TESIS DOCTORAL

SOCIAL NETWORK ANALYSIS IN TOURISM FOR IMPROVING MARKETING STRATEGIES
Understanding tourists' behaviour through their customer journey

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"A mis padres"

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CONTENTS

RESUMEN

La presente tesis tiene por objetivo llegar a una mejor comprensión del comportamiento de los turistas en ciertas etapas del *customer journey* (viaje del cliente). Se compone de tres capítulos, divididos a su vez en dos partes: la primera, compuesta por los dos primeros capítulos, analiza el comportamiento del consumidor en relación a la búsqueda de información sobre los destinos turísticos antes de viajar; y la segunda parte, correspondiente al tercer capítulo, analiza el comportamiento del turista durante el viaje. En los tres capítulos se emplea la metodología de análisis de redes sociales (SNA), la cual nos permite estudiar las interrelaciones existentes entre los diferentes agentes turísticos. Tanto el análisis del comportamiento del turista como la metodología SNA actúan como hilo conductor durante los diferentes capítulos, permitiendo así llegar al objetivo final, un mejor entendimiento del comportamiento del turista antes y durante su viaje, y de las interrelaciones de los agentes que forman parte de este sector. La presente investigación puede ayudar tanto a las organizaciones públicas como a las privadas a dar respuesta a algunos de los problemas a los que se enfrenta el sector turístico.

Introducción

La investigación en turismo ha experimentado un crecimiento significativo en los últimos años, y cada vez existen más revistas especializadas y artículos publicados en relación a dicho sector. En el siglo XXI el turismo se ha posicionado en muchos países como el principal motor de la economía, siendo en la actualidad uno de los sectores con mayor crecimiento económico de ámbito mundial (Brunelli, Macedo-Soares, Zouain y Borges, 2010; Rivera y Upchurch, 2008; Sokhanvar, 2019; Sokhanvar, Çiftçioğlu y Javid, 2018; WTTC, 2019).

Las llegadas de turistas internacionales han pasado de 25 millones en 1950 a 1.400 millones en 2018, y los ingresos actuales por turismo internacional son de 1.541.628 millones de euros movilizando una gran cantidad de ingresos y viajeros (UNWTO, 2019) y el 10% del PIB mundial ha sido generado por el turismo (UNWTO, 2018).

Europa lleva 8 años consecutivos de crecimiento sostenido, siendo la región más visitada del mundo. Las llegadas de turistas internacionales aumentaron un 6% entre 2017 y 2018, alcanzando un total de 713 millones, 41 millones de turistas más que en el año anterior. Al igual que las llegadas, también crecieron los ingresos un 8% en 2017. Europa recibe (receptor) el 51% de las llegadas internacionales y es la región de turismo emisor más importante del mundo, siendo fuente del 48% de las llegadas internacionales a nivel

mundial en 2017 (UNWTO, 2018, 2019). Todo ello, pone de manifiesto la importancia del turismo en Europa y la necesidad de ahondar en el comportamiento del turista europeo, en el que se centrara esta tesis.

Por otro lado, en 2018 llegaron a España 82,8 millones de turistas internacionales, un 1,1% más respecto a 2017, y un 44% más desde 2012. Estos datos se reflejan también en el gasto total realizado por los turistas, el cual ascendió a 89.856 millones de euros, y experimentó un crecimiento del 3,3% respecto a 2017 y del 57,7% respecto a 2012. La importancia del turismo para España también radica en la cantidad de trabajadores afiliados a actividades características del turismo. Existiendo en 2018 2,4 millones de trabajadores afiliados a la seguridad social en actividades turísticas, un 4% más que en 2017 (Turespaña, 2019).

Las Islas Canarias recibieron 13.751.914 turistas en 2018 (IET, 2019) ocupando el 2º puesto entre las Comunidades Autónomas más competitivas según el "Informe Monitur 2018". Además, el turismo aporta el 35,2% del PIB (15.573 millones de euros) y el 40,3% del empleo, generando 326.970 puestos de trabajo (Impactur, 2018). Estos datos, muestran la importancia del turismo y de la investigación turística para el desarrollo regional.

Una vez aceptada la premisa de la importancia del turismo, la cuestión sobre la que versa esta tesis es conocer mejor cómo actúan y cómo se interrelacionan los diferentes agentes turísticos. Esta inquietud surge porque los destinos son considerados sistemas complejos de intercambio y de relaciones (Pavlovich, 2003; Sainaghi y Baggio, 2014) entre agentes turísticos, formando así una red (Hogan, 2008). Estas redes son conocidas como redes sociales cuando los agentes son personas, organizaciones, grupos, etc. Dichas relaciones son un elemento fundamental en la comprensión del ecosistema turístico. Surge aquí la siguiente pregunta ¿Cómo podríamos analizar este sistema complejo de relaciones en el sector turístico?

Se necesitan nuevas herramientas para analizar y comprender las relaciones existentes entre los diferentes agentes turísticos (Stienmetz y Fesenmaier, 2015). Merinero-Rodríguez y Pulido-Fernández (2016) destacan seis líneas metodológicas de investigación adecuadas para estudiar y entender mejor los aspectos relacionales en turismo, destacando la línea de redes turísticas. Consideramos que tiene gran capacidad para analizar el sistema turístico y las relaciones existentes entre los diversos agentes

presentes en el sector. En una línea similar, hay muchos autores que destacan la importancia y la utilidad del análisis de redes en la investigación turística (Baggio, Scott y Cooper, 2010; Baggio, Scott y Wang, 2007), y su gran potencial para mejorar el entendimiento de las relaciones entre los agentes turísticos (Merinero-Rodríguez y Pulido-Fernández, 2016; Scott, Cooper y Baggio, 2007).

El término general de SNA incluye diversas técnicas cuantitativas que ayudan a estudiar las características de las interacciones entre diferentes nodos (Wasserman y Faust, 1994) y revelan la importancia de estos vínculos. Al aplicar métodos cuantitativos al análisis de relaciones en turismo se ponen en relieve nuevas características de este sector que hasta el momento no se habían tenido en cuenta. El SNA se ha convertido en un tópico importante para la literatura turística (Baggio, 2017; Baggio, 2018; Scott, Cooper y Baggio, 2007) permitiendo explicar el fenómeno turístico desde un nuevo punto de vista, observando y analizando las relaciones entre los agentes del sector.

Aunque hay algunos investigadores que han utilizado conceptos teóricos de redes en el campo del turismo, los estudios que aplican dicho análisis en este sector son aún bastante recientes (Baggio, Scott y Cooper, 2010; Casanueva et al., 2016). Esta metodología ha sido utilizada en turismo desde diferentes enfoques como representación de redes (Baggio, 2013; Baggio, Scott, y Wang, 2007; Brás, Costa y Buhalis, 2010; González-Díaz et al., 2015; McLeod, Vaughan y Edwards, 2010; Pavlovich, 2003; Pforr, 2006; Shih, 2006; Tasci, Khalilzadeh y Uysal, 2019; Wang, Li y Lai, 2017), detección de actores clave en la red (centralidades) (Baggio, 2013; Baggio, Scott, y Wang, 2007; Bendle y Patterson, 2010; Beritelli, 2011; González-Díaz et al., 2015; McLeod, Vaughan y Edwards, 2010; Pavlovich, 2003; Shih, 2006; Tasci, Khalilzadeh y Uysal, 2019; Wang, Li y Lai, 2017), medición de diversos indicadores de conexión, tamaño, densidad y concentración de la red turística (Baggio, 2013; Baggio, Scott, y Wang, 2007; Bendle y Patterson, 2010; Brás, Costa y Buhalis, 2010; González-Díaz et al., 2015; McLeod, Vaughan y Edwards, 2010; Pansiri, 2009; Pavlovich, 2003; Pforr, 2006; Wang, Li y Lai, 2017), detección de grupos dentro de la red (Baggio, 2013; Baggio, Scott, y Wang, 2007; Bendle y Patterson, 2010; Hernández, Kirilenko and Stepchenkova, 2018; Kirilenko, Stepchenkova and Hernandez, 2019; Pforr, 2006; Wang, Li y Lai, 2017) y, finalmente, búsqueda de patrones de comportamiento de los turistas (Asero, Gozzo y Tomaselli, 2016; Hwang, Gretzel y Fesenmaier, 2006; Smallwood, Beckley y Moore, 2012; Stienmetz y Fesenmaier, 2015; Wang, Li y Lai, 2017; Zach y Gretzel, 2011). Por otro

lado, algunos investigadores aplicaron el SNA y el análisis de la imagen junto con asociaciones libres para estudiar las percepciones de los turistas sobre la imagen de destinos (Tasci, Khalilzadeh y Uysal, 2019) y también para identificar patrones de recuperación de la imagen y la conexión entre los elementos de la imagen de destino (Wang, Li y Lai, 2017).

Basándonos en estudios previos se puede afirmar que la ventaja del SNA sobre otras metodologías, se fundamenta en el uso de la información completa sobre las relaciones entre los distintos agentes turísticos y la integración de relaciones complejas. Además, se observa que esta metodología es útil y eficiente para estudiar diferentes aspectos turísticos y proponer enfoques y respuestas novedosas con respecto al turismo. Asimismo, proporciona métricas cuantitativas para analizar redes, los nodos que la conforman y las relaciones, entre estos (Borgatti et al., 2013). En la presente tesis se aplica el SNA para analizar las relaciones entre los diferentes actores: plataformas turísticas digitales, actividades y atracciones del destino, y turistas. Para una mejor claridad en la narrativa, y pese a que la metodología general (SNA) es común, en cada capítulo se menciona y explica la misma para facilitar su lectura y comprensión concreta por separado.

El conjunto de las investigaciones aquí realizadas ha supuesto el desarrollo de múltiples trabajos de campo, con encuestas a amplias muestras representativas que permitieran el estudio en red que se pretendía. El uso de varias bases de datos de este carácter permite obtener una visión más profunda y detallada sobre el tema a tratar.

Justificación del tema

Como se menciona en el prólogo, la presente tesis nace de la inquietud por entender mejor a los turistas y su comportamiento (en el campo del comportamiento del consumidor y el marketing) en las diferentes etapas del *customer journey* (viaje del cliente). Para ello, el SNA nos permite explorar los entresijos de las interrelaciones existentes entre los diversos agentes presentes en el sector turístico. Esto proporcionará mejores respuestas a los problemas a los que se enfrentan las organizaciones públicas y privadas en diferentes etapas del *customer journey*.

Analizar el *customer journey* ayuda a entender el ciclo completo del comportamiento del consumidor ya que se tiene en cuenta tanto la etapa previa como la experiencia durante el viaje (Lemon y Verhoef, 2016; Stickdorn y Zehrer, 2009). Este análisis se considera fundamental para que las empresas y los destinos tengan éxito, sobre todo en el sector

turístico (Stickdorn y Schwarzenberger, 2016). La etapa previa al viaje es una parte importante del análisis del consumidor ya que es donde se toman las decisiones principales de reserva que determinarán en gran medida el resto del proceso. En segundo lugar, durante la experiencia de viaje aparecen una gran variedad de partes interesadas (stakeholders) que influyen sobre el consumidor y lo convierten en un servicio complejo (Stickdorn y Zehrer, 2009) con múltiples interacciones en red. Una vez finalizado el viaje se puede seguir analizando al consumidor a través de sus percepciones, tales como la imagen y su satisfacción (Prebensen, Chen y Uysal, 2018; Yachin, 2018). Así, el *customer journey* se convierte en un ciclo iterativo y dinámico, donde no todos los procesos están bajo el control de las empresas o los destinos (Lemon y Verhoef, 2016), y exige un mayor conocimiento de las dinámicas de redes que se producen para poder gestionar este complejo ecosistema turístico.

Con el objetivo de comprender mejor el comportamiento del consumidor en turismo a través del SNA, esta tesis se estructura en tres capítulos, divididos en dos partes. En los dos primeros capítulos se analiza el comportamiento del turista antes del viaje y en el tercer capítulo se estudia su comportamiento durante el viaje. Se abordan los siguientes temas específicos:

1) Análisis del uso de las principales plataformas del e-tourism (turismo digital) por los turistas europeos para informarse sobre los posibles destinos a visitar antes de realizar su viaje, y así detectar actores clave en la red y analizar las relaciones entre plataformas dentro del complejo ecosistema turístico digital.

2) Comprensión de las diferencias en el uso de plataformas digitales por parte de los turistas pertenecientes a las principales generaciones (Y, X y Baby Boomers) y la forma en que estos turistas interactúan en la denominada economía de plataforma (economía colaborativa).

3) Identificación de patrones de gasto turístico en relación con la red de actividades que realizan los turistas en destino, para alcanzar un mejor entendimiento del portfolio de actividades a gestionar por los destinos.

Los temas presentados anteriormente suponen un ambicioso conjunto de tópicos de gran relevancia y actualidad para el turismo (economía colaborativa, diferencias intergeneracionales, plataformas digitales en el ecosistema turístico europeo, etc.). El objetivo final perseguido en esta tesis es contribuir a una mejor comprensión del

comportamiento del turista, las etapas de su viaje y las interrelaciones de diferentes agentes del sector turístico.

Objetivos y resumen de cada capítulo

Los dos primeros capítulos estudian la etapa inicial del viaje de los turistas, es decir, el momento de búsqueda de información antes de emprender un viaje. En concreto, el primer capítulo, *"Understanding European tourists' use of e-tourism platforms. Analysis of networks"*, indaga en cómo se informan los turistas sobre los posibles destinos a visitar antes de viajar. Dicha preocupación surge porque la industria turística ha cambiado de forma radical desde la aparición de Internet (Baggio y Del Chiappa 2014) y, como consecuencia, cada vez se tiene acceso a una mayor gama de fuentes de información online, convirtiendo la búsqueda de información en un proceso complejo. Todo ello, ha generado un ecosistema digital muy dinámico y complejo, donde cada vez más plataformas interactúan en la provisión de información y en la conexión de los turistas. Como resultado, el sector turístico ha sufrido profundos cambios vinculados a la transformación de la estructura de distribución y al comportamiento del turista. En este contexto, el objetivo general de este capítulo es comprender de forma novedosa el comportamiento de los turistas europeos en relación al uso que hacen de las plataformas del e-tourism para elegir su próximo destino y sus implicaciones en la gestión y marketing de destinos.

Existe un vacío de conocimiento que trate de forma conjunta las plataformas y sus interconexiones. Estudios anteriores analizaron las interrelaciones entre proveedores (Baggio, 2007; Piazzi et al. 2011, 2012) sin tener en cuenta al turista y el uso que este hace de las plataformas web para reservar sus vacaciones. Entender este nuevo escenario de interrelaciones exige nuevas técnicas analíticas. Por ello, en el presente trabajo se emplea el análisis de redes, ya que permite integrar relaciones complejas como el ecosistema del e-tourism y ayuda a arrojar luz sobre las interacciones entre plataformas y turistas (Baggio et al. 2010; Fuchs et al. 2014). Es más, esta metodología contribuye a tener una visión clara de las relaciones entre diferentes sitios web ya que permite representar visualmente las redes e identificar la relevancia de cada plataforma con respecto al resto.

Al avanzar en esta investigación, surgió el interés por entender mejor la red europea de e-tourism, analizando las redes de 19 países europeos por separado. De esta manera, el

estudio proporciona información para entender las peculiaridades de los principales mercados europeos de forma individualizada. Los resultados ayudan a entender mejor las características del turismo europeo digital y a identificar las plataformas clave que conectan la red europea de e-tourism.

Alcanzar un mayor entendimiento de cómo los turistas europeos utilizan las fuentes de información para elegir su próximo destino de viaje es un factor estratégico para su éxito. Los resultados obtenidos a partir de este primer estudio son útiles para las empresas, las Organizaciones de Marketing de Destinos (OMDs) y para los proveedores turísticos (hoteles, aerolíneas, etc.), ya que ayudan a comprender cómo están conectadas las plataformas de e-tourism y a diseñar una estrategia, entre otras, de segmentación, comunicación y distribución a través de dichas plataformas en el mercado europeo.

El primer capítulo, confirma la importancia de internet en la distribución turística y el surgimiento de un nuevo ecosistema de plataformas, donde aparecen nuevas alternativas con gran poder de transformación. En este sentido, el segundo capítulo, *"Sharing Economy and the Generation Effect: Platform economy and the tourism ecosystem"*, tiene como principal objetivo profundizar en el conocimiento del comportamiento de búsqueda de información por parte de los turistas, y el papel que tiene la economía de plataformas (colaborativa) según generaciones.

