (currency)

Q9. How did you book your hotel?

☐1 Through a Tour-Operator (TUI, Condor, Expedia) ☐2 With a Travel agency
☐3 On the hotel website ☐4 Online through other platforms (Booking,TripAdvisor,Hotels.com)

Q10. Travel purpose: ☐1 Leisure ☐2 Business
☐3 Studies ☐4 Personal (health, family...) ☐5 Others

Q11.a Who did you travel with? ☐1 Alone **-->Go to Q12.a** ☐2 With my partner
☐3 With friends ☐4 As a family ☐5 With co-workers

Q11.b How many people do you travel with? Number of people _____ (not counting you)

Q12.a Do you know if the hotel you are staying in has any environmental quality management system or environmental certification?

☐1 Yes ☐2 No **-->Go to Q13** ☐3 I do not remember **-->Go to Q13**

Q12.b Which one? (Choose all relevant options)

☐1 ISO 14001 ☐2 EMAS ☐3 Cradle to cradle
☐4 Ecolabel ☐5 Other: Specify: _____

Q13	**Were you offered environmental information (environmental badge, environmental certificate) when hiring the hotel?**
	☐1 Yes ☐2 No ☐3 Do not know/no answer

Q14	**INDICATE YOUR DEGREE OF AGREEMENT with …**	**1: totally disagree**				**5: totally in agreement**
a	For me it is important that tourist accommodation carry out a responsible policy with the environment	☐1	☐2	☐3	☐4	☐5
b	When I choose a tourist accommodation, for me it is important that it has some seal of environmental quality	☐1	☐2	☐3	☐4	☐5
c	I am willing to pay a little more for a hotel with better environmental quality	☐1	☐2	☐3	☐4	☐5
d	For me it is important that a hotel has a recycling and waste management policy	☐1	☐2	☐3	☐4	☐5
e	For me it is important that a hotel has a water saving policy	☐1	☐2	☐3	☐4	☐5
f	For me it is important that a hotel has an energy saving policy	☐1	☐2	☐3	☐4	☐5
g	For me it is important that hotel staff have training in environmental issues (recycling, etc.)	☐1	☐2	☐3	☐4	☐5

Q15	**How often do you perform the following sustainable practices during your stay at the hotel establishment?** Never (1), Very rarely (2), Sometimes (3), Almost always (4) or Always (5)	**Never**	**Very rarely**	**Sometimes**	**Almost always**	**Always**
a	I shower instead of bathing	☐1	☐2	☐3	☐4	☐5
b	I use the partial discharge tank	☐1	☐2	☐3	☐4	☐5
c	I turn off air conditioning and lights when I leave the room	☐1	☐2	☐3	☐4	☐5
d	I keep the air conditioner thermostat at more than 22ºC	☐1	☐2	☐3	☐4	☐5
e	Recycle if the hotel has recycling bins	☐1	☐2	☐3	☐4	☐5
f	I try to reduce food waste in restaurants	☐1	☐2	☐3	☐4	☐5
g	I ask for a change of sheets or towels only when necessary	☐1	☐2	☐3	☐4	☐5

Q16	**INDICATE YOUR DEGREE OF AGREEMENT with …**	**1: totally disagree**				**5: totally in agreement**
a	For me it is important that tourist accommodations manage the way in which water is used in the hotel to reduce consumption and / or maximize its reuse	☐1	☐2	☐3	☐4	☐5
b	For me it is important that tourist accommodation use renewable energy	☐1	☐2	☐3	☐4	☐5
c	For me it is important that tourist accommodation manage the use and consumption of energy to minimize its consumption.	☐1	☐2	☐3	☐4	☐5
d	I am willing that hotels offer closed menus in restaurants to reduce food waste	☐1	☐2	☐3	☐4	☐5
e	For me it is important that tourist accommodation reduce the volume of waste through recycling, reuse of waste or the sale of waste to a third company.	☐1	☐2	☐3	☐4	☐5
f	If they were available I would be willing to use collaborative platforms during my stay (BlaBlaCar, foodtogo, etc.)	☐1	☐2	☐3	☐4	☐5