Las plataformas han llevado las relaciones *peer-to-peer* (de igual a igual) al modelo *online*, reemplazando los intermediarios tradicionales, facilitando la aparición de plataformas digitales y cambiando la forma en que las personas viajan (Heo, 2016). La economía colaborativa ha ido ganando fuerza dentro del sector turístico (Decrop, Del Chiappa, Mallargé, y Zidda, 2018), convirtiéndose en un importante competidor para los proveedores tradicionales de bienes y servicios.

Los turistas no solo utilizan las plataformas de economía colaborativa por motivos económicos (Guttentag, 2015; Tussyadiah, 2015), sino que también las utilizan por otros motivos como utilidad, confianza, reducción de costes, familiaridad (Möhlmann, 2015) o aspectos sociales relacionados con sostenibilidad y comunidad (Tussyadiah, 2015). Además, Tussyadiah (2015) fundamentó que "El consumo colaborativo penetra en el mercado no solo como una alternativa de alojamiento de bajo coste, sino más bien como una nueva forma de viajar". Varios estudios han analizado la economía colaborativa desde diferentes puntos de vista (Belk, 2014; Decrop et al., 2018; Lamberton y Rose, 2012;

Möhlmann, 2015; Guttentag, 2015; Zervas, Proserpio y Byers, 2014). Sin embargo, estos trabajos no analizan la interacción entre las nuevas plataformas y su relación con intermediarios tradicionales, así como las diferencias intergeneracionales entre turistas.

Las plataformas de economía colaborativa (Airbnb, TripAdvisor, etc.), las plataformas tradicionales (líneas aéreas, hoteles, turoperadores) y las *startups* (nuevas empresas en internet) no turísticas (Google, redes sociales, etc.) coexisten y compiten (Edvardsson, Gustafsson, Kristensson, y Witell, 2010) creando redes entre usuarios y proveedores, en el nuevo ecosistema digital (Acquier, Dudigeos y Pinkse, 2017). Por ello, comprender en qué punto se encuentra la economía colaborativa dentro de este ecosistema es crucial para desarrollar estrategias de marketing. Es más, entender cómo actúan las diferentes generaciones dentro de este ecosistema es relevante para gestionar adecuadamente la promoción de los productos o servicios turísticos (Chaney, Touzani, y Slimane, 2017; Lösing, 2016; Valentine y Powers, 2013).

Para una mejor comprensión de las conexiones entre plataformas y turistas, se decidió aplicar el SNA para una red de 19 países europeos. Este análisis nos llevó a plantearnos cómo continúan las relaciones en red durante el disfrute de sus vacaciones, donde los turistas se relacionan con diferentes atracciones y actividades.

En consecuencia, el tercer capítulo de la presente tesis, *"Understanding tourists' leisure expenditure at the destination: a social network analysis"*, analiza el comportamiento del turista durante su visita al destino. El objetivo concreto es entender los patrones de gasto de los turistas en relación con las actividades que realizan en el destino, y cómo la centralidad (importancia de un individuo o una actividad en particular) influye en el gasto en destino. Esta preocupación se debe a la importancia que tiene el gasto realizado por los turistas directamente en destino sobre los ingresos totales de los destinos (Brida y Scuderi, 2013; Hung, Shang y Wang, 2012; Pouta et al., 2006; Pulido-Fernández, Cárdenas García y Carrillo-Hidalgo, 2016; Thrane y Farstad, 2012). El estudio profundiza en el tipo de actividad, la frecuencia y el momento en el que se realiza durante las vacaciones (durante los dos primeros días, entre el tercer y el último día, o en cualquier momento).

La principal contribución de este estudio es el análisis conjunto de las actividades y los turistas. Por lo tanto, no se aplica un enfoque tradicional de gestión de productos, sino que se examina la cartera de actividades desde la perspectiva de los turistas, siguiendo las

recomendaciones de Vargo y Lusch (2004). Ayudando así a mejorar la gestión de marketing y la planificación del mercado y a maximizar los ingresos en destino a través una nueva metodología para analizar los patrones de gasto turístico. Este estudio abre nuevos interregoantes y futuras líneas para seguir profundizando en las implicaciones posteriores tras la visita al destino.

En resumen, la presente tesis pretende llegar a un mejor entendimiento del comportamiento del turista durante el *customer journey* a través de una metodología común, el SNA. Dicha técnica analítica se complementa con otros análisis estadísticos (regresión múltiple), pruebas de diferencias/heterogeneidad (prueba U de Mann-Whitney), etc. Las técnicas de investigación empleadas para recabar la información empleada en los estudios fueron cuestionarios estructurados realizados antes y durante la visita del turista al destino, consiguiendo una amplia muestra de más de 13.000 turistas, con casi 500 plataformas analizadas, 35 actividades en destino, y que abarca la multiculturalidad a través de 19 países europeos.

Además de las conclusiones específicas en cada capítulo, la tesis culmina con algunas conclusiones generales. Asimismo, esta última sección incluye las principales contribuciones, implicaciones y recomendaciones. Finalmente, se sugieren algunas limitaciones y retos de futuro.

Conclusiones

En la presente tesis, se pone de manifiesto la importancia de analizar el comportamiento del consumidor teniendo en cuenta las interconexiones entre los múltiples agentes pertenecientes al sector turístico durante las diferentes etapas del *customer journey*: cómo actúa el turista antes y durante su viaje ya que es un ciclo iterativo y dinámico (Lemon y Verhoef, 2016).

Las principales conclusiones generales derivadas del primer capítulo son:

1) La búsqueda de las fuentes de información más importantes para el ecosistema del e-turism, se identificaron cuatro plataformas clave pertenecientes a la red europea de plataformas: Google, Facebook, Booking y TripAdvisor, donde Google es considerado como la principal puerta de entrada a ese ecosistema. Ninguna de estas plataformas corresponde a los agentes tradicionales del sector.

2) El comportamiento de los turistas europeos en términos de búsqueda de información sobre destinos turísticos varía según la nacionalidad. Europa se puede

describir, por un lado, como un mercado fragmentado en cuanto a algunas fuentes de información y, por otro lado, como un único mercado para las cuatro grandes plataformas.

3) Metodológicamente, el estudio ayuda a comprender, desde un enfoque innovador, el uso de las plataformas pertenecientes al ecosistema turístico europeo y cómo las plataformas están interconectadas a través de una red compleja.

De manera práctica, las empresas turísticas y las OMDs pueden utilizar la información resultante de este trabajo para mejorar su estrategia de segmentación y comunicación, tanto en los medios convencionales como a través de las redes sociales. Por ejemplo, cuando se trata de las plataformas conocidas como las cuatro grandes (Google, Facebook, Booking y TripAdvisor), los gerentes de destino deben emplear estrategias de marketing comunes para casi todos los países. Los gestores también deberían emplear estrategias de comercialización adaptadas a cada uno de los mercados geográficos estudiados ya que se identificaron diferencias en el uso de las plataformas por países.

Las principales conclusiones generales derivadas del segundo capítulo son:

1) La *digital economy* (economía digital) europea es un sistema complejo en el que coexisten y compiten diferentes tipos de plataformas. Las más importantes para todas las generaciones son Facebook, TripAdvisor, Google y Booking, aunque también se muestran algunas diferencias relevantes en la configuración de redes de cada generación.

2) Algunas de las plataformas de economía colaborativa se encuentran entre las plataformas más importantes del ecosistema europeo de e-turism. No obstante, son menos destacadas de lo que a priori se esperaba. La información compartida a través de estas plataformas se convierte en información para el futuro.

3) Se observan diferencias generacionales en el uso de las plataformas digitales. La generación Y utiliza de forma más frecuente fuentes de información no turísticas, que pueden asociarse con el momento de inspiración. La Generación X suele emplear más comparadores, motores de búsqueda, agencias de viage online (OTAS) y plataformas de economía colaborativa (SE), la mayoría de estas plataformas se asocian a la fase previa a la compra. Finalmente, los Baby Boomers (BB) utilizan más touroperadores y agencias de viajes (TA), las cuales podríamos

asociar con la fase de compra. Las generaciones más jóvenes tienden a usar más plataformas digitales antes del momento de la compra.

Los resultados del segundo capítulo ayudan a diseñar estrategias de marketing específicas para cada generación. Las OMDs deben llevar a cabo sus promociones en ciertos medios dependiendo de la generación objetivo, ya que el comportamiento de búsqueda de información difiere.

Se concluye que a pesar del atractivo de la Generación Y por su gran interacción con las redes, las acciones de marketing no pueden olvidar a la Generación X, ya que buscan personalización y calidad y tienen mayor poder adquisitivo. Sin embargo, si lo que se pretende es atraer a los Millennials, las empresas deben formar parte de sus vidas forjando vínculos emocionales con ellos motivándolos a través de, por ejemplo, redes sociales y haciéndolos partícipes.

Los dos primeros capítulos tienen grandes implicaciones prácticas en las estrategias de marketing, ya que ayudan a elegir las plataformas clave para llegar a ciertos segmentos de turistas, y también contribuyen a la literatura sobre plataformas de información.

Finalmente se presentan las principales conclusiones generales derivadas del tercer capítulo:

1) Se confirma que tanto el tipo como el número de actividades realizadas en el destino influyen en el gasto turístico total.

2) Los turistas que realizan las actividades más populares se ajustan al patrón del turismo de masas, con un comportamiento homogéneo. Sin embargo, los turistas que realizan actividades más periféricas se ajustan a la definición de "turistas de nicho".

3) También se identificaron algunas actividades conocidas como "actividades de apertura", realizadas principalmente durante los primeros dos días de vacaciones, y que probablemente influyen en la configuración de las actividades realizadas durante el resto de las vacaciones.

Este estudio también implica una contribución metodológica al aplicar el SNA junto con otras técnicas para estudiar las relaciones entre turistas, actividades y gasto. Este análisis ayuda a crear una mejor comprensión de los patrones de comportamiento y una gestión de la cartera de actividades más eficiente.

Los resultados obtenidos en este tercer capítulo, permiten a los gerentes de las OMDs elegir las estrategias a utilizarán para el desarrollo de productos para la cartera de actividades, con el objetivo de aumentar el gasto en destino y los beneficios económicos del turismo para la población local. Se concluyó que los gerentes de destino deben promover el aumento del gasto promedio por actividad de los turistas que realizan actividades más populares y el número de actividades realizadas por los turistas que realizan actividades más periféricas. Por ejemplo, crear paquetes que combinen actividades centrales y periféricas e incorporen algunas "actividades exclusivas" (que no se combinan con otras, como por ejemplo, practicar deportes y visitar lugares remotos) identificadas en el paquete.

Es aconsejable aumentar el papel activo de los turistas después de verificar que las "actividades pasivas y contemplativas" generan menos gastos por actividad y se realizan con menos frecuencia. Además, las oficinas de información deberían promover activamente actividades que estén más orientadas al gasto, otorgando incentivos al respecto.

Finalmente, se presentan algunas limitaciones de esta tesis y futuras líneas de investigación.

Esta tesis, como todo estudio parcial de un fenómeno social complejo, presenta limitaciones de diversa índole. Entre ellas, destacamos las limitaciones de alcance y metodológicas. Por ejemplo, la tesis no tiene en cuenta todas las etapas del *customer journey*. Hemos abarcado las dos primeras, a falta de profundizar en la etapa posterior al viaje. Metodológicamente, la tesis adolece de un análisis longitudinal debido a la naturaleza dinámica y cambiante del sector. A pesar de incluir varias generaciones, la generación Z no se ha tenido en cuenta, sin embargo, esta generación desempeñará un papel crucial en el futuro del turismo (Haddouche y Salomone, 2018; Skinner, Sarpong y White, 2018). Se podrían haber implementado otras metodologías tradicionales como el análisis cluster o el canonical para complementar los análisis. Por otro lado, sería posible llegar a una mejor comprensión del gasto turístico teniendo en cuenta el gasto por actividad. Se utilizaron diferentes indicadores en la realización de la tesis, sin embargo se podrían incluir otros como los ingresos de los turistas.

Futuros estudios deberían continuar analizando la complejidad de esta red europea antes, durante y después de visitar el destino. Concretamente, proponemos las siguientes futuras líneas de investigación:

1) Incluir indicadores adicionales como tasas de conversión, retorno de la inversión (ROI), precios, ingresos y otras actividades, diferenciar nacionalidades y generaciones durante la visita al destino, e incluir a todas las generaciones en la etapa previa a la visita del destino.

2) Realizar más análisis teóricos y aplicados relacionados con el e-tourism y el análisis de redes sociales.

3) Analizar cómo los turistas utilizan las plataformas para informarse sobre actividades, restaurantes, etc., en destino, o realizar un seguimiento de las actividades a través de las redes sociales una vez que los turistas llegan al destino.

4) Investigar las actividades realizadas para poder planificar rutas a través de la ubicación de la actividad y observar la distribución geográfica de las mismas.

5) Diferenciar el uso de plataformas de economía colaborativa que implican transacciones económicas de aquellas que no implican dichas transacciones económicas.

6) Relacionar el coste exacto de las actividades con la satisfacción de los turistas, y así, profundizar en el análisis de la predisposición a pagar.

7) Realizar análisis separados para aquellos turistas que se alojan en las zonas más turísticas del destino, y los que se alojan en zonas no turísticas.

8) Metodológicamente, se pueden utilizar otros patrones de comportamiento o agrupaciones. El SNA es una herramienta bastante joven y en crecimiento (Casanueva, Gallego y García-Sánchez, 2016) que en algunos casos, debe complementarse con metodologías alternativas como un Logit, análisis de clúster, análisis canónico, etc.

9) Ampliar el área geográfica de investigación, y aplicar dicha investigación a otras áreas como los EE. UU., América del Sur, Australia, etc. o realizar el estudio en áreas más limitadas.

10) Realizar estudios longitudinales para ver si el uso de plataformas por parte de los turistas al buscar información sobre destinos evoluciona con el tiempo. Los agentes turísticos deben estar en constante análisis debido a la naturaleza dinámica

y cambiante del sector, especialmente con el auge de Internet. La aparición y extinción de las fuentes de información digitales es constante.

11) Para poder cerrar el ciclo del *customer journey* abordado en la presente tesis, futuros trabajos de investigación analizarán la etapa post visita al destino, concretamente, se estudiará la imagen que tienen los turistas sobre el destino una vez lo han visitado.

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INTRODUCTION

The present dissertation aims to obtain a better understanding of the behaviour of tourists at different stages of the customer journey. It consists of three chapters, divided into two parts: the first part, composed of the first two chapters, analyses consumer behaviour in relation to the search for information on tourist destinations before travelling; and the second part, corresponding to the third chapter, analyses the tourist behaviour during the trip. In the three chapters the methodology of social network analysis (SNA) is used, which allows us to study the interrelationships between the different tourist agents. Both the analysis of tourist behaviour and the SNA methodology act as a conductive thread during the different chapters, allowing us to reach the final objective, which as mentioned above is obtain a better understanding of the tourist's behaviour before and during the trip, and the interrelationships of the agents that are part of this sector. This research can help both public and private organisations to respond to some of the problems facing the tourism sector.

Introduction

Tourism research has experienced a remarkable growth in recent years; there are increasingly more specialised journals and papers published these days in relation to this sector. In the 21st century, tourism has positioned itself in many countries as the main engine of the economy, and is currently one of the sectors with the highest economic growth worldwide (Brunelli, Macedo-Soares, Zouain and Borges, 2010; Rivera and Upchurch, 2008; Sokhanvar, 2019; Sokhanvar, Çiftçioğlu and Javid, 2018; WTTC, 2019).

International tourist arrivals have increased from 25 million in 1950 to 1,400 million in 2018, current revenues from international tourism are 1,541,628 million euros, mobilising a large amount of income and travellers (UNWTO, 2019) and generating 10% of the world GDP (UNWTO, 2018).

Europe has experienced eight consecutive years of sustained growth, being the most visited region in the world. International tourist arrivals increased 6% between 2017 and 2018, reaching a total of 713 million, 41 million tourists more than in 2017. As with arrivals, revenues also increased 8% in 2017. In addition, Europe receives 51% of international arrivals and is the most important outbound tourism region in the world; it was a source of 48% of international arrivals worldwide in 2017 (UNWTO, 2018, 2019).

All this highlights the importance of tourism in Europe and the need to investigate further the behaviour of European tourists.

On the other hand, in 2018 82.8 million international tourists arrived in Spain, 1.1% more than in 2017, and 44% more than in 2012. These data are also reflected in the total expenditure made by tourists, which amounted to 89,856 million euros, and experienced a growth of 3.3% compared to 2017 and 57.7% compared to 2012. The importance of tourism for Spain also lies in the number of workers affiliated with activities related to the sector. There were 2.4 million workers affiliated to social security in tourism activities in 2018, 4% more than in 2017 (Turespaña, 2019).

The Canary Islands received 13,751,914 tourists in 2018 (IET, 2019) and occupies the second position among the most competitive Autonomous Communities according to the "Monitur 2018 Report". In addition, it contributes 35.2% of GDP (15,573 million euros) and 40.3% of employment, generating 326,970 jobs in the Canary Islands (Impactur, 2018). These data show the importance of tourism and tourism research for regional development.

Once the premise of the importance of tourism has been accepted, the question about this thesis is to better understand how the different tourism agents act and how they interrelate. This concern arises because destinations are considered complex systems of exchange and relations between tourism agents (Pavlovich, 2003; Sainaghi and Baggio, 2014), thus forming a network (Hogan, 2008). These networks are known as social networks when the agents are people, organisations, groups, etc. These relationships are a fundamental element in the understanding of the tourism ecosystem. The following question arises here: How could we analyse this complex system of relations in the tourism sector?

New tools are needed to analyse and understand the relationships between the different tourism agents (Stienmetz and Fesenmaier, 2015). Merinero-Rodríguez and Pulido-Fernández (2016) highlight six appropriate methodological lines of research to study and understand the relational aspects of tourism, among them the line of tourism networks. We consider that this line has a great capacity to analyse the tourism system and existing relationships among the various agents present in the sector. In a similar vein, there are many authors who highlight the importance and usefulness of network analysis in tourism research (Baggio, Scott and Wang, 2007; Baggio, Scott and Cooper, 2010) and its great

potential to improve the understanding of the relationships between tourism agents (Merinero-Rodríguez and Pulido-Fernández, 2016; Scott, Cooper and Baggio, 2007).

The general term of SNA includes various quantitative techniques that help study the characteristics of the interactions between different nodes (Wasserman and Faust, 1994) and reveal the importance of these links. When applying quantitative methods to the analysis of relations in tourism, new and until now disregarded characteristics of this sector are highlighted. The SNA has become an important topic for tourism literature (Scott, Cooper and Baggio, 2007; Baggio, 2017; Baggio, 2018) and explains the tourist phenomenon from a new point of view, observing and analysing the relationships between tourist agents.

Although some researchers have used theoretical concepts of networks in the field of tourism, studies that apply network analysis to tourism are still quite recent (Baggio, Scott and Cooper, 2010; Casanueva et al., 2016). The SNA has been used in tourism from different methodological approaches such as: network representation (Baggio, 2013; Baggio, Scott and Wang, 2007; Brás, Costa and Buhalis, 2010; González-Díaz et al., 2015; McLeod, Vaughan and Edwards, 2010; Pavlovich, 2003; Pforr, 2006; Shih, 2006; Tasci, Khalilzadeh and Uysal, 2019; Wang, Li and Lai, 2017); detection of key actors in the network (centralities) (Baggio, 2013; Baggio, Scott, and Wang, 2007; Bendle and Patterson, 2010; Beritelli, 2011; González-Díaz et al., 2015; McLeod, Vaughan and Edwards, 2010; Pavlovich, 2003; Shih, 2006; Tasci, Khalilzadeh and Uysal, 2019; Wang, Li and Lai, 2017); measurement of various indicators of connection, size, density and concentration of the tourism network (Baggio, 2013; Baggio, Scott, and Wang, 2007; Bendle and Patterson, 2010; Brás, Costa and Buhalis, 2010; González-Díaz et al., 2015; McLeod, Vaughan and Edwards, 2010; Pansiri, 2009; Pavlovich, 2003; Pforr, 2006; Wang, Li and Lai, 2017); detection of groups within the network (Baggio, 2013; Baggio, Scott and Wang, 2007; Bendle and Patterson, 2010; Hernández, Kirilenko and Stepchenkova, 2018; Kirilenko, Stepchenkova and Hernandez, 2019; Pforr, 2006; Wang, Li and Lai, 2017); and finally, search for tourist behaviour patterns based on SNA (Hwang, Gretzel and Fesenmaier, 2006; Smallwood, Beckley and Moore, 2012; Stienmetz and Fesenmaier, 2015; Zach and Gretzel, 2011; Asero, Gozzo and Tomaselli, 2016; Wang, Li and Lai, 2017). On the other hand, some researchers applied the SNA and image analysis together with free associations to analyse the perceptions of tourists about the image of destinations (Tasci, Khalilzadeh and Uysal, 2019) and also to identify

patterns of image recovery and the connection between the elements of the destination's image (Wang, Li and Lai, 2017).

Based on previous studies, it can be affirmed that the advantage of the SNA is based on the use of complete information on the relationships between the different tourism agents and the integration of complex relationships. In addition, previous studies reveal that this methodology is useful and efficient for studying different tourism aspects and proposing innovative approaches and responses regarding tourism. This methodology also provides quantitative metrics to analyse networks, the nodes that it comprises and the relationships between them (Borgatti et al., 2013). In this thesis the SNA allows analysing the relationships between the different actors: tourist platforms, activities and attractions of the destination, and tourists. For better clarity in the narrative, and although the general methodology (SNA) is common, its methodology is mentioned and explained in each chapter to facilitate reading and concrete understanding separately.

The set of research carried out in this thesis has led to the development of multiple field works, with surveys of large representative samples that allowed the network study that was intended. The use of several databases of this nature allows obtaining a deeper and more detailed vision of the subject to be treated.

Justification of the subject analysed

As mentioned in the preface, this thesis arises from the concern to better understand tourists and their behaviour (in the field of consumer behaviour and marketing) in the different stages of the customer journey. For this aim, SNA allows us to explore the ins and outs of the interrelations between the various agents present in the tourism sector. This will help to give a better response to the problems faced by public and private organisations at different stages of the customer journey.

Analysing the customer journey helps to understand the complete cycle of consumer behaviour since both the previous stage and the experience during the trip are taken into account (Stickdorn and Zehrer, 2009; Lemon and Verhoef, 2016). This analysis is considered essential for companies and destinations to succeed, especially in the tourism sector (Stickdorn and Schwarzenberger, 2016). The pre-trip stage is an important part of the consumer analysis, since it is where the tourist confirms their expectations regarding the real service or product, and it is where the main reservation decisions largely determining the rest of the process are made. Secondly, during the travel experience, a

wide variety of stakeholders appears influencing the consumer, making it a complex service (Stickdorn and Zehrer, 2009) with multiple network interactions. Once the trip is over, the consumer can continue to be analysed through their perceptions, such as image and satisfaction (Yachin, 2018; Prebensen, Chen and Uysal, 2018). Post-trip analysis is crucial, since through tourist socialisation (comments shared on the internet and in person) the information that tourists have will become a key source of information for making new decisions for both the individual and for other tourists (Stickdorn and Zehrer, 2009; Stickdorn and Schwarzenberger, 2016). Thus, the customer journey becomes an iterative and dynamic cycle, where not all processes are under the control of companies or destinations (Lemon and Verhoef, 2016), which require greater knowledge of the network dynamics that occur to manage this complex tourism ecosystem.

In order to better understand consumer behaviour in tourism through the SNA, this thesis is structured in three chapters, divided into two parts. The behaviour of the tourist before the trip is analysed in the first two chapters and the behaviour during the trip is studied in the third chapter. The following specific topics are addressed:

1) Analysis of the use of the main e-tourism (digital tourism) platforms by European tourists to inform themselves about the possible destinations to visit before making their trip, and thus detect key actors in the network and analyse the relationships between platforms within the complex digital tourism ecosystem.

2) Understanding of the differences in the use of digital platforms by tourists belonging to the main generations (Y, X and Baby Boomers) and the way in which these tourists interact in the so-called platform economy (sharing economy).

3) To identify patterns of tourist expenditure in relation to the network of activities carried out by tourists at the destination, in order to achieve a better understanding of the portfolio of activities to be managed by destinations.

The topics presented above represent an ambitious set of themes of great relevance for tourism (sharing economy, intergenerational differences, digital platforms in the European tourism ecosystem, etc.). The final aim pursued in this thesis is to contribute to a better understanding of tourist behaviour, the stages of their trip and the interrelationships of different agents of the tourism sector.

Objectives and summary of each chapter

The first two chapters study the initial stage of the tourist trip, that is, the time spent searching for information before embarking on a trip. Specifically, the first chapter, *"Understanding European tourists' use of e-tourism platforms. Analysis of networks"*, investigates how tourists are informed about the possible destinations to visit before their trip. This concern arises because the tourism industry has radically changed since the appearance of Internet (Baggio and Del Chiappa 2014) and, as a consequence, there is increasing access to a wider range of online information sources, making the search for information a complex process.

All this has generated a very dynamic and complex digital ecosystem, where more and more platforms interact in the provision of information and in the connection of tourists. As a consequence, the tourism sector has undergone profound changes linked to the transformation of the tourist distribution structure and tourist behaviour. In this context, the general objective of this chapter is to understand, in a novel way, the behaviour of European tourists in relation to the use they make of e-tourism platforms when choosing their next destination and their implications in the management and marketing of destinations.

There is a vacuum of studies that jointly address the platforms and their interconnections. Previous studies analysed the interrelationships between suppliers (Baggio, 2007; Piazzi et al. 2011, 2012) without taking into account the tourists and their use of web platforms to book their holidays. Understanding this new interrelation scenario requires new analytical techniques. Therefore, the present study uses network analysis, since it allows integrating complex relationships, such as the e-tourism ecosystem, and helps shed light on interactions between platforms and tourists (Baggio et al. 2010; Fuchs et al. 2014). Moreover, this methodology helps to have a clear vision of the relationships between different websites as it allows visually representing the networks and identifying the relevance of each platform with respect to the rest.

As this research progressed, interest arose to better understand the European e-tourism network, analysing the networks of 19 European countries separately. In this way, the study provides information to understand the singularities of the main European markets individually. The results help to better understand the characteristics of digital European tourism and to identify the key platforms that connect the European e-tourism network.

Achieving a greater understanding of how European tourists use information sources to choose their next travel destination is a strategic factor for their success. The results obtained from this first study are useful for companies, Destination Marketing Organizations (DMOs) and for tourism providers (hotels, airlines, etc.), as they help to understand how e-platforms are connected and design a strategy of segmentation, promotion and distribution through these platforms in the European market.

The first chapter confirms the importance of the Internet for tourist distribution and the rise of a new platform ecosystem, where new alternatives appear with great transformation power. In this sense, the second chapter, *"Sharing Economy and the Generation Effect: Platform economy and the tourism ecosystem"*, aims to further understand the behaviour of information search by tourists, and the role of the economy of platforms (collaborative) according to generations.

Platforms have brought peer-to-peer relationships to the online model, replacing traditional intermediaries, facilitating the emergence of digital platforms and changing the way people travel (Heo, 2016), becoming an extension of the platform economy (Drahokoupil and Fabo, 2016). The sharing economy has been gaining strength within the tourism sector (Decrop, Del Chiappa, Mallargé, and Zidda, 2018), becoming an important competitor for traditional suppliers of goods and services.

Tourists not only use sharing economy platforms for economic reasons (Guttentag, 2015; Tussyadiah, 2015), but also for other aspects including their utility, trust, cost reduction, familiarity (Möhlmann, 2015) or social aspects related to sustainability and community (Tussyadiah, 2015). In addition, Tussyadiah (2015) stated, "Collaborative consumption penetrates the market not only as a low-cost accommodation alternative, but rather as a new "way to travel". Several studies have analysed sharing economics from different points of view (Belk, 2014; Lamberton and Rose, 2012; Möhlmann, 2015; Guttentag, 2015; Zervas, Proserpio and Byers, 2014; Decrop et al., 2018). However, these studies do not analyse the interaction between the new platforms and their relationship with traditional intermediaries, as well as the intergenerational differences between tourists.

Sharing economy platforms (Airbnb, TripAdvisor, etc.), traditional platforms (airlines, hotels, tour operators) and non-tourism start-ups (Google, social networks, etc.) coexist and compete (Edvardsson, Gustafsson, Kristensson, and Witell, 2010) creating networks between users and suppliers in the new digital ecosystem (Acquier, Dudigeos and Pinkse,

2017). Therefore, understanding where the sharing economy is within this ecosystem is crucial to developing marketing strategies. Moreover, understanding how different generations act within this ecosystem is relevant to properly manage the promotion of tourism products or services (Valentine and Powers, 2013; Lösing, 2016; Chaney, Touzani and Slimane, 2017).

To better understand the connections between platforms and tourists, it was decided to apply SNA to a network of 19 European countries. This analysis led us to consider how network relationships continue once the tourist has reached the destination during the enjoyment of their vacation, where tourists interact with different attractions and activities.

In consequence, the third chapter of this thesis, *"Understanding tourists' leisure expenditure at the destination: a social network analysis"*, analyses the behaviour of tourists during their visit to the destination. Specifically, the objective is to understand the spending patterns of tourists in relation to the activities they perform at the destination, and how the centrality (importance of an individual or a particular activity) influences spending at the destination. This concern is due to the importance of tourist expenditure on the total income of the destinations (Brida and Scuderi, 2013; Hung, Shang and Wang, 2012; Pouta et al., 2006; Pulido-Fernández, Cárdenas-García and Carrillo-Hidalgo, 2016; Thrane and Farstad, 2012). The study analyses the type of activity carried out, the frequency and the moment in which the activity is carried out during the holidays (during the first two days, between the third and the last day, and at any time).

The main contribution of this study is to jointly analyse activities and tourists. Therefore, a traditional product management approach is not applied, but the portfolio of activities is examined from the perspective of tourists, following the recommendations of Vargo and Lusch (2004). Thus, the study helps to improve marketing management and market planning and maximise destination revenue through a new methodology to analyse tourist spending patterns. Nevertheless, this study gave way to questioning the implications after visiting the destination.

In summary, this thesis aims to gain a better understanding of tourist behaviour during the customer journey through a common methodology, SNA. This analytical technique is complemented with others such as statistical analysis (multiple regression) and differences/heterogeneity tests (Mann-Whitney U test). The research technique applied

to gather the information used in the studies was structured questionnaires made before and during the tourist's visit to the destination. With this aim in mind, we obtained a large sample of more than 13,000 tourists, almost 500 platforms analysed, 35 activities at the destination, and covering multiculturalism across 19 European countries.

In addition to specific conclusions in each chapter, the thesis culminates with some general conclusions. Likewise, this last section includes the main contributions, implications and recommendations. Finally, some limitations and future challenges are suggested.

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CHAPTER 1

UNDERSTANDING EUROPEAN TOURISTS' USE OF E-TOURISM PLATFORMS. ANALYSIS OF NETWORKS

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CHAPTER 1

Understanding European tourists' use of e-tourism platforms. Analysis of networks

Abstract

This paper analyses the use of the main e-tourism platforms by European tourists. A computer-aided Web interview (CAWI) was used to conduct the research in 19 European countries: Germany, Austria, Belgium, Denmark, Spain, Finland, France, Holland, Ireland, Italy, Norway, Poland, Portugal, Russia, Sweden, Switzerland, Luxemburg, Czech Republic, and the United Kingdom. The final sample consisted of 13,243 tourists. Through the methodology of social network analysis (SNA), the study focuses on detecting key network players (social media, OTAs, etc.) in the e-tourism ecosystem. The network analysis reveals the structural characteristics of the network of networks in the European e-tourism ecosystem: number of platforms (473), centrality degree and betweenness, and the specific characteristics of the networks by country. The results show an e-tourism network of platforms following a pattern known as core-periphery. Four platforms show a predominant role: Facebook, TripAdvisor, Google, and Booking. These 'big four' ego-networks are graphically represented to better understand the e-tourism network. The results also show that different networks are formed by country according to the use of e-tourism platforms. This study helps understand in a novel way the behaviour of European tourists when using e-tourism platforms to choose their travel destination. The results obtained are useful for companies and Destination Marketing Organizations (DMOs), understanding how e-tourism platforms are connected in order to design their segmentation and promotion strategy through e-tourism platforms in the European market.