Q17	How often do you perform the following sustainable practices during your stay on the island?					
	Never (1), Very rarely (2), Sometimes (3), Almost always (4) or Always (5)	Never	Very rarely	Sometimes	Almost always	Always
a	I use public transport	☐1	☐2	☐3	☐4	☐5
b	I buy in small shops instead of big chains	☐1	☐2	☐3	☐4	☐5
c	I buy products with less packaging	☐1	☐2	☐3	☐4	☐5
d	I use reusable bags when buying	☐1	☐2	☐3	☐4	☐5
e	I carry out environmentally sustainable leisure activities (hiking, bike routes, stargazing, visit natural parks ...)	☐1	☐2	☐3	☐4	☐5
f	I participate in environmental recovery actions (beach cleaning, tree planting ...)	☐1	☐2	☐3	☐4	☐5
g	I am interested in knowing the environment of the island and its environmental problems	☐1	☐2	☐3	☐4	☐5

Q18.a	Does the hotel establishment offer any type of incentives for the guest or client to carry out environmentally sustainable practices? Examples: discounts for another stay, prizes, tickets to natural parks, etc....
	☐1 Yes ☐2 No **-->Go to Q19.a**

Q18.b	Detail what kind of incentives

SUSTAINABLE PRACTICES IN YOUR HOME

In this section we ask you to indicate how often you carry out the following actions in your daily life in the country where you reside.

Q19.a		How often do you perform the following sustainable practices in your home / country of residence?					
		Never (1), Very rarely (2), Sometimes (3), Almost always (4) or Always (5)	Never	Very rarely	Sometimes	Almost always	Always
WASTE	a	I recycle glass	☐1	☐2	☐3	☐4	☐5
	b	I recycle paper and cardboard	☐1	☐2	☐3	☐4	☐5
	c	I recycle cooking oil	☐1	☐2	☐3	☐4	☐5
	d	I recycle plastic containers	☐1	☐2	☐3	☐4	☐5
	e	I recycle household appliances, printers, computers ...	☐1	☐2	☐3	☐4	☐5
	f	I separate the organic waste	☐1	☐2	☐3	☐4	☐5
	g	I avoid wasting food	☐1	☐2	☐3	☐4	☐5
	h	I try to repair before buying	☐1	☐2	☐3	☐4	☐5
	i	I buy / sell second-hand products (furniture, appliances, clothes, etc.)	☐1	☐2	☐3	☐4	☐5
	j	When I buy clothes I notice that it is environmentally sustainable	☐1	☐2	☐3	☐4	☐5
	k	I buy local and / or seasonal products	☐1	☐2	☐3	☐4	☐5
	l	I buy organic products	☐1	☐2	☐3	☐4	☐5
	m	I buy products with the least possible packaging	☐1	☐2	☐3	☐4	☐5
	n	I use reusable bags when buying	☐1	☐2	☐3	☐4	☐5
	o	I avoid aluminum foil	☐1	☐2	☐3	☐4	☐5

WATER AND ENERGY	a	I try to save water and energy	☐1	☐2	☐3	☐4	☐5
	b	I use renewable energy sources	☐1	☐2	☐3	☐4	☐5
	c	I use public transport	☐1	☐2	☐3	☐4	☐5
	d	I use sustainable transport (bicycle, electric car, etc.)	☐1	☐2	☐3	☐4	☐5
	e	I turn off air conditioning, heating and lights when I leave home	☐1	☐2	☐3	☐4	☐5
	f	Thermostat with time programming	☐1	☐2	☐3	☐4	☐5
	g	I take into account the level of energy efficiency in the house	☐1	☐2	☐3	☐4	☐5
OTHER	a	I do environmentally sustainable leisure activities (hiking, cycling, stargazing ...)	☐1	☐2	☐3	☐4	☐5
	b	In the family we promote environmental awareness	☐1	☐2	☐3	☐4	☐5
	c	In my daily life I use shared platforms (if any) Indicate which_____	☐1	☐2	☐3	☐4	☐5

Q19.b	**Other practices I do (Indicate which):**

Q20.a	**Do you carry out the same environmentally sustainable practices in your home as when you are traveling?**		
	☐1 Yes	☐2 No	**-->Go to Q21**

Q20.b	**How often do you do the same sustainable practices in your home as when you are traveling?**				
	☐1 Never	☐2 Very rarely	☐3 Sometimes	☐4 Almost always	☐5 Always

Q21. Specify your age:	
Q22. Nationality:	
Q23. Residence country:	
Q24. Residence city:	
Q25. Gender:	☐1 Male ☐2 Female ☐3 Other
Q26. How many people live in your home? (including you)	

Q27. Family income level (whole family, net per month):

☐1 Less than 500 €	☐2 501 – 1.000 €	☐3 1.001 – 2.000 €	☐4 2.001 – 3.000 €
☐5 3.001 – 5.000 €	☐6 5.001 – 7.000 €	☐7 More than 7.000 €	☐8 No answer/do not know

Q28. Occupation:

☐1 Self-employed entrepreneur	☐2 Salaried, senior management, etc.	☐3 Average salaried employee
☐4 Salaried without qualification	☐5 Student	☐6 Retired
☐7 Unemployed	☐8 Other	

Q29. Highest level of education completed:

☐1 No studies	☐2 Primary education	☐3 Obligatory secondary education
☐4 Upper-Secondary education	☐5 University studies	☐6 I prefer not answer

THANK YOU FOR YOUR KIND COOPERATION

Questionnaire 2

The study was undertaken in the island of Gran Canaria (Canary Islands), a mature sun and beach destination with serious sustainability problems caused by the development of tourist activity. The population of this study comprised hotel establishments and it targeted the entire population of 2-, 3-, 4- and 5-star hotels in the island.

QUESTIONNAIRE ABOUT CIRCULAR PRACTICES IMPLEMENTED IN THE HOTEL SECTOR OF GRAN CANARIA

Un grupo de investigadores de la Universidad de Las Palmas de Gran Canaria estamos realizando un estudio sobre la implantación de prácticas de Economía Circular en el sector hotelero. Este estudio se enmarca dentro del proyecto INTERREG - MAC 2014-2020 "R+D+i towards aquaponic development in the UP islands and the Circular Economy. Interregional Forward Challenges-Islandap Advanced".

La economía circular es definida como un modelo económico cuyo objetivo es que el valor de los productos, los materiales y los recursos (agua, energía, etc.) se mantenga en la economía durante el mayor tiempo posible, reduciendo al mínimo la generación de residuos. El desarrollo de una economía turística circular podría contribuir a lograr el uso sostenible de los recursos, mejorando la eficiencia de la industria turística y alcanzando el desarrollo sostenible del sector.

Le agradeceríamos nos ayudase contestando unas breves preguntas.

P1.a	¿Dispone el establecimiento hotelero de alguna certificación ambiental o sistema de gestión de la calidad ambiental?			
☐1	Sí	☐2	No	**-->Ir a P2**

P1.b	**Señale cual** (todas las que correspondan)				
☐1	ISO 14001	☐2	EMAS	☐3	Cradle to cradle
☐4	Ecolabel	☐5	Otro, indicar:_____		

ECONOMÍA CIRCULAR E INNOVACIÓN

P2	¿Ha llevado a cabo el hotel alguna de las siguientes actividades/ actuaciones/ medidas de economía circular en los últimos 3 años (2016-2019)?					
		No, no hay prevista ninguna actuación en este sentido	No, pero se están planificando	Sí, se han planificado ya acciones en este sentido y están ahora en fase de implementación	Sí, se han llevado a cabo actuaciones en este sentido	NS/NC
a	Re-diseño de la forma en que se utiliza el agua en el hotel para reducir el consumo y/o maximizar su reutilización	☐1	☐2	☐3	☐4	☐5
b	Uso de energías renovables	☐1	☐2	☐3	☐4	☐5
c	Re-diseño del uso y consumo de energía para minimizar su consumo.	☐1	☐2	☐3	☐4	☐5
d	Reducir el volumen de residuos mediante el reciclado, la reutilización de residuos o la venta de los residuos a una tercera empresa.	☐1	☐2	☐3	☐4	☐5
e	Rediseño de los productos o servicios ofrecidos para utilizar materiales reciclados para minimizar el uso de materiales o productos/materiales locales (habitaciones, cocina, restaurantes...)	☐1	☐2	☐3	☐4	☐5
f	Formación a los RR. HH en prácticas circulares y de RSC	☐1	☐2	☐3	☐4	☐5