Key words: Europe, Social Media, Social Network Analysis, Core–Periphery Structure, Network Science, Information Sources, Communities.

1. Introduction

The Internet has radically changed the tourism industry (Baggio and Del Chiappa 2014), opening a new paradigm where e-tourism is representing a predominant role. The function of the Internet as a primary source of information is increasingly important (Almeida-Santana and Moreno-Gil 2017; Manap and Adzharudin 2013), generating a very dynamic and complex digital ecosystem, where several typologies of platforms interact in providing information and connecting tourists (Munar and Jacobsen 2014). This e-network is formed by social media (e.g. Facebook), review channels (e.g. TripAdvisor), general search engines (e.g. Google), online travel agencies—OTAs (e.g. Booking, Expedia), communication exchange channels (e.g. Instagram, YouTube), comparators (e.g. Trivago), tour operators' websites (e.g. TUI, Neckermann, Thomas Cook et al.), blogs and microblogs (e.g. Twitter), and the different major tourism services providers (e.g. airlines, hotels, etc.).

The resulting complex network in the e-tourism ecosystem has not reduced the number of intermediaries in the distribution channel, but rather increased the number of platforms, connections and interactions between these connections (Kracht and Wang 2010). Thus, the tourist's process of searching for information has become extremely complicated, with different and new platforms taking over the top positions. Hence, understanding this new scenario demands new analytical techniques. Network science becomes an optimal path to deal with this challenge, as network analyses allow to integrate complex relationships between the ecosystem to shed light on the interactions that explain the network (Baggio et al. 2010; Fuchs et al. 2014). This methodology contributes to a more global and clear vision of the relationships between different websites by (1) allowing a visual representation of the network or relationships, and (2) identifying the relevance of each platform with respect to the rest.

In the European market, the e-tourism ecosystem is especially complex (Sigala 2015), since some platforms may have a predominant role in most countries, while others may have a significant influence in one single country. Thus, tourist suppliers (destinations, hotels, airlines, etc.) need to better understand the information and distribution network, both in global terms around Europe and the peculiarities in the different targeting markets-countries (Amaro and Duarte 2017).

This paper analyses the network of the different tourism platforms used by the European tourists to search for information to make their travel decisions. The research considered 473 platforms and involved 13,243 tourists in 19 European countries, those of Germany, Austria, Belgium, Denmark, Spain, Finland, France, Holland, Ireland, Italy, Norway, Poland, Portugal, Russia, Sweden, Switzerland, Luxemburg, Czech Republic and the United Kingdom. The goals of this research are as follows:

This research helps to better explain the characteristics of the European e-tourism network, and to identify key platforms connecting the network. In addition, the specific network (ego network) of the main platforms will be analysed and represented to better interpret how they are interconnected. Finally, the analysis of the network by each of the aforementioned European countries provides information to understand the peculiarities of each main market in Europe.

This study helps understand in a novel way how the European tourists use e-tourism information sources for choosing their travel destination. The results obtained are useful for Destination Marketing Organizations (DMOs) and the tourism suppliers (hotels, airlines, etc.) in order to design their promotion and distribution strategy in the European market.

2.   Literature review

2.1 Importance of e-tourism as a new tourist information paradigm

The tourists' search for information has become more complex in a new Internet era, in which tourists have access to a wide range of online information sources connected to each other. Traditional tourism companies have implemented significant strategies to operate online, while new start-up companies have arrived to the tourism industry, changing the tourist's information search, and the promotion and distribution strategies of tourist destinations and companies (Fatanti and Suyadnya 2015; Sigala 2015). This new scenario supports the importance of analysing the relationship between these e-tourism platforms from the demand perspective, and understanding how they are connected and structured.

New social media and microblogging are playing a predominant role in today's communication. Facebook and Twitter are the most widely used social media sites in the industry (Chan and Guillet 2011; Mich and Baggio 2015). Thus, Facebook is the most-

used social media platform among European tourists (Escobar-Rodríguez et al. 2016), and Twitter is the most popular microblogging service (Jansen et al. 2009). Besides Facebook and Twitter, YouTube, Instagram and TripAdvisor are among other popularly used social media sites in the industry. Google is becoming increasingly important for providing tourism information (Fritsch and Sigmund 2016), and YouTube is the second-largest worldwide search engine after Google (Welbourne and Grant 2015), being the leader in the distribution of video content. TripAdvisor is the largest community travel site in the world (TripAdvisor 2016). OTAs such as Booking and Expedia have been growing their market share very rapidly, and comparators like Kayak are gaining a major role (Inversini and Masiero 2014). Understanding this complex network is key to successfully promoting and distributing any tourism product online.

The importance of the Internet and especially the role of the new e-tourism platforms as a push factor to promote destinations have been stressed (Amaro and Duarte 2017; Hanan and Putit 2014; Manap and Adzharudin 2013). Most of these tourism platforms (websites) have recently received great interest from researchers (Angus et al. 2010; Escobar-Rodríguez et al. 2016; Fang et al. 2015; Gupta and Kim 2004; Hennig-Thurau et al. 2015; Kaplan and Haenlein 2010). However, much attention has been paid to certain platforms, while others have been marginalised in the literature (Almeida-Santana and Moreno-Gil 2017). In addition, there is a lack of studies that jointly analyse all these platforms, understanding how they are interconnected in the e-tourism network.

2.2 Omni-channel distribution strategy to improve the competitiveness of tourist destinations and companies

Tourism distribution channels have attracted a tremendous amount of attention in the last decade owing to the important role they play in the tourism industry (Kracht and Wang 2010; Pearce and Schott 2005). The structure of the tourism industry distribution system does not only affect the choices available to the consumer, but also the business models and marketing strategies adopted by the various channel participants (Pearce et al. 2004; Santana and Gil 2018). However, the change of the structure of tourism distribution has not been extensively explored (Kracht and Wang 2010).

The Internet has meant a revolution for the tourism sector. The evolution of interactive media, leading to profound changes in tourist behaviour, has made the connection of destinations and companies with tourists truly complex, and has transformed the structure

of tourism distribution (Buhalis and Laws 2001; Kracht and Wang 2010; Wang and Qualls 2007). The tourists are using different platforms at different times to search for information and book their holidays and make their decisions (Quintana et al. 2016). Thus, in this context, the range of channels that tourism suppliers might use to promote and distribute their products has been expanded (Pearce 2009), and the multi-channel distribution has become a new normal (Koo et al. 2011; Pearce 2009; Pearce and Taniguchi 2008). The new technologies allow destinations and tourist suppliers to integrate and jointly manage all the information offered by emerging channels, giving rise to the phenomenon known as Omni-channel.

The increasing use of mobile devices and social networks makes the traditional online-physical channel dichotomy obsolete, as the lines between channels are blurred (Piotrowicz and Cuthbertson 2014). Emerging as a new business model, the Omni-channel will be less focused on the channel used and more on the interaction between the customer and the brand through multiple channels (Juaneda-Ayensa et al. 2016; Piotrowicz and Cuthbertson 2014).

An Omni-channel strategy is a form of trade that, by enabling real interaction, allows customers to acquire information and book across channels anywhere and at any time, thereby providing them with a unique, complete and seamless shopping experience that breaks down the barriers between channels (Juaneda- Ayensa et al. 2016). Nowadays, DMOs should enhance tourists' convenience innovatively and manage this e-tourism ecosystem using multiple channels and platforms in order to increase their competitiveness (Park and Park 2016), and increase the tourists' experience (Fuentes et al. 2015). However, before such a level of cross-channel integration can be achieved, destination managers need to enhance their knowledge of the European e-tourism network in order to properly redesign their promotion and distribution network. Although recent literature has paid attention to the Omni-channel phenomenon in the retail context, it is important to continue research in this field (Neslin et al. 2014; Verhoef et al. 2015), and in particular in the context of tourist destinations.

Social networks analysis is a suitable methodology to analyse this phenomenon. Previous literature has used social network analysis (SNA) to study the interrelationships between e-tourism websites of tourist operators in different destinations, such as Elba (Italy) and Austria (Baggio 2007; Piazzi et al. 2011, 2012). A link between two operators appears if

a hyperlink among them is found in their websites. In these papers, the characteristics of the e-tourism networks in each destination is analysed by calculating the common node-level and network-level metrics in SNA. Additionally, some communities in the graph were detected. Our paper is inserted in this line of research. However, links between websites are here defined by the visitor's use of these websites when looking for information to book their holidays, not by the interrelationships among suppliers as in the previous contributions. Hence, the analysis is not limited to a specific destination, but to several origin countries.

2.3 The multiculturalism of tourists and the use of information sources

This network analysis should take into account the cultural differences between the different countries throughout Europe. The impact of culture on the overall consumer decision-making process has been extensively studied; however, there is a lack of studies related to the impact of national culture on travellers' information search behaviour (Carballo et al. 2015; Gursoy and Umbreit 2004; Hyde 2007; Kozak 2002). In particular, little attention has been paid to the differences among European travellers regarding the use of different platforms to learn about and book their travel destination, and how tourists are interacting through these networks of sources of information depending on their own outbound market.

Interesting contributions have been made in previous studies, showing that the national culture of tourists influences how they search for information (Chen 2000; Gursoy and Chen 2000; Uysal et al. 1990). However, on many occasions, and because of the difficulty of obtaining information from many countries simultaneously, studies are usually confined to comparing only a few countries simultaneously, and they are unable to analyse the new platforms as a relevant tool to search for information given their recent appearance. Thus, it is evident there is a need for more global representative studies. Therefore, a greater research effort on the Omni-channel strategy in the tourist industry and the European context is required. In consequence, this study focusses on 19 origin countries within Europe, and provides information about 473 different information platforms used by tourists and representing the European e-tourism ecosystem.

3. Methodology

3.1 Population

In order to achieve the proposed objectives, fieldwork was undertaken through a structured questionnaire given to European tourists. They were asked for their behaviour when searching for information to make their decision about the destination they chose to visit. Therefore, the target population of this study were tourists, aged 16 and over, who had travelled abroad during the last 2 years and who had used the Internet to acquire information about their travel destination. In particular, they were asked to indicate (open question) the Internet websites they had consulted (social media, comparators, OTAs, and other tourism services platforms consulted). "In what platforms or websites did you search for information to choose your last holidays?"

The study gathered tourists from the 19 major European countries in tourist terms: Germany, Austria, Belgium, Denmark, Spain, Russia, Finland, France, Holland, Ireland, Italy, Luxembourg, Norway, Poland, Portugal, the United Kingdom, Czech Republic, Sweden and Switzerland. Europe remains the largest outbound region for tourist flows in the world, a region that generates more than half of the annual international arrivals (UNWTO 2015).

3.2 Sample selection and fieldwork

The work was done through the provision of an Internet questionnaire (CAWI) to a representative sample of the 19 countries mentioned, chosen from a database of panellists in each country using a specialised panel research company. A random selection of the panellists was made based on the variables of stratification of geographical area and province on the one hand and, on the other, of the criteria of gender and age, in order to guarantee the representativeness of the sample with the population of each country. The selected sample was sent a personalised email inviting them to participate in the study. Embedded in the mail itself was a personalised link that led them to the online survey. In order to ensure the expected number of surveys, during the 3 months of fieldwork in the different countries, two reminders were utilized to encourage response. The final sample was 13,243 tourists.

The questionnaire was translated into the languages of each country analysed. Once the questionnaire was pre-tested in the language of the potential tourists, and the pertinent

corrections made to the questions that raised comprehension difficulties, the questionnaires were carried out. The online system, after the relevant programming had taken place, reviewed all the questionnaires completed, detecting the time that a respondent had taken to respond to the survey, thus any survey answered in less than 5 min was not accepted as valid.

3.3 Platform-tourist network and metrics

In order to accomplish the goal of this study, to examine the interrelationships between platforms used by tourists to find out about the destination, SNA was used to represent and examine the data (Borgatti et al. 2013). From the information gathered through the questionnaires, an affiliation network was built connecting tourists with the platforms they used to yield information about their travel destination. This is a two-mode network that includes two node categories: on the one hand the tourists, and on the other the platforms (websites). A tourist is connected to a platform if he or she has used such a platform to acquire information of the destination before visiting. It can be converted into two one-mode networks; on the one hand, the tourists, and on the other the platforms. In the one-mode projection, two platforms are connected if they have been used by the same tourists.

Regarding the network size, 13,243 tourists used Internet platforms to find information about their travel destination. In total, 473 different platforms were consulted. To allow comparisons, general answers not mentioning any specific platform (e.g. hotel website), and those platforms with less than 10 mentions were not included in our analysis. Finally, a total of 178 platforms were analysed. Thus, the final number of tourists in the network is NT = 13,243 and the number of platforms is NP = 178.

We have used several metrics to analyse the different networks. In affiliation networks, metrics can be applied to one or another category, in our case platforms and tourists. In this paper, we focus exclusively on the applications to platforms:

1) Centrality metrics: The analysis of centrality allows us to observe the importance of each node, its influence, and its ability to connect other nodes of the network (König and Battiston 2009), helping us to identify the importance of each platform within the whole network.

In this study, we have focused on degree, betweenness, eigenvector and closeness centrality. The traditional definitions given in the literature to these metrics do not take into account the presence of two node categories in affiliation networks. However, the role of the nodes in these kind of networks should be circumscribed to the category they belong. For example, the centrality position of every platform should be measured with respect exclusively to the position of the rest of the platforms. Therefore, the specific structure of the network needs to be considered in the definition of the metrics (Faust 1997). We will follow here the criteria of Borgatti and Everett (1997) and take normalized indicators according to the two-mode network layout.

Degree Node degree is the number of direct links that a node has (Freeman 1978; Borgatti et al. 2013), that is, the degree of a platform is the number of tourists who use this platform, and the degree of a tourist is the number of platforms used by this tourist. In normalized terms, the degree of a platform is the percentage of tourists who use this platform. It is quite likely that those platforms with a high degree are the most influential within the network (Ye et al. 2013). It could be said that these platforms have an advantageous position and therefore greater power in the network, since their field of choice is greater and show less dependence (Casanueva et al. 2016).

Betweenness In general, node betweenness can be defined as the number of times that a node appears as an intermediary in the path between two other nodes, inversely weighted by the total number of paths between these two nodes (Freeman 1978). In each category (platforms and tourists), this indicator is normalized according to its possible maximum value, the platforms with high betweenness centrality are key points of the network since they are in the shortest path between other pairs of nodes and therefore connect different groups.

A platform with high betweenness could be considered a key point of information distribution between tourists and platforms since they can facilitate or hinder the flow of information from the network (Benckendorff 2010; Corral-Marfil et al. 2015). It could be said that an intermediary platform of many others could transmit information to tourists about other platforms so as to be able to direct it to lesserknown platforms. Nodes with high betweenness are the core of the collaboration network (Ye et al. 2013).

Closeness In general, closeness centrality is inversely proportional to the total geodesic distance from a node to all other nodes in the network (Freeman 1978). In the case of the

tourist-platform network analyzed here, the closeness centrality refers to the distance between nodes in every category. However, the platforms are only connected directly to tourists, therefore all their paths to other platforms first pass through a tourist. The normalized term introduced in the calculation of this metric here takes into account the minimum possible distance in an affiliation network.

A platform with high closeness indicates centrality in terms of accessibility. In other words, it is a platform which can be accessed through few path steps, e.g. if platform A with high closeness is not used directly by a certain tourist, it is highly likely that this tourist uses a platform B which is used in common with platform A by other tourists.

Eigenvector In general, eigenvector centrality indicates the number of nodes directly connected to a given node, but weighted by the centrality of each adjacent node (Borgatti et al. 2013). Thus, a platform eigenvector centrality can be thought of as the sum of centralities of the tourists who visited it (Borgatti and Everett 1997). A platform with high eigenvector centrality indicates that this platform is referred by central tourists who refer to other central platforms. By normalizing, the eigenvector centrality metric shows the percentage of its possible maximum value in each category.

2) Ego-networks: We select some of the platforms with the highest centrality levels and build their ego-networks, which are the network of platforms that link directly with them in the one-mode projection. By showing the ego-networks, we precisely observe the ecosystem of platforms which surround the principal ones. To represent said ego-networks, the one-mode projection of the network on tourism is taken, where two platforms are linked if they are referred by at least 10 tourists.

3) Community detection: We apply the continuous method proposed by Borgatti and Everett (1999) to detect core-periphery structures in the one-mode network for platforms. This method includes an algorithm which first estimates a measure of "coreness" or closeness to the core of every node. Then, the algorithm orders the nodes according to the coreness value and proposes a core with those nodes with the highest correlation to an ideal core-periphery structure. Details of the method can be found in Borgatti and Everett (1999) and Borgatti et al. (2013).