P3. ¿Qué porcentaje de la facturación anual del hotel se ha destinado a la puesta en marcha de medidas/actuaciones de economía circular en los últimos 3 años?									
☐1	0%	☐2	Entre 1 y 5%	☐3	Entre 6 y 10%	☐4	11% o más	☐5	NS/NC

P4	Marque en una escala de 1 a 5, siendo 1 totalmente en desacuerdo y 5 totalmente de acuerdo, las Razones u Objetivos perseguidos con la introducción o puesta en marcha de medidas de economía circular en los últimos 3 años					
		1: totalmente en desacuerdo				**5: totalmente de acuerdo**
a	Exigencia del Tour-Operador	☐1	☐2	☐3	☐4	☐5

b	Incrementar la imagen de marca	□1	□2	□3	□4	□5
c	Responder a demanda de los clientes	□1	□2	□3	□4	□5
d	Ahorrar costes	□1	□2	□3	□4	□5
e	Estrategia corporative	□1	□2	□3	□4	□5
f	Otros	□1	□2	□3	□4	□5

P5	**Marque en una escala de 1 a 5, siendo 1 totalmente en desacuerdo y 5 totalmente de acuerdo, las barreras encontradas en la implantación de medidas de economía circular-innovación en los últimos 3 años (Posibilidad de Respuesta Múltiple)**					
		1: totalmente en desacuerdo				**5: totalmente de acuerdo**
a	Falta de recursos humanos	□1	□2	□3	□4	□5
b	Falta de experiencia en el personal para implementar dichas actividades/actuaciones	□1	□2	□3	□4	□5
c	Burocracia para implementar estas actuaciones.	□1	□2	□3	□4	□5
d	Alto coste de implementar estas actuaciones y cumplir estándares.	□1	□2	□3	□4	□5
e	Dificultades de financiación para llevarlas a cabo.	□1	□2	□3	□4	□5
f	Desconocimiento o falta de información	□1	□2	□3	□4	□5
g	Otras: _____	□1	□2	□3	□4	□5
h	NS/NC	□1	□2	□3	□4	□5

P6	**Marque en una escala de 1 a 5, siendo 1 totalmente en desacuerdo y 5 totalmente de acuerdo, las razones para la no puesta en marcha de medidas/actuaciones de economía circular en los últimos 3 años (Posibilidad de Respuesta Múltiple)**					
		1: totalmente en desacuerdo				**5: totalmente de acuerdo**
a	Falta de recursos humanos	□1	□2	□3	□4	□5
b	Falta de experiencia en el personal para implementar dichas actividades/actuaciones	□1	□2	□3	□4	□5
c	Burocracia para implementar estas actuaciones.	□1	□2	□3	□4	□5
d	Alto coste de implementar estas actuaciones y cumplir estándares.	□1	□2	□3	□4	□5
e	Dificultades de financiación para llevarlas a cabo.	□1	□2	□3	□4	□5
f	Desconocimiento o falta de información	□1	□2	□3	□4	□5
g	Otras: _____	□1	□2	□3	□4	□5
h	NS/NC	□1	□2	□3	□4	□5

ECONOMÍA CIRCULAR: AGUA y ENERGÍA

P7	**¿Con qué frecuencia lleva a cabo las siguientes acciones en su establecimiento hotelero?**						
		Nunca	Muy pocas veces	Algunas veces	Casi siempre	Siempre	No es aplicable