To perform these analyses, the UCINET 6591 software was used (Borgatti et al. 2002). Additionally, to perform the representation of the networks in graphics, the software NetDraw was selected. The Graph Theoretic Layout 'Spring Embedding' (GTL) method

was used to represent the networks. This layout uses the Multidimensional Scaling (MDS) method to distribute the nodes using geodesic distances and, in order to avoid node superposition, it also applies a node repulsion function (Borgatti et al. 2013).

4. Results

Table 1 shows the network size of the sub-networks extracted from the general affiliation network, restricting the nodes to those belonging to the same country. As expected, the network size decreases considerably with respect to the general network (NT = 13,243 and NP = 178) and varies for each nationality. The size of the platforms network ranges from 32 (Luxembourg) to 66 (Switzerland) platforms. These first results confirm the complexity of the European e-tourism network, both in general and by each specific country. The most important European tourism markets (Germany, the United Kingdom and Russia) show smaller networks of platforms than other 'minor' markets (Belgium, Switzerland, Austria). Thus, the size of the e-tourism network is not related to the size of the market, and it seems that the main markets show a higher concentration of platforms. In addition, the countries where some important platforms were founded or their headquarters are located, show a higher concentration than can be caused by the influence and market power of those big firms (Booking in the Netherlands, TripAdvisor and Expedia in the United Kingdom and Ireland, Trivago and Holiday Check in Germany, Yandex and Vkontake in Russia, Momondo in Denmark). A more in-depth analysis by country is developed in Sect. 4.3.

Table 1 Tourists-Platforms network size (NT=number of tourists; NP=number of platforms)

Country	N_T	N_P	Country	N_T	N_P
Germany	737	39	Norway	718	55
Austria	672	52	Spain	711	39
Belgium	654	59	Poland	670	36
Denmark	701	51	Portugal	762	50
Finland	923	53	United Kingdom	747	45
France	719	62	Czech Republic	770	34
Netherlands	740	40	Russia	762	42
Ireland	611	45	Sweden	693	61
Italy	881	44	Switzerland	611	66
Luxembourg	161	32			

4.1 Centrality metrics

To better understand which are the main platforms in the European e-tourism network, the results of the centrality indicators are shown in Table 2. From these indicators a ranking of platforms is represented, showing those with higher centrality. In this way, it is observed how the positions in the ranking differs depending on the centrality analysed (Degree, Betweenness, Eigenvector and Closeness).

Table 2 shows the top 20 platforms with the highest index of centrality for the indicators. It is observed that Google clearly ranks first independently of the centrality analysed. This means that Google is the platform with the greater degree (around 22% of tourists refer this platform), betweenness, eigenvector and closeness (24, 86 and 56% of its possible maximum value, respectively), followed by Facebook, TripAdvisor and Booking. In particular, the eigenvector centrality for Google almost triplicates its follower, showing that the Google position in the graph is much more central than the rest, as this search engine is the main gateway to the European tourism ecosystem.

Tabla 2 Ranking of platforms used by tourists in terms of centrality (degree, betweenness, eigenvector and closeness)

Degree		Betweenness		Eigenvector		Closeness	
Google	0.2170	*Google*	0.2379	*Google*	0.8626	*Google*	0.5609
Facebook	0.1358	*Facebook*	0.1477	*Tripadvisor*	0.3030	*Facebook*	0.5187
Tripadvisor	0.1342	*Tripadvisor*	0.1323	*Facebook*	0.3000	*Tripadvisor*	0.5114
Booking	0.1204	*Booking*	0.1195	*Booking*	0.2365	*Booking*	0.5070
Trivago	0.0473	Trivago	0.0351	Trivago	0.0726	Trivago	0.4697
Expedia	0.0338	Momondo	0.0236	Expedia	0.0532	Expedia	0.4488
Momondo	0.0313	Expedia	0.0210	Momondo	0.0369	Twitter	0.4403
Wikipedia	0.0196	Wikipedia	0.0117	Wikipedia	0.0366	Momondo	0.4389
Ryanair	0.0181	Ryanair	0.0103	Twitter	0.0345	Wikipedia	0.4366
Twitter	0.0180	Ving	0.0096	Instagram	0.0275	Skyscanner	0.4341
Ebookers	0.0173	Ebookers	0.0096	Ebookers	0.0213	Ryanair	0.4326
Ving	0.0165	Vkontake	0.0084	Ryanair	0.0197	Ebookers	0.4324
Instagram	0.0132	Neckermann	0.0084	Ving	0.0195	Instagram	0.4311
Apollo	0.0128	Tui	0.0078	Skyscanner	0.0194	Thomas Cook	0.4233
Skyscanner	0.0127	Holiday Check	0.0074	Lonely Planet	0.0192	Lonely Planet	0.4232
Vkontake	0.0123	Apollo	0.0066	Norwegian	0.0173	Youtube	0.4225
Aurinkomatkat	0.0120	Aurinkomatkat	0.0064	Airbnb	0.0136	Airbnb	0.4225
LONELY planet	0.0119	Norwegian	0.0061	Viajes Abreu	0.0126	Lastminute	0.4222
Norwegian	0.0119	Skyscanner	0.0053	Finn.no	0.0123	Kayak	0.4215
Neckermann	0.0117	Yandex	0.0053	Routard	0.0123	Norwegian	0.4210

Italics indicates more important platforms connecting with others

Google, Facebook, TripAdvisor and Booking are positioned as the key platforms in the European e-tourism ecosystem, since they are referred by many tourists (degree), connect different groups of platforms (betweenness), they have a central position with respect to all other platforms (eigenvector) and they are near most platforms and tourists (closeness).

These 'big four' platforms show a great difference with the rest of the platforms. Google is the leading search engine, Facebook is the most important social media, TripAdvisor is the leading review platform, and Booking is the most important OTA (followed by far by Expedia). The next individual platform is Trivago (the leading comparator followed by Momondo and Skyscanner), while Ryanair is the leading air carrier followed by Norwegian; and with Ving, Apollo, Neckermann, and AurinkoMatkat being the leading tour operators in number of connections. Other platforms that appear in the four types of centrality in Table 2 are Wikipedia and Ebookers.

Some interesting interpretations can be extracted by analysing the rest of the platforms in Table 2. Some of them, such as Twitter, Instagram or Lonely Planet do not appear in the column of bbetweenness centrality but they do in the rest. This is because, although they have been quite well named by tourists, they are not the best intermediaries among tourists and platforms. These platforms (leaders in microblogging, photo sharing and travel guides) may have an important role in the inspiration stage, and then again for searching specific information about the destination once the decision has been made. However, it seems their use is not so widespread to connect all kinds of tourists.

Furthermore, some review platforms such as Holiday Check and tour operators—such as TUI, do not appear in the top 20 of centrality degree, eigenvector or closeness, although they have a high betweenness centrality, which means that they act as connectors between tourists who use different platforms during the decision-making process. Other platforms, such as Airbnb, Viajes Abreu, Finn.no and Routard, only appear in eigenvector centrality. So, they are well positioned in respect to all other platforms, although their use is not generalized. On the other hand, YouTube is only relevant in terms of closeness, appearing as a potential partner of the main platforms for reinforcing the final decision of the tourists.

The variability of the centrality positions of platforms shown in Table 2 call for a deeper analysis by country, in order to better understand the European e-tourism ecosystem (Sect. 4.1)

4.2 Platform networks

Figure 1 shows the graphic representation of the complete network of platforms used by European tourists. The application of the continuous method to detect core-periphery structures confirm the existence of this pattern in the one-mode network of platforms.

Thus, platforms belonging to the core have many connections with other platforms used by tourists, while peripheral platforms are mostly connected to the core platforms but not among each other. The algorithm proposes the 'big four', of Facebook, TripAdvisor, Google and Booking, as the only components of the core with the highest correlation (0.93) to an ideal coreperiphery structure. This pattern corroborates what was shown in Table 2, with the 'big four' platforms playing a greater relevance. Thus, core platforms became key partners in connecting tourists with other platforms and communities. This makes them crucial "display platforms" for the rest of the conventional tourism industry (hotels, airlines, tour operators), luring for marketing investment.
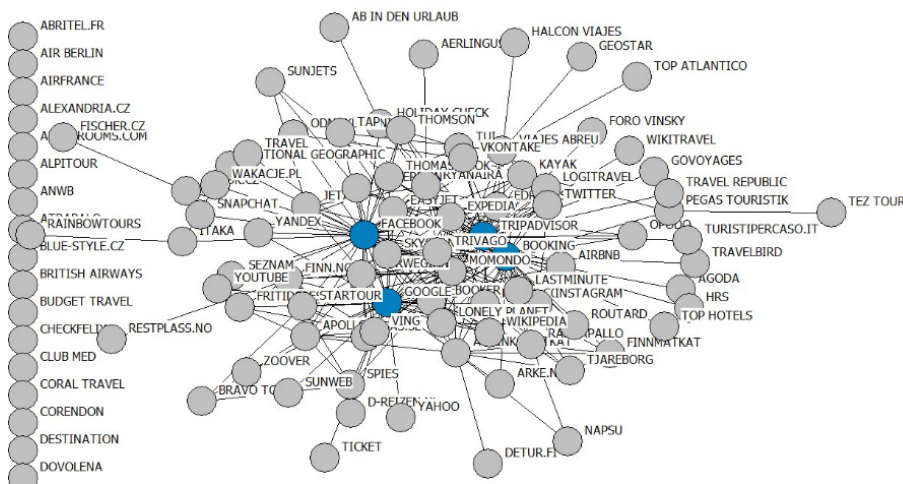
Fig. 1 Core-periphery network of European e-tourism platforms

Subsequently, we represent the ego-networks of the four most influential platforms (Google, Facebook, TripAdvisor, Booking) to analyse how the connections differ according to the platform used by the tourists. From such ego-networks, we can analyse whether or not the main platforms are directly connected with other main platforms, how may platforms they are connected with, and if the connections are very different between the 'big four' ego-networks.

The ego-networks of the four most relevant platforms are observed in Figs. 2, 3, 4 and 5. The analysed platform is shown in a blue colour. As general observations, it should be noted that the connections between the platforms are very similar in the four-represented ego-networks. Moreover, platforms that are interconnected between themselves and with the ego-platform analysed are basically the same platforms in the four networks. The platforms differing among the four ego-networks are located on the periphery and not connected among them.

The Google ego-network is represented in Fig. 2. Google is highly connected with Facebook, Momondo, Booking, Trivago and TripAdvisor, while most of the platforms in the figure are interconnected. The platforms that are only connected to Google (and not among them) seem to be tour operators and airlines. This is due to the search engine optimization (SEO) and search engine marketing (SEM) practices that link them with Google. There are other platforms that appear in the rest of the ego-networks that are not present here (TUI, Vkontake or Viajes Abreu). Moreover, it is important to highlight the link between Lonely Planet and Wikipedia and both with Google.

They form a key triangle for general and specific destination information search. It is worth to mention the relationship between Airbnb, TripAdvisor and Booking, where the channel distribution between sharing economy, traditional OTAs, and review platforms is just starting; and likewise the relationship of them all with Google. Google is not connected with other search engines (with the exception of Yandex in Russia), but if Google continues advancing in its tourism direct presence, acting as a new channel, their central role in the network could be challenged by other "neutral" platforms.
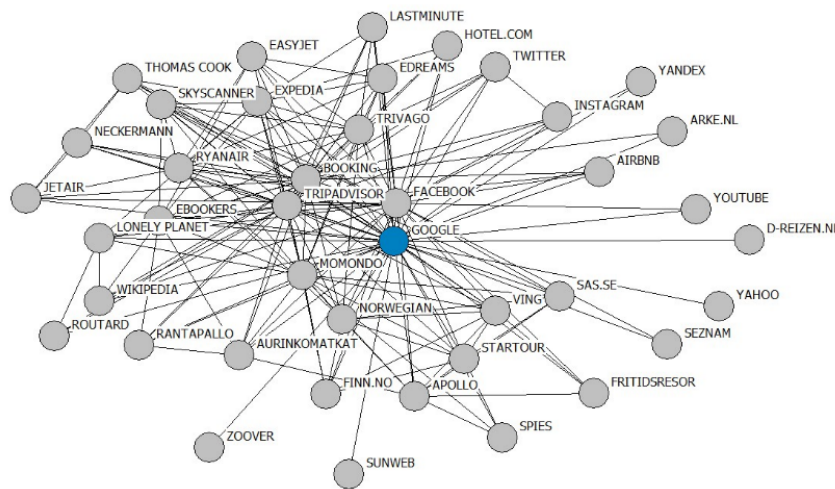
Fig. 2 Google ego-network

In Fig. 3 we can observe the TripAdvisor ego-network. This ego platform is located at the centre of the network and is surrounded by those platforms directly connected to it (Google, Booking, Facebook, Trivago, Expedia, Momondo, etc.). Some of the platforms are connected with TripAdvisor, but not among themselves: Goyovoyages, Wikitravel, Turistipercaso.it, etc. Thus, interesting relationships of co-marketing can be developed between these platforms. TripAdvisor has recently decided to reduce its marketing investment in Google due to the decision of the latter to foster its tourism presence

(Google flights and Google hotel finder, etc.). TripAdvisor is not closely connected with Holiday Check (its main competitor in German-speaking countries), but the main community (Facebook) could increase its presence in the tourism industry in the future.
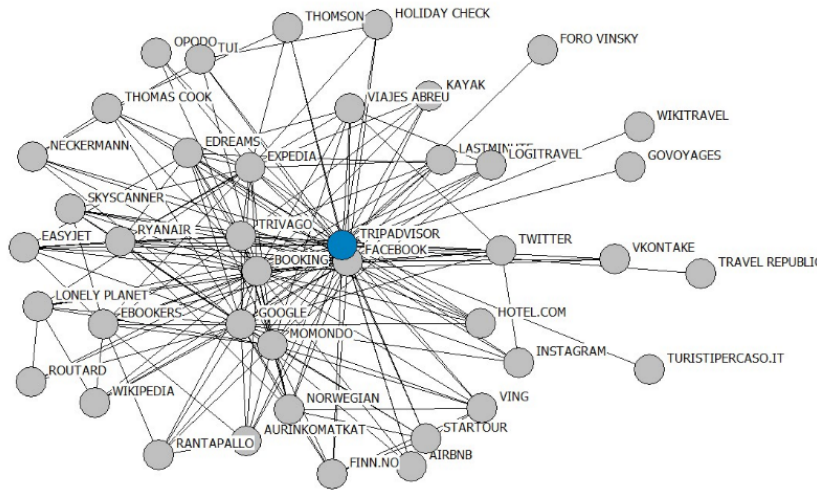
Fig. 3 TripAdvisor ego-network

The Facebook ego-network is represented in Fig. 4. It is observed that there are only three platforms—Snapchat, Cedok.cz and Travel—that do not connect with any other platform except with Facebook. Marketing opportunities for third parties between those three platforms are identified. Facebook is also well connected with many tour operators and airlines. On the other hand, there are some platforms connected to Facebook but not connected to the other three ego-networks analysed such us Wakacje.pl, Itaka or Odnoklassniki. This ego-network also shows how some tourism companies (Norwegian, Ryanair) show an important connection with Facebook, which means they prioritise in their promotional strategy an intensive social presence. In any case, Facebook is a leading social media with a high relevance in any kind of information search besides tourism.
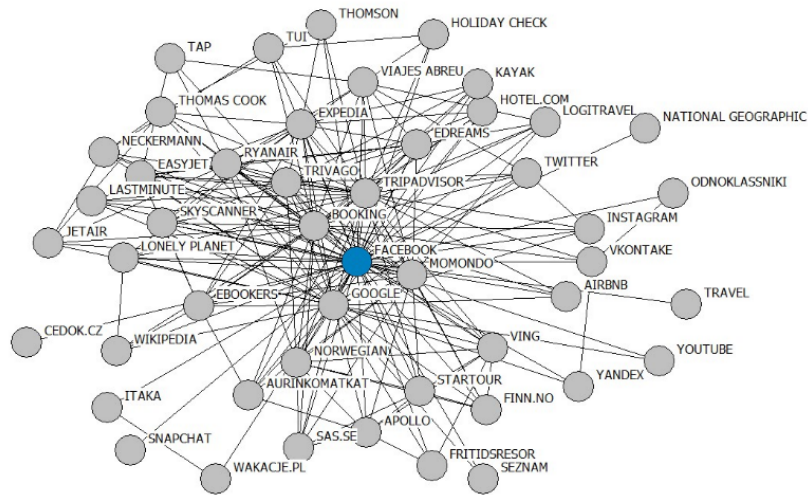
Fig. 4 Facebook ego-network