a	Duchas de bajo consumo en las habitaciones	$?_1$	$?_2$	$?_3$	$?_4$	$?_5$	$?_6$
b	Cisternas con doble pulsación o descarga parcial	$?_1$	$?_2$	$?_3$	$?_4$	$?_5$	$?_6$
c	Grifos temporizados o de activación por célula	$?_1$	$?_2$	$?_3$	$?_4$	$?_5$	$?_6$
d	Recoger el agua de lluvia para riego de jardines	$?_1$	$?_2$	$?_3$	$?_4$	$?_5$	$?_6$
e	Depurar aguas residuales y dedicarlas al riego de jardines	$?_1$	$?_2$	$?_3$	$?_4$	$?_5$	$?_6$
f	Utilizar riego por goteo, exudación o aspersión	$?_1$	$?_2$	$?_3$	$?_4$	$?_5$	$?_6$
g	Plantas autóctonas o de secano en jardines	$?_1$	$?_2$	$?_3$	$?_4$	$?_5$	$?_6$
h	Uso de aguas grises para jardines	$?_1$	$?_2$	$?_3$	$?_4$	$?_5$	$?_6$
i	Regar en horas de baja insolación	$?_1$	$?_2$	$?_3$	$?_4$	$?_5$	$?_6$
j	Sistema ecológico de cloración de la piscina	$?_1$	$?_2$	$?_3$	$?_4$	$?_5$	$?_6$
k	Limpieza diaria de la piscina	$?_1$	$?_2$	$?_3$	$?_4$	$?_5$	$?_6$
l	Medir los consumos energéticos de todos los departamentos del hotel y realizar un seguimiento periódico de los mismos	$?_1$	$?_2$	$?_3$	$?_4$	$?_5$	$?_6$
m	Disponer de sistemas de control de la energía	$?_1$	$?_2$	$?_3$	$?_4$	$?_5$	$?_6$
n	Luces con sistemas de detección que se activen y desactiven automáticamente	$?_1$	$?_2$	$?_3$	$?_4$	$?_5$	$?_6$
o	Habitaciones dotadas con tarjeta para desconectar la energía cuando el huésped no se encuentre en la habitación	$?_1$	$?_2$	$?_3$	$?_4$	$?_5$	$?_6$
p	Utilizar lámparas de bajo consumo	$?_1$	$?_2$	$?_3$	$?_4$	$?_5$	$?_6$
q	Aire acondicionado y/o calefacción que puedan ser desconectados por los clientes	$?_1$	$?_2$	$?_3$	$?_4$	$?_5$	$?_6$
r	Disponer de puertas giratorias en la entrada del hotel	$?_1$	$?_2$	$?_3$	$?_4$	$?_5$	$?_6$
s	Contar con paneles solares suficientes para electricidad y calentamiento de agua	$?_1$	$?_2$	$?_3$	$?_4$	$?_5$	$?_6$
t	Contar con una buena ventilación y aislamiento térmico	$?_1$	$?_2$	$?_3$	$?_4$	$?_5$	$?_6$
u	No bajar el termostato del aire acondicionado a menos de 22ºC	$?_1$	$?_2$	$?_3$	$?_4$	$?_5$	$?_6$
v	Utilizar el grupo electrógeno de emergencia para suprimir picos	$?_1$	$?_2$	$?_3$	$?_4$	$?_5$	$?_6$
w	Aprovechar al máximo la luz natural	$?_1$	$?_2$	$?_3$	$?_4$	$?_5$	$?_6$
x	Evitar iluminación excesiva de exteriores	$?_1$	$?_2$	$?_3$	$?_4$	$?_5$	$?_6$
y	Adaptar la temperatura del agua de calefacción según la temperatura exterior	$?_1$	$?_2$	$?_3$	$?_4$	$?_5$	$?_6$
z	Mantenimiento y limpieza de las instalaciones energéticas	$?_1$	$?_2$	$?_3$	$?_4$	$?_5$	$?_6$
ç	Otras	$?_1$	$?_2$	$?_3$	$?_4$	$?_5$	$?_6$

P8	Señale aquellas buenas prácticas hoteleras no contempladas anteriormente en gestión del agua y/o energía que se aplican en el establecimiento hotelero

P9	De acuerdo a su opinión, valore el grado de compromiso en gestión del agua y energía del establecimiento hotelero	1 (nada) a 5 (total) _____

ECONOMÍA CIRCULAR Y RESIDUOS

P10	¿Con qué frecuencia se reciclan los siguientes productos en su establecimiento hotelero?						
		Nunca	Muy pocas veces	Algunas veces	Casi siempre	Siempre	Indique porcentaje aproximado de reciclaje anual
a	Vidrio	☐1	☐2	☐3	☐4	☐5	_____
b	Papel y carton	☐1	☐2	☐3	☐4	☐5	_____
c	Aceite	☐1	☐2	☐3	☐4	☐5	_____
d	Envases de plastic	☐1	☐2	☐3	☐4	☐5	_____
e	Residuos orgánicos de cocina	☐1	☐2	☐3	☐4	☐5	_____
f	Residuos orgánicos de jardines	☐1	☐2	☐3	☐4	☐5	_____
g	Ropa de cama, toallas	☐1	☐2	☐3	☐4	☐5	_____
h	Pilas	☐1	☐2	☐3	☐4	☐5	_____
i	Electrodomésticos	☐1	☐2	☐3	☐4	☐5	_____
j	Ordenadores, impresoras	☐1	☐2	☐3	☐4	☐5	_____
k	Muebles y ensures	☐1	☐2	☐3	☐4	☐5	_____
l	Otros residuos (indicar cuál): _____	☐1	☐2	☐3	☐4	☐5	_____