Finally, Fig. 5 shows the Booking ego-network platform. In this case, it is observed that most of the platforms that are only connected to the ego-platform Booking and not to the other three ego-platforms studied are tour operators: Finnmatkat, Pegas Touristik, etc. These platforms may be competing in terms of accommodation, but also cooperating in planning their holidays, as Booking does not offer flights. Booking's main competitor (Expedia) is well-connected with Trivago (they belong to the same group).
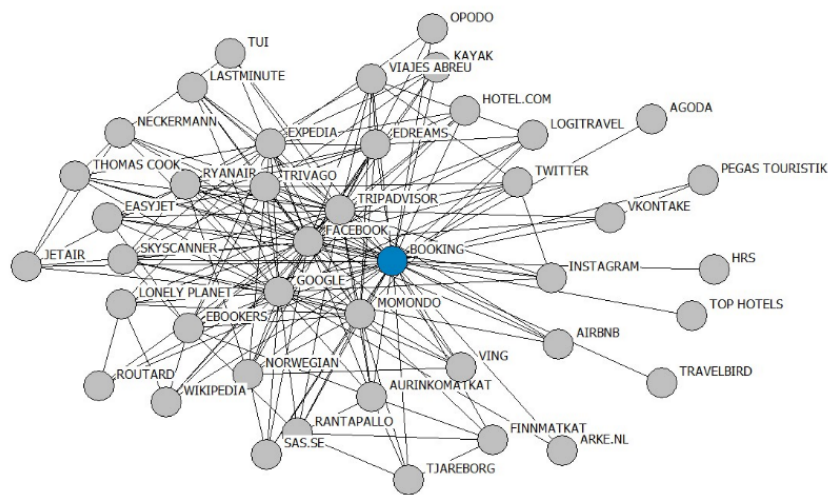
Fig. 5 Booking ego-network

4.3 Results by country

In order to better understand the e-tourism network in each European country, we calculated two of the four measures of centrality for each of the nationalities studied. We have selected degree and eigenvector, since their interpretation is rather comprehensible, useful and the results present significant differences among countries. Table 3 shows the degree centrality results obtained for the 19 countries studied, with Table 4 showing the results for the eigenvector centrality. To facilitate interpretation, the platforms are displayed with different colour intensity, depending on the number of countries where the platforms are listed, hence differentiating between global and country-specific platforms.

As it can be observed, there are four platforms used by almost all countries under study: Google, Facebook, Booking and TripAdvisor. At least two of these platforms always appear among the four platforms with the highest degree centrality in every country. Nevertheless, it is worth mentioning the disparity of other platforms between different nationalities. Some countries make use of international global platforms, while in others there is greater use of local platforms. For example, in Belgium, besides using the 'big four', big tour operators like Jetair or Neckerman show a high centrality. The same applies to Denmark (Spies), Finland (Aurinkomatkat), Norway (Ving and Finn.no) or Sweden (Fritidresor and Ving). Scandinavian countries show some important local tour operators' platforms.

Table 3 Degree Centrality per country

Germany		Austria		Belgium		Denmark	
Google	0,151	Google	0,277	Google	0,205	Google	0,305
Facebook	0,065	Booking	0,161	Booking	0,164	Momondo	0,198
Holiday Check	0,061	Facebook	0,149	Neckermann	0,162	Spies	0,117
Ab in den Urlaub	0,053	Tripadvisor	0,083	Jetair	0,150	Facebook	0,111
Booking	0,046	Holiday Check	0,074	Facebook	0,136	Startour	0,097
Trivago	0,043	Trivago	0,065	Tripadvisor	0,104	Apollo	0,057
Expedia	0,037	Tui	0,046	Thomas Cook	0,078	Tripadvisor	0,054
Tui	0,028	Checkfelix	0,030	Sunjets	0,067	Booking	0,050
Tripadvisor	0,024	Expedia	0,027	Ryanair	0,046	Bravo Tours	0,047
Opodo	0,016	Wikipedia	0,027	Sunweb	0,040	Expedia	0,040

Finland		France		Netherlands		Ireland	
Google	0,231	Tripadvisor	0,189	Google	0,334	Tripadvisor	0,388
Aurinkomatkat	0,172	Facebook	0,156	Booking	0,114	Google	0,252
Momondo	0,140	Booking	0,147	Arke.nl	0,072	Facebook	0,154
Tripadvisor	0,132	Google	0,114	Facebook	0,059	Booking	0,133
Rantapallo	0,119	Routard	0,100	D.Reizen.nl	0,047	Trivago	0,059
Finnmatkat	0,108	Expedia	0,074	Zoover	0,043	Expedia	0,054
Booking	0,106	Trivago	0,063	Tripadvisor	0,041	Ryanair	0,051
Tjareborg	0,104	Lastminute	0,057	Tui	0,035	Aerlingus	0,051
Facebook	0,101	Govoyages	0,047	Sunweb	0,030	Lonely Planet	0,034
Ebookers	0,096	Promovacances	0,047	Neckermann	0,024	Skyscanner	0,029

Italy		Luxembourg		Norway		Spain	
Booking	0,215	Booking	0,261	Google	0,316	Google	0,198
Tripadvisor	0,210	Google	0,186	Tripadvisor	0,164	Booking	0,160
Google	0,175	Tripadvisor	0,149	Finn.no	0,156	Tripadvisor	0,129
Trivago	0,144	Ryanair	0,056	Ving	0,141	Trivago	0,084
Facebook	0,101	Luxair	0,050	Facebook	0,138	Kayak	0,030
Expedia	0,084	Trivago	0,031	Norwegian	0,117	Edreams	0,028
Edreams	0,037	Expedia	0,031	Startour	0,097	Ryanair	0,024
Turistipercaso.it	0,033	Facebook	0,025	Apollo	0,074	Viajes el Corte Ingles	0,023
Volagratis	0,026	Airbnb	0,025	Momondo	0,065	Atrapalo	0,020
Lastminute	0,025	Routard	0,025	Booking	0,060	Rumbo	0,018

Poland		Portugal		United Kingdom		Czech Republic	
Google	0,240	Facebook	0,322	Tripadvisor	0,365	Google	0,252
Facebook	0,206	Viajes Abreu	0,182	Google	0,191	Facebook	0,160
Itaka	0,091	Google	0,180	Expedia	0,150	Seznam	0,087
Wakacje.pl	0,054	Booking	0,163	Facebook	0,137	Dovolena	0,056
Booking	0,042	Ryanair	0,092	Thomson	0,092	Fischer.cz	0,055
Tui	0,036	Edreams	0,091	Booking	0,082	Booking	0,051
Wikipedia	0,034	Tripadvisor	0,088	Thomas.Cook	0,078	Cedok.cz	0,051
Travel Planet	0,030	Easyjet	0,073	Trivago	0,054	Eximtours.cz	0,040
Tripadvisor	0,028	Trivago	0,067	Skyscanner	0,037	Wikipedia	0,038
Rainbowtours	0,028	Logitravel	0,067	Lonely Planet	0,031	Tripadvisor	0,029

Russia		Sweden		Switzerland	
Vkontake	0,207	Facebook	0,216	Google	0,221
Booking	0,181	Google	0,203	Booking	0,187
Facebook	0,126	Ving	0,167	Tripadvisor	0,172
Yandex	0,125	Fritidsresor	0,136	Ebookers	0,160
Tripadvisor	0,109	Tripadvisor	0,121	Facebook	0,144
Google	0,092	Apollo	0,091	Hotelplan	0,065
Top.Hotels	0,080	Booking	0,072	Easyjet	0,047
Pegas Touristik	0,075	Momondo	0,058	Trivago	0,046
Odnoklassniki	0,054	Instagram	0,045	Tui	0,038
Tez Tour	0,052	Reseguiden.se	0,042	Holiday Check	0,034

-> platform that appears in 15 or more countries; -> platform that appears between 11 and 14 countries;
-> platform that appears between 5 and 11; -> platform that appears in 5 or fewer countries;
-> platform that appears only in one country.

Tabla 4 Eigenvector centrality per country

Germany		Austria		Belgium		Denmark	
Google	0,984	Google	0,893	Jetair	0,472	Google	0,902
Facebook	0,088	Booking	0,313	Neckermann	0,457	Momondo	0,312
Booking	0,083	Facebook	0,242	Booking	0,405	Spies	0,162
Trivago	0,072	Tripadvisor	0,161	Google	0,395	Facebook	0,150
Tripadvisor	0,061	Trivago	0,082	Facebook	0,290	Startour	0,123
Ab in den Urlaub	0,058	Holiday Check	0,055	Thomas Cook	0,241	Apollo	0,076
Holiday Check	0,038	Wikipedia	0,043	Tripadvisor	0,232	Expedia	0,067
Expedia	0,029	Tui	0,043	Sunjets	0,172	Tripadvisor	0,064
Fluege	0,026	Urlaubguru.at	0,037	Ryanair	0,074	Booking	0,058
Opodo	0,023	Checkfelix	0,032	Sunweb	0,062	Bravo Tours	0,054

Finland		France		Netherlands		Ireland	
Aurinkomatkat	0,538	Tripadvisor	0,699	Google	0,988	Tripadvisor	0,888
Google	0,422	Booking	0,484	Booking	0,074	Google	0,330
Tjareborg	0,348	Facebook	0,293	Arke.nl	0,069	Booking	0,220
Finnmatkat	0,336	Routard	0,276	Zoover	0,062	Facebook	0,158
Momondo	0,252	Expedia	0,161	D.Reizen.nl	0,056	Expedia	0,100
Rantapallo	0,251	Google	0,139	Facebook	0,040	Trivago	0,081
Booking	0,205	Trivago	0,128	Sunweb	0,033	Lonely.Planet	0,056
Tripadvisor	0,205	Lastminute	0,088	Tripadvisor	0,027	Ryanair	0,052
Ebookers	0,165	Govoyages	0,080	Anwb	0,027	Aerlingus	0,042
Facebook	0,149	Promovacances	0,074	Corendon	0,022	Ebookers	0,033

Italy		Luxembourg		Norway		Spain	
Booking	-0,591	Booking	0,910	Google	0,776	Google	0,609
Tripadvisor	-0,589	Tripadvisor	0,313	Tripadvisor	0,289	Booking	0,595
Trivago	-0,371	Google	0,220	Ving	0,262	Tripadvisor	0,453
Google	-0,240	Ryanair	0,081	Finn.no	0,262	Trivago	0,235
Expedia	-0,219	Trivago	0,062	Facebook	0,224	Ryanair	0,074
Facebook	-0,188	Luxair	0,052	Norwegian	0,191	Edreams	0,051
Edreams	-0,072	Lastminute	0,050	Startour	0,184	Kayak	0,049
Turistipercaso.it	-0,058	Voyage Prive	0,046	Apollo	0,110	Rumbo	0,028
Lastminute	-0,054	Routard	0,045	Momondo	0,105	Logitravel	0,027
Skyscanner	-0,051	Expedia	0,044	Sas.se	0,096	Atrapalo	0,026

Poland		Portugal		United Kingdom		Czech Republic	
Google	0,758	Facebook	0,774	Tripadvisor	0,881	Google	0,903
Facebook	0,615	Viajes Abreu	0,388	Expedia	0,299	Facebook	0,336
Itaka	0,140	Booking	0,225	Google	0,221	Seznam	0,231
Twitter	0,071	Google	0,207	Booking	0,141	Wikipedia	0,073
Wakacje.pl	0,068	Twitter	0,164	Thomson	0,135	Booking	0,057
Rainbowtours	0,057	Ryanair	0,156	Facebook	0,128	Cedok.cz	0,056
Tui	0,051	Edreams	0,139	Thomas Cook	0,118	Fischer.cz	0,051
Wikipedia	0,051	Tripadvisor	0,134	Trivago	0,077	Tripadvisor	0,035
Booking	0,044	Easyjet	0,126	Skyscanner	0,056	Eximtours.cz	0,033
Travel Planet	0,039	TAP	0,125	Lonely Planet	0,055	Bluestyle.cz	0,023

Russia		Sweden		Switzerland	
Vkontake	0,720	Ving	0,539	Google	0,519
Facebook	0,401	Facebook	0,465	Booking	0,482
Booking	0,351	Fritidsresor	0,445	Tripadvisor	0,462
Yandex	0,252	Google	0,379	Ebookers	0,403
Tripadvisor	0,195	Apollo	0,271	Facebook	0,288
Odnoklassniki	0,162	Tripadvisor	0,153	Hotelplan	0,085
Pegas Touristik	0,140	Momondo	0,086	Easyjet	0,074
Google	0,119	Instagram	0,085	Trivago	0,065
Top Hotels	0,096	Booking	0,073	Routard	0,062
Tez Tour	0,071	Resia	0,072	Skyscanner	0,052

-> platform that appears in 15 or more countries; -> platform that appears between 11 and 14 countries;
-> platform that appears between 5 and 11; -> platform that appears in 5 or fewer countries;
-> platform that appears only in one country

Local platforms are also relevant in the Netherlands (Arke.nl, Zoover), Poland (Itaka, Wakacje.pl), Czech Republic (Seznam, Dovolena, Fischer.cz), or Spain (Kayak). Russia is noticeable for using its "own" search engine and social media (Yandex and Vkontake). Finally, there are other countries where the centrality of airlines' platforms is noteworthy, such as Portugal (Ryanair, easyJet) or Luxembourg (Ryanair, Luxair). On the other hand, there is a notable use of tour operators and travel agencies in some countries (Belgium, Denmark, Finland, Holland, Norway, Poland, Sweden or Czech Republic), in others the use of social networks is more prevalent (Russia), while others prefer to use search engines and comparators (Spain) or use mostly comparators, search engines and OTAs (Italy and France).

In terms of the degree centrality, there are a series of platforms that are only relevant to a specific country analysed (e.g. Ab in den Urlaub in Germany, Checkfelix in Austria, Jetair in Belgium, Spies in Denmark, Aurinko Matkat in Finland, Promovacances in France, Arke in The Netherlands, Aerlingus in Ireland, Turistipercaso. it in Italy, Luxair in Luxembourg, Norwegian and Finn.no in Norway, Kayak in Spain, Itaka in Poland, Viajes Abreu in Portugal, Thomson in the United Kingdom, Seznam in Czech Republic, Vkontake in Russia, Fritidresor in Sweden and Hotelplan in Switzerland). There are also differences between the main markets. For instance, in Germany, Austria and Switzerland, TUI and HolidayCheck play a relevant role. However, in the United Kingdom and Ireland TripAdvisor is the main review platform, Thomas Cook and Thomson are the main tour operator brands, and Expedia the most relevant OTA.

As it was observed for the degree centrality, there are some platforms that rank in the first places of eigenvector centrality (Table 4) without appearing in the ranking of other countries (e.g. Ab in den Urlaub for Germany, Jetair for Belgium, Spies for Denmark, Aurinko Matkat for Finland, Lastminute for France, Arke.nl for Netherlands, Aerlingus for Ireland, Turisticpercaso.it for Italy, Luxair for Luxemburg, Finn.no for Norway, Atrapalo for Spain, Itaka for Poland, Viajes Abreu and Tap for Portugal, Thomson for the United Kingdom, Seznam for Czech Republic, and Vkontake for Russia).

Some platforms appear in the ranking of eigenvector centrality, but not in the ranking of degree centrality. For example, this is the case of Fluegue, Anwb, Corendon, Sas.se, Voyage-prive, TAP, Blue-Style.cz, Twitter and Resia. According to the definition of both

indicators, these platforms are not used so much by tourists as those shown in Table 3, but they are usually combined with the most central platforms.

5. Conclusions

This study helps in understanding from an innovative methodological approach the use of e-tourism information sources by European tourists for choosing their travel destination, and how platforms are connected through modelling a complex network. The theoretical contribution is related to the information search literature and the following under-researched topic (Almeida-Santana and Moreno-Gil 2017; Juaneda-Ayensa et al. 2016): this research jointly analyses the interconnections of all the platforms in the e-tourism network from an Omni-channel perspective. The results obtained are useful for tourism companies and DMOs in order to design their segmentation and promotion strategy through e-tourism platforms in the European market. The main practical contribution of this research lies in helping to understand the Europeans' information search related to the e-tourism network. More specifically, this study analyses 178 e-tourism platforms, considering jointly the different typologies—generic and tourist (OTAs, search engines, social media, comparators, destination websites, providers' websites—hotels, airlines, etc.), and understanding how they are interconnected in the e-tourism network. The results identify the 'big four' platforms, of Facebook, TripAdvisor, Google and Booking, that are the most important connectors in the network, playing a crucial role in its configuration. The European e-tourism network presents a core structure formed by the 'big four' platforms. These platforms are located in the centre of the network and therefore are those that have more connections among them and with other platforms used by tourists. The rest of the platforms are located in the periphery, which present many connections to the core but not so many among themselves.

In addition, the analysed centrality metrics allow to understand the role of the different platforms in connecting with others. For instance, the 'big four' platforms are connected with more than 50 other websites, becoming key platforms in terms of co-marketing. Moreover, the visual representation of the European e-tourism network and of the 'big four' ego-networks facilitates a fine-tuning analysis of the most important platforms in configuring the network. The results confirm that Google has become the main gateway to the European tourism ecosystem. This has generated a new complex dynamic scenario where traditional agents (tour operators, travel agencies, hotels, airlines) but also new

Internet companies (OTAs, review communities, sharing economy platforms, social media) are competing for centrality. Centrality will eventually mean market power (traffic, gaining advertisement from other platforms, etc.).

Another contribution of this research is the analysing of 19 European countries, and the specific networks in each. It can be concluded that destinations and tourism providers should adapt their marketing strategies by country, considering the e-tourism configuration in each target market. Furthermore, some platforms allow destinations to develop a community marketing strategy, where those communities (for instance, Facebook and TripAdvisor) are represented throughout the majority of European countries. However, other platforms play a crucial role only in one particular country. Additionally, the size of the e-tourism network by country is not related to the size of the tourism market in that country, and the main European markets (Germany, the United Kingdom) actually show a higher concentration of platforms and fewer central agents than in other countries.

European tourists use a vast number of Internet platforms—more than 470— when making their travel decisions, generating a complex e-tourism ecosystem. Further analysis is needed to better understand these convoluted relationships. Future research should face some limitations, and analyse the key performance indicators, such as conversion rates, return on investiment (ROI), etc., by the different network configurations and markets. New theoretical and applied analyses of the e-tourism ecosystem are suggested, and the network science offers an interesting approach to shed some light on this important scientific field.

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CHAPTER 2

UNDERSTANDING SHARING ECONOMY AND THE GENERATION EFFECT IN THE DIGITAL ECONOMY AND THE TOURISM ECOSYSTEM

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CHAPTER 2

Understanding sharing economy and the generation effect in the digital economy and the tourism ecosystem.

Abstract

The platform economy (PE) has emerged as an alternative supplier of goods and services traditionally provided by long-established industries. Furthermore, PE is driven by the development and proliferation of platforms. Since its inception, the tourism industry has presented itself as one of the sectors that has allowed it to grow more and in which the sharing economy has had a greater impact. Thus, the aim of this study is twofold. In the first place, it explains the digital economy and the role played by the sharing economy in this network of platforms that tries to dominate the tourist market. Secondly, it analyses the differences in the use of the platform economy, between the generation Y, X and Baby Boomers and how these networks differ between generations. Finally, the implications for the future of the platform economy in the tourism industry are discussed. Applying the methodology of social network analysis (SNA), with 13,243 tourists from 19 European countries, the study provides interesting recommendations for destinations with a view to better designing marketing activities across different European countries.

1. Introduction

The so-called sharing economy (SE) should be better addressed as platform economy; both terms will be used throughout the text indistinctively. This transformative business model has been developed by new start-up players, who have made the peer-to-peer relationships possible in a very convenient and on-line model. Thus, these new platforms have replaced the traditional intermediaries (travel agencies, tour operators, etc.) to a certain extent competing at the same time with new non-tourism info-intermediaries (Google, Facebook) who try to capture the leads, and thus to increase their social capital and power.

Traditional studies on sharing economy have been oriented to analyse the consumer behaviour (offering and demand side) in using these platforms (motivations to use them, etc.) (Belk, 2014; Lamberton and Rose, 2012; Möhlmann, 2015), the legal and financial implications and the transformative effect on the destinations (Guttentag, 2015; Zervas, Proserpio and Byers, 2017). Some previous research has analysed business models and platforms such as Airbnb (Zervas et al., 2017) and Couchsurfing (Decrop, Del Chiappa, Mallargé and Zidda, 2018). However, the literature has not addressed the relationship between traditional tourism intermediaries and novel platforms, including new stakeholders that dominate the information and sales in the digital economy. In addition, there is a lack of understanding of how these relations affect the interactions and relationships between the platforms encompassed in the digital economy.

Analysing the platform economy from a general network perspective is crucial to understanding properly this new phenomenon and the digital ecosystem. The whole process starts in the Zero Moment of Truth (Lecinski, 2011) when tourists begin their on-line research in order to make a travel decision. Thus, the different touristic stakeholders (traditional web sites: tour operators, travel agencies, airlines, on-line travel agencies, tourism comparators, etc.) and non-touristic stakeholders (search engines, review platforms, social networks, etc.) compete, in an ecosystem also occupied by SE platforms among many others. Any platform can connect interactions between users, but they first must win the battle to catch the tourists' attention in the Zero moment of truth, either by providing valuable information (reviews, destination explanations, etc.) or convenient deals –value for money.

In addition, new generations have radically changed the way the interactions with the offering companies and their customers take place. Millennials are a digital generation (Gorman, Nelson and Glassman, 2004), however, generation X and baby-boomers are also an important part of the market interaction in this economy.

The aim of this research is twofold. It first explains the role that the sharing economy is playing in this network of platforms by trying to dominate the tourism market in the digital ecosystem. Secondly, it analyses the use of the platform economy between generations Y, X and Baby Boomers (BB), and how these networks differ between generations. Finally, the implications for the future of the sharing economy in the tourism digital ecosystem are discussed.

2. Literature review

2. 1. Platform economy

We are immersed in a digital economy (Srineck, 2016), in which the power of the Internet leads our economic and social lives. Digital platforms are the basis on which an increasing number of activities are being organised, and have been defined as frameworks that allow users to carry out a series of activities, forming complete ecosystems for the creation and value capture (Kenney and Zysman, 2015). The term platform economy covers different types of relationships and actions by individuals and organisations on the Internet. It is not a homogeneous phenomenon, but includes different modalities of exchange and interaction between individuals through digital platforms (Möhlmann, 2015). Thus, the platform economy has been defined as a set of initiatives that intermediate decentralised exchanges among peers through digital platforms (Acquier, Dudigeos and Pinkse, 2017; Srineck, 2016; Sundararajan, 2016) giving rise to new models of business.

The SE is an emerging phenomenon that is driven by the development and proliferation of these platforms (Breidbach and Brodie, 2017). Although the term sharing economy (Belk, 2014; Cusumano, 2015; Sundararajan, 2014) seems to be the most widespread term to describe this economic and social phenomenon, an increasing number of authors prefer to frame it within the so-called platform economy (Kenney and Zysman, 2016). The world has witnessed a strong increase and penetration of the sharing economy facilitated by the growing emergence of digital platforms. Thus, the sharing economy cannot be understood

in isolation, since this trend is an extension of the new market mechanism that has been denominated the platform economy (Drahokoupil and Fabo, 2016).

The platform economy is currently growing at a spectacular rate (Drahokoupil and Fabo, 2016; Heo, 2016). Because of this rapid growth, there have been several recent lines of research in literature. Some researchers have analysed the reasons why customers use this type of services (Hamari, Sjöklint and Ukkonen, 2016), mentioning the sustainability, economic reasons or reasons for convenience of the services offered, among many others. Other researchers, analyse the impact of the platform economy in a specific sector (Zervas et al., 2017), the global problems of the platform economy (Malhotra and Van Alstyne, 2014), possible situations of racial discrimination against Airbnb owners (Edelman and Luca, 2014) and, the concept of how to attract more bookings to the platform economy, by analysing the purchasing process carried out by consumers (Ert, Fleischer and Magen, 2016). Finally, the type of employment that is being generated by the development of this economy is being analysed (Aloisi, 2016).

However, academic research in this context is still novel (Drahokoupil and Fabo, 2016; Heinrichs, 2013), and literature has not yet studied the interaction and relationship of the platform economy in the digital ecosystem with the rest of the traditional tourism intermediaries and the new web-sites dominating the information and sales in the digital economy. Furthermore, empirical studies of "sharing" have not taken the latest generation of sharing platforms into consideration (Breidbach and Brodie, 2017).

2.2 The role of platforms in the new digital tourism ecosystem

The platform economy has caused a disruption in traditional markets, for example, in transport and accommodation services (D'aveni and Ravenscraft, 1994; Srineck, 2016), with tourism being one of the activities in which the platform economy has developed most intensively, significantly transforming the sector (Decrop et al., 2018). Thus, the platform economy has transformed the digital tourism ecosystem, in which, the traditional platforms (web sites-tourist operators, travel agencies, airlines, etc.), new tourism stakeholders (online travel agencies, tourism comparators and review platforms), sharing economy platforms (Airbnb, HomeAway, ...) and new non-tourist start-ups (Google, social networks, etc.) coexist, facilitating processes of value co-creation between different agents (Edvardsson, Gustafsson, Kristensson and Witell, 2010) and competing, in turn, among them. In this way, these platforms create strong network effects, since their

relative value increase with the number of actors (users and providers) that join their digital "ecosystem" (Acquier et al., 2017). However, research in this new digital ecosystem is still limited. To our knowledge, there are no studies that analyse the relationships that can occur between the different types of platforms in the digital ecosystem connected through individuals.

Werthner (2003) describes this digital ecosystem in the context of tourism as an "intelligent" tourism system supporting autonomous networked "nodes" with dynamic network configurations in heterogeneous and distributed environments. In addition, it characterises it as a flexible communication support, allowing access to information anywhere and at any time, covering the complete life cycles of the consumer and all business phases, and going through different businesses and users. The products and services are assembled dynamically (grouped) by companies and users alike, creating new markets and experiences of added value.

In addition, tourism ecosystems are especially dynamic and, on a global scale, many sharing economy platforms have emerged, with TripAdvisor (Sigala, 2017) and AirBnB (Zervas et al., 2017) being prominent examples that have come to be part of this ecosystem, coexisting with traditional platforms and non-tourist platforms. This ecosystem is rapidly changing and requires that their relationships co-evolve (Gretzel, Werthner, Koo and Lamsfus, 2015). In the near future we will see the development of new platforms, the disappearance of many of them and the consolidation of others. Thus, more studies are necessary to correctly understand their implications in the sector (Cheng, 2016). Understanding what role the sharing economy plays in the tourism ecosystem is fundamental for the development of marketing strategies.

2.3 Zero moment of truth in the digital tourism ecosystem

New technologies and the emergence of digital platforms have also changed consumer behaviour (Gretzel et al., 2015), since they have become the most commonplace for information search (Xiang and Gretzel, 2010), changing the traditional consumer decision journey (Hudson and Thal, 2013). Tourists have always been recognised as active contributors to the experience and main actors, but now, thanks to the emergence of these platforms, they are formally conceptualised as co-creators of value within tourism ecosystems (Vargo and Lusch, 2008). In this way, understanding how tourists have included these platforms in their decision-making process is essential to identify and

develop effective communication strategies (Xiang, Wang, O'Leary and Fesenmaier, 2014).

The consumer decision process, before the appearance of the new digital economy, was made up of three different stages: the stimulus (advertisements on television, radio, press, other printed material, or on the web), the first moment of truth (phase prior to the purchase in the decision process, in which the consumer assesses different factors that are decisive for the purchase) and finally, the second moment of truth (the experience after the purchase). However, many authors agree that this model fails to capture current purchasing trends due to technological advances, and open a new stage in the decision-making process (Hudson and Thal, 2013; Lecinski, 2011), which has been called the zero moment of truth, a term recently coined to describe the new reality where companies must compete for the attention of buyers long before the purchase decision is made (Lecinski, 2011). The zero moment of truth describes the online research carried out by tourists before buying a product. Being present at this moment is the key to the success of companies in the new digital ecosystem in which we find ourselves. In this way, knowing when and where tourists conduct their search for information online will help companies to design their digital strategy.

2.4 Generations

Consumer behaviour is usually analysed by groups of people. In this context, a group can be defined as a "cohort", a group of people who have experienced a significant event or series of events during a given period of time (Glenn, 1977). This "cohort" can be defined by age, education, year of birth, etc. (Pennington-Gray, Fridgen and Stynes, 2003). When the birth limits of the "cohort" are imposed from events, that is, natural limits, it is known as a generational cohort (Pennington-Gray et al., 2003). Specifically, the generational cut is a way of dividing the population into segments proposed by Inglehart (1997), which has gained importance in recent years (Pennington-Gray et al., 2003).

These cohorts are usually established according to the years of birth and cover periods of 20-25 years (Lissitsa and Kol, 2016; Meredith and Schewe, 1994), where similar historical, social, cultural, political or economic events are experienced in the different phases of life (Beldona, 2005; Chaney, Touzani and Slimane, 2017; Glenn, 1977; Mannheim, 1952; Pennington-Gray et al., 2003; Sessa, Kabacoff, Deal and Brown, 2007; Strauss and Howe, 1991; Turner, 1998), especially during youth (Mannheim, 1952;

Schuman and Scott, 1989). This influences the formation of values, motivations, personalities, attitudes, ideologies, beliefs, life perspective, consumption patterns, habits, lifestyles, preferences, experiences, etc. (Beldona, 2005; Bolton et al., 2013; Chaney et al., 2017; Lissitsa and Kol, 2016; Mannheim, 1952; Parment, 2011, 2013; Simirenko, 1966; Turner, 1998). Therefore, each generation differs by having unique and similar characteristics (Chen and Shoemaker, 2014; Mannheim, 1952), creating a generational identity (Egri and Ralsston, 2004; Eyerman and Turner, 1998; Hung, Gu and Yim, 2007; Inglehart, 1997; Lissitsa and Kol, 2016; Strauss and Howe, 1991). Consequently, marketing strategies must be carried out at a generational level (Chaney et al., 2017; Pennington-Gray et al., 2003).

In addition, generational segmentation is considered the most useful, rich and effective statistical technique to study the behaviour of the members (Beldona, 2005; Chaney et al., 2017; Lissitsa and Kol, 2016; Parment, 2013).

In order to understand the different values and motivations of each generation, first, generational groups must be identified. From this point, tourists' motivations belonging to each generation can be identified, as well as the reasons that drive them to a certain behaviour. Literature distinguishes different names and dates to identify generations, however, most studies use the following nomenclature: baby boomers, generation X and generation Y.

Most researchers agree that people who belong to the baby boom generation are those born between 1946-1964 (Cornman and Kingson, 1997; Dohm, 2000; Patterson and Pegg, 2009; Roof, 2001; Strauss and Howe, 1991; Wuthnow, 2010; Yu and Miller, 2005). However, other authors use alternative classifications: 1943-1960 (Beldona, 2005; Elam, Stratton and Gibson, 2007), 1945-1964 (Eisner, 2005), 1946-1960 (Bolton et al., 2013).

In the scenario where the final cut for baby boomers is established in 1964, Generation X would begin in 1965 (Eisner, 2005; Pennington-Gray et al., 2003; Yu and Miller, 2005) and ends in 1980 (Eisner, 2005; Gurău, 2012; Yu and Miller, 2005). However, other authors use a different cut: 1961-1980 (Gurău, 2012; Lissitsa and Kol, 2016), 1961-1981 (Beldona, 2005; Bolton et al., 2013; Elam et al., 2007), 1965-1979 (Kumar, Lahiri, and Dogan, 2018), 1965-1981 (Pennington-Gray et al., 2003), 1966-1980 (Chaney et al., 2017).