P11.a	INDIQUE el grado de acuerdo con cada una de las siguientes afirmaciones						
	NO SE RECICLA MÁS EN EL ESTABLECIMIENTO HOTELERO PORQUE…	1: totalmente en desacuerdo				5: totalmente de acuerdo	
a	… no podemos reciclar más, ya reciclamos todo lo que se puede reciclar	☐1	☐2	☐3	☐4	☐5	
b	… no tengo contenedores cerca proporcionados por el Ayuntamiento	☐1	☐2	☐3	☐4	☐5	
c	… no hay un servicio de reciclaje previsto por el Ayuntamiento	☐1	☐2	☐3	☐4	☐5	

d	… creo que al final juntan todos los residuos y no se reciclan	□1	□2	□3	□4	□5
e	… los clientes no lo solicitan/valoran	□1	□2	□3	□4	□5
f	… los tour operadores con los que trabajamos no lo solicitan	□1	□2	□3	□4	□5
g	…supone un alto coste	□1	□2	□3	□4	□5

P11.b	**INDIQUE SU GRADO DE ACUERDO con …**					
		1: totalmente en desacuerdo				**5: totalmente de acuerdo**
a	Nos gustaría que hubiera un quinto contenedor para reciclar los residuos orgánicos	□1	□2	□3	□4	□5
b	Nos gustaría que el Ayuntamiento dispusiera un servicio de reciclaje de _____ (Indicar el residuo)	□1	□2	□3	□4	□5
c	Nos gustaría que la administración ofreciera incentivos para aplicar prácticas circulares (desgravaciones fiscales, ayudas a la implementación y medidas de eco-innovación, etc.)	□1	□2	□3	□4	□5

P12	**¿Con qué frecuencia lleva a cabo las siguientes acciones en su establecimiento hotelero?**					
		Nunca	Muy pocas veces	Algunas veces	Casi siempre	Siempre
a	Utiliza papel blanco o reciclado	□1	□2	□3	□4	□5
b	Evitar el papel de aluminio	□1	□2	□3	□4	□5
c	Evitar el uso de productos de un solo uso	□1	□2	□3	□4	□5
d	Compra de productos a granel	□1	□2	□3	□4	□5
e	Reducción de envases	□1	□2	□3	□4	□5
f	Optar por envases retornables	□1	□2	□3	□4	□5
g	Utilización de bolsas de basura compostables	□1	□2	□3	□4	□5
h	Priorizar la compra de productos de limpieza naturales	□1	□2	□3	□4	□5
i	Uso de pesticidas naturales	□1	□2	□3	□4	□5
j	Separación de aceites y grasas	□1	□2	□3	□4	□5
k	Ofrecer menús cerrados en los restaurantes para reducir el desperdicio de comida	□1	□2	□3	□4	□5
l	Priorizar la reparación a la sustitución	□1	□2	□3	□4	□5
m	Priorizar el alquiler de equipos en vez de la compra	□1	□2	□3	□4	□5
n	Compostaje de residuos orgánicos	□1	□2	□3	□4	□5
o	Dispone de contenedores de reciclaje	□1	□2	□3	□4	□5
p	Dispone de un sistema de incentivos o premios a los clientes para fomentar el reciclaje en el hotel	□1	□2	□3	□4	□5
q	Otras	□1	□2	□3	□4	□5

P13	Señale aquellas buenas prácticas hoteleras en reciclaje no contempladas que se aplican en el establecimiento hotelero:

P14	De acuerdo a su opinión, valore el grado de compromiso en reciclaje del establecimiento hotelero:	1 (nada) a 5 (total) _____

ECONOMÍA CIRCULAR: POLÍTICA DE PERSONAL Y RSC

P15	¿Con qué frecuencia lleva a cabo las siguientes acciones en su establecimiento hotelero?					
		Nunca	Muy pocas veces	Algunas veces	Casi siempre	Siempre
a	Empleados reciben formación sobre prácticas de economía circular y concienciación medioambiental	☐1	☐2	☐3	☐4	☐5
b	Empleados pueden participar de la política medioambiental	☐1	☐2	☐3	☐4	☐5
c	Compra de productos locales	☐1	☐2	☐3	☐4	☐5
d	Relación con proveedores y productores locales	☐1	☐2	☐3	☐4	☐5
e	Se sensibiliza a los proveedores de la política medioambiental de la empresa	☐1	☐2	☐3	☐4	☐5
f	La empresa tiene recogidas sus buenas prácticas medioambientales y las publicita entre su personal y clientes	☐1	☐2	☐3	☐4	☐5
g	Recaudación para acciones medioambientales	☐1	☐2	☐3	☐4	☐5
h	Relación con asociaciones con fines medioambientales	☐1	☐2	☐3	☐4	☐5
i	Se promueve que los clientes realicen actividades de ocio medioambientalmente sostenibles	☐1	☐2	☐3	☐4	☐5
j	Incentivan un transporte más sostenible	☐1	☐2	☐3	☐4	☐5
k	Cuenta con parking para clientes	☐1	☐2	☐3	☐4	☐5
l	Participan en acciones de recuperación medioambiental	☐1	☐2	☐3	☐4	☐5
m	Se ofrece información a los clientes sobre el entorno	☐1	☐2	☐3	☐4	☐5
n	Recompensa a los empleados por responsabilidad medioambiental	☐1	☐2	☐3	☐4	☐5
o	Otras	☐1	☐2	☐3	☐4	☐5

P16	Señale aquellas buenas prácticas hoteleras no contempladas en política de personal y RSC que se aplican en el establecimiento hotelero:

P17	De acuerdo a su opinión, valore el grado de compromiso en política de personal y RSC del establecimiento hotelero:	1 (nada) a 5 (total) _____

P18.	¿Ha tenido en cuenta el establecimiento hotelero el ecodiseño en la construcción del mismo?	
☐ 1	Sí -->	Valore en qué medida se ha tenido en cuenta, de 0 (nada) a 5 (mucho): _____
☐ 2		No

INFORMACIÓN DEL ENTREVISTADO y HOTEL

19. Indique su edad:	

20. Cargo dentro de la Empresa:					
☐ 1	Director del Hotel	☐ 2	Sub-director del Hotel	☐ 3	Jefe de área o departamento, indicar cuál _____
☐ 4	Otro, indicar cuál: _____				

P21. Nivel de estudios más alto completado:					
☐ 1	Sin studios	☐ 2	Estudios primarios	☐ 3	Secundaria
☐ 4	Bachillerato o FP	☐ 5	Universitario	☐ 6	Prefiero no contestar

P22. Tamaño del establecimiento hotelero:	Nº de habitaciones:_____ Nº de camas:_____

P23. Indique la antigüedad del Hotel:	_____ (en años)

P24. Independiente/cadena:	☐ 1 Hotel Independiente ☐ 2 Perteneciente a una Cadena

P25. Tipo de sistema de propiedad:					
☐ 1	Propiedad	☐ 2	Contrato de Gestión	☐ 3	Franquicia

P26. Categoría del establecimiento hotelero:					
☐ 1	5 estrellas	☐ 2	4 estrellas	☐ 3	3 estrellas
☐ 4	2 estrellas/2 palmeras	☐ 5	1 estrella/1 palmera		

P27.	Tipología de establecimiento hotelero				
☐ 1	Hotel de sol y playa (vacacional)	☐ 2	Hotel urbano	☐ 3	Agro-turismo
☐ 4	Hotel rural	☐ 5	Otro, indicar: _____		

P28. Nombre del establecimiento hotelero:	

P29. Municipio donde está ubicado:	

P30. Finalmente, de acuerdo a su opinión, valore el grado de compromiso medioambiental del hotel:	1 (nada) a 5 (total) _____

MUCHAS GRACIAS POR SU COLABORACIÓN


ULPGC
Universidad de
Las Palmas de
Gran Canaria