One of the most recent generations is the Millenial or Y generation. Due to its recent definition, the cut off years are not well defined, finding disparate classifications. Some researchers have not defined the exact date at which the generation ends (Eisner, 2005; Pennington-Gray et al., 2003; Schweitzer and Lyons, 2010), however, most agree that it starts around 1980 and ends around 2000 (Benckendorff, Moscardo and Pendergast, 2010; Bolton et al., 2013; Brosdahl and Carpenter, 2011; Cohen, Prayag, and Moital, 2014; Elam et al., 2007; Gurău, 2012; Lissitsa and Kol, 2016; Meister and Willyerd, 2010; Much, Wagener, Breitkreutz, and Hellenbrand, 2014; Nusair, Parsa and Cobanoglu, 2011; Yu and Miller, 2005). In the present study, we decided to establish a generation Y between 1981 and 2000.

Finally, Generation Z is the next and the most recent cohort, which are already reaching young adulthood. There is no general agreement on the exact boundaries of this generation, although most of the authors comment that it covers from the mid-1990s until the late 2000s (Benckendorff, et al., 2010; Posnick-Goodwin, 2010; Seemiller and Grace, 2016; Skinner, Sarpong and White, 2018; Turner, 2015; Wiedmer, 2015). They are digital natives, the generation with the earliest access to technology (Prensky, 2001) and access to more information (Kardes, Cronley and Cline, 2014). Generation Z will play a crucial role in tourism in the future and seek new experiences in tourism (Haddouche and Salomone, 2018; Skinner, et al., 2018). As a result, tourism must adapt to new generations and to a dynamic and changing market (Cohen, et al., 2014). Future studies should take into consideration this generation.

Therefore, the present study focuses on three generations: baby boomers (1946-1964), generation X (1965-1980) and generation Y or Millenials (1981-2000). Through the analysis of generational differences, we can better understand the use of sharing economy platforms.

2.4.1 Baby Boomers

Baby boomers are a generation with very different experiences therefore they are a dispersed generation with different objectives and needs (Cornman and Kingson, 1997; Kingson, 1992). However, they are characterised by having worked hard to achieve their goals (Kumar et al., 2018). The birth rate of this generation was very high therefore, they are a very significant generational cohort in western societies (Chaney et al., 2017).

On the other hand, if the product or service has the values they are looking for, they are less price sensitive (Kumar et al., 2018) as they are characterised by having a very high average income (Chaney et al., 2017). Moreover, they trust the retailer (Chaney et al., 2017; Parment, 2013). They are currently beginning to retire and are financially stable (Kumar et al., 2018).

They use cable and satellite television and are open to adopting smartphones and Internet for functional use (Kumar et al., 2018). Moreover, they adopted the Internet sooner than expected (Beldona, 2005). Therefore, a balance between digital and traditional promotion must be sought in order to reach the entire generation (Kumar et al., 2018).

It is more feasible for baby boomers to participate in the sharing economy with a more prominent role, because they have flexible hours and free time. On other hand, they are considered active and in good health, (Chen and Shoemaker, 2014) so they are not a weak, dependent and lonely generation (Beldona, 2005).

In addition, economically and technologically they are more prepared to travel where they want and how they want, than previous generations (Tiago, Almeida Couto, Tiago and Faria, 2016). According to these authors, they are people willing to travel and can do it more times and for longer periods than what was done previously. They do not want predictability when travelling but they look for exciting adventures and new challenges (Chen and Shoemaker, 2014; Patterson and Pegg, 2009). They also consider themselves younger than they are, want to feel young again, relive experiences and remember their youth (Chen and Shoemaker, 2014; Patterson and Pegg, 2009).

2.4.2. X Generation

This generation has been less studied since it is between two great generations and does not have as many distinctive characteristics as Millennials and Baby Boomers (Lösing, 2016; Taylor and Gao, 2014).

Generation X has grown marked by the threat of nuclear war, the economic crisis, unemployment (Chaney et al., 2017; Solomon, 2014), economic uncertainty, recessions of the 80s and 90s, divorces, and within families where both parents worked (Lösing, 2016; Pennington-Gray et al., 2003). As a result of poverty and non-traditional families, many became independent soon (Lösing, 2016). They are also characterised by being individual, self-sufficient (Gursoy et al., 2008; Much et al., 2014; Taylor and Gao, 2014),

skeptic (Crumpacker and Crumpacker, 2007; Pennington-Gray et al., 2003; Reisenwitz and Iyer, 2009) and socially insecure (Barford and Hester, 2011) having been labelled even as the generation of fear (Chaney et al., 2017). So they feel more secure if they take into account the opinions of others (Lissitsa and Kol, 2016).

On the other hand, they are at the peak of their careers (Kumar et al., 2018) with high income and economic stability, granting them a high purchasing power (Peralta, 2015). In addition, their expenditure on clothes, entertainment, food and restaurants is high (Chaney et al., 2017) and they often help their families financially. Moreover, they worry about having a stable job that covers their medical expenses (Kumar et al., 2018; Williams and Page, 2011) because they do not have confidence in the government, so they expect that the members of the generation will be those who take it forward (Pennington-Gray et al., 2003).

Regarding the digital domain, they are considered digital immigrants (Bennett, Maton and Kervin, 2008) since they use both smartphones and social networks as well as desktop computers or laptops (Kumar et al., 2018). However, they prefer email over conventional mail, word of mouth and social meetings (Kumar et al., 2018).

They do not trust traditional advertisement through television, press and radio, which makes it more difficult to persuade them and influence their behaviour (Kumar et al., 2018; Chaney et al., 2017).

Regarding their purchasing behaviour, it is worth noting that they value high-quality products, are attracted to personalised marketing and spend more online than the Y generation (Lissitsa and Kol, 2016; Lösing, 2016).

2.4.3 Y Generation or Millenials

Generation Y is born and grows in complex family situations thus, they develop a sense for the community. However, their economic conditions are strong, with capitalist, materialist and consumerist influence (Bakewell et al., 2006). They are characterised by being multitaskers, passionate about fun and personal freedom (Benckendorff et al., 2010), optimistic (Howe and Strauss, 2007), they are safe and self-expressive (Lösing, 2016), materialistic, self-centred (Ong and Cros, 2012; Rosen, 2009; Sabet, 2010) and consumption-oriented (Jackson, Stoel and Brantley, 2011; Lissitsa and Kol, 2016). They look for instant gratification, are used to relative abundance, have a relatively high income

which is expected to increase in a few years (Cohen et al., 2014; Lösing, 2016) and travel frequently (Cohen et al., 2014; Nusair, Bilgihan, Okumus and Cobanoglu, 2013; Nusair et al., 2011). However, they are a protected generation (Howe and Strauss, 2007).

On the other hand, they are the first generation to have grown up with computers, they are considered digital natives and they use technology above all to communicate through social networks such as Facebook, Twitter or Instagram (Bennett et al., 2008; Lissitsa and Kol, 2016; Lösing, 2016; Norum, 2003; Palfrey and Gasser, 2011; Prensky, 2001). They have grown up in the era of globalisation and information, saturated with multimedia influence (Benckendorff et al., 2010; Cohen et al., 2014), always connected to different devices (Chaney et al., 2017) for social interactions as well as for civic activities (Bolton et al., 2013; Lissitsa and Kol, 2016). Therefore, they are considered experts in technology (Benckendorff et al., 2010; Bolton et al., 2013; Lösing, 2016). The constant connexion to the world makes them more open to changes (Lösing, 2016), allows them to question the authority and traditional hierarchical structures, share and disseminate opinions and expect information exchange in a similar way as they do (Bolton et al., 2013; Chaney et al., 2017).

This generation is used to use electronic commerce, which gives them access to search for a wide range of products/services and change the site of purchase with a very low cost. As a result, the commitment of this generation to use or buy in certain websites is considerably reduced (Nusair, et al., 2011). Therefore, they are not loyal to brands because they look for specific characteristics in a product, style and quality and look at the price, changing fashion, trend and popularity (Lissitsa and Kol, 2016; Reisenwitz and Iyer, 2009). In addition, they want them to be practical and like useful products and services (Kumar et al., 2018). The access to this amount of information allows them to carry out a preliminary investigation on the subject they wish to know and to check this information (Lissitsa and Kol, 2016). However, this generation is characterised by taking quick and less deliberate decisions, so it tends to make impulse purchases more frequently (Lissitsa and Kol, 2016).

On the other hand, they trust the comments on a blog more than in a traditional advertisement (Lissitsa and Kol, 2016; Kumar et al., 2018).

Finally, some authors trust that Millennials will become the main source of tourists for some destinations and attractions in the near future (Cohen et al., 2014).

2.4.4 Generations and information sources

Generation Y actively contributes to the content of social networks such as Facebook, Twitter or Instagram (Lösing, 2016), being able to participate makes them feel important, they feel comfortable with new technologies (Bolton et al., 2013). Furthermore, they are prone to using the Internet as part of their daily routine, (Hershatter and Epstein, 2010; Pempek et al., 2009), however, this is less common in other generations (Chaney et al., 2017). This is because their contact with technology such as social networks or mobile phones started at an early age (Bolton et al., 2013; Chaney et al., 2017; Hershatter and Epste, 2010; Lissitsa and Kol, 2016; Lösing, 2016). Mobile phones, computers, laptops, tablets and social networks are essential in their life both to interact socially, as a hobby, to learn about products and services, to travel and to work (Jackson et al., 2011; Lösing, 2016; Mangold and Smith, 2012; Parment, 2013).

Generation Y is the one that most uses services related to the sharing economy due to its values, attitudes and ideologies, with the rest of generations being in the initial phase of adoption of said services (Kumar et al., 2018). They feel the need to interact and therefore tend to use more social networks (Bolton et al., 2013), however, they interact less with acquaintances, friends and family. As a consequence, they value the opinions made by other people in social networks (Bolton et al., 2013). Millennials actively contribute, share, search and consume digital content on social media platforms (Bolton et al., 2013; Lösing, 2016; Mangold and Smith, 2012).

Although the youngest generations have high rates of Internet use compared to the Baby Boom generation (Lissitsa and Kol, 2016), generation Y uses it more often than X. However, generation X spends more on online purchases than Y (Lösing, 2016). Online purchases have an opposite trend as age increases in generation X, however, the opposite occurs with generation Y.

It is clear that generation Y leads the way with new technologies, however, we must not lose sight of the X generation or the Baby Boomers when it comes to using the platform economy. Generation X is up-to-date regarding the use of the Internet and its advantages, frequently using applications such as Google, Amazon and Wikipedia (Lösing, 2016). The Baby Boomers use Smartphone and Internet for functional things, cable television and satellite, for that reason they are considered good to be service providers through the sharing economy such as P2P, Airbnb (Kumar et al., 2018).

Finally, it is important to highlight that depending on the target generation, promotion must be done through one channel or another (Chaney et al., 2017; Lösing, 2016).

3. Methodology

To achieve the proposed objectives, a specific fieldwork was carried out, developed after a bibliographic review focusing on socio-demographic and holiday behaviour variables.

3.1 Population and sample selection

Europe remains the largest outbound region for tourist flows in the world, a region that generates more than half of the annual international arrivals (UNWTO, 2018). Therefore, the target population of this study includes tourists from the 19 major European countries in tourist terms: Germany, Austria, Belgium, Denmark, Spain, Russia, Finland, France, Ireland, Italy, Luxembourg, Norway, Poland, Portugal, The Netherlands, United Kingdom, Czech Republic, Sweden and Switzerland, aged 16 and over, who had travelled abroad during the last two years and who had used internet for planning their holidays.

A computer-assisted web interview (CAWI) was undertaken considering a sample of the 19 countries mentioned, chosen from a database of panellists in each country. In order to keep the representativeness of the sample within the population of each country, a random selection was made based on the variables of stratification of geographical area and province and on the criteria of gender and age. The selected sample was sent a personalised e-mail inviting them to participate in the study. Embedded in the mail itself was a personalised link that led them to the online survey. In order to ensure the expected number of surveys, two reminders were held to encourage response during the three months of fieldwork in the different countries. The final sample was 13,243 tourists. Table 1 shows the basic profile of the sample analysed.

Table 1. Tourists' profile

		Total tourists	Percentage
Age	From 16 to 24	1522	11.50
	From 25 to 30	1751	13.20
	From 31 to 45	4415	33.30
	From 46 to 60	3823	28.90
	Older than 60	1732	13.10
Gender	Male	6233	47.10
	Female	7010	52.90
Income	Less than 12,000	2159	16.30
	12,000 – 48,000	6844	51.70
	48,001 – 84,000	2927	22.10
	More than 84,000	1313	9.90
Studies	Primary	10842	8.20
	Secondary	4647	35.10
	University degree	2948	22.30
	University masters, doctorate	4527	34.20
	No studies	39	0.30
Nationality	Austria	672	5.10
	Belgium	654	4.90
	Czech Republic	770	5.80
	Denmark	701	5.30
	Finland	923	7.00
	France	719	5.40
	Germany	737	5.60
	Netherlands	740	5.60
	Ireland	611	4.60
	Italy	881	6.70
	Luxembourg	161	1.20
	Norway	718	5.40
	Poland	670	5.10
	Portugal	762	5.80
	Russia	762	5.80
	Spain	711	5.40
	Sweden	693	5.20
	Switzerland	611	4.60
	UK	747	5.60

3.2 Questionnaire, quality control and data analysis

In order to achieve the proposed objectives, the questionnaire asked tourists - open questions - on the platforms used for planning their holidays and booking their accommodation. In addition, socio-demographic, nationality, and typographic variables were also included.

The questionnaire was translated into the languages of each country analysed. Once the questionnaire was pre-tested in the language of the potential tourists, and the pertinent corrections made to the questions that raised comprehension difficulties, the interviews were carried out. The online system, after the relevant programming had taken place, reviewed all the interviews conducted, detecting the time that a respondent had taken to

respond to the survey, thus any survey answered in less than 5 minutes was not accepted as valid. After completing the fieldwork, frequency analysis was carried out with the latest version of the SPSS statistical analysis program.

Once the questionnaires have been conducted and the corresponding quality controls have been applied, we performed the data analysis. Social network analysis (SNA) was chosen because it is an appropriate methodology to examine the interrelationships between the platforms used by tourists, mainly those called sharing economy platforms. Finally, a total of 104 platforms and 13243 tourists were analysed.

3.2.1 Social Network Analysis

The methodology of SNA provides quantitative metrics to analyse networks, which are formed by nodes and their relationships (Borgatti, Everett and Johnson, 2018). The network studied here is an affiliation network with two categories of nodes, tourists and platforms. In this network tourists are connected to a platform if they have consulted this platform. From this two-mode network a one-mode network can be extracted containing platforms shared by tourists. That is, two platforms are connected if the same tourist has consulted them.

The present study analyses the network of platforms shared by tourists at the global level, encompassing the entire network. Additionally, it analyses the affiliation network of platforms and tourists at the micro level, that is, the characteristics of the nodes are analysed individually (Benckendorff, 2010; Liu et al., 2005). Then, a specific network structure (core-periphery) was detected. Finally, some of these networks were represented.

The percentage represented by each category of platforms for each generation was observed for the global level analysis. Then, the global level metrics were calculated based on Borgatti et al., (2018) and Hanneman and Riddle (2005). These global level metrics include:

a) Network density: the proportion of the total number of links in the network with respect to the total of possible links.

b) Network density (weighted): the average weight of the network.

c) Clustering coefficient: the number of present triangle connections in relation to all the possible connections in the network. It indicates the cohesion degree of the network of platforms used by tourists to search information about tourist destinations.

d) Average distance: It is the shortest path length (minimum number of edges connecting two nodes) and measures the average distance between two nodes.

e) QAP Correlation: It estimates the Pearson correlation coefficient between square matrices, which allows observing the similarity of two networks.

For the micro level analysis, we use centrality metrics based on Bonacich (2007), Borgatti and Everett (1997) and Freeman (1978). These metrics help us to observe the influence of the nodes in the network (König and Battiston, 2009; Wang, Li and Lai, 2018), identifying the most important platforms of the network in terms of centrality. Specifically, Degree and Eigenvector centralities are applied. Degree centrality measures the number of direct links that a node has. Eigenvector centrality is similar to Degree centrality but weighted by the centrality of each adjacent node. When applied to a platform it is the sum of the centralities of the tourists who consulted it (Borgatti and Everett, 1997). If the eigenvector centrality of the platform is high, it is because central tourists refer to this platform concomitantly to other central platforms. All centrality metrics are normalised according to its maximum possible value.

Finally, the continuous model to detect core-periphery structures in networks is applied (Borgatti and Everett, 2000; Borgatti et al., 2018). This algorithm orders the nodes according to a measure called "Coreness" and proposes a core with those nodes with highest correlation respect to an ideal core-periphery structure. Core platforms have many connections with other platforms used by tourists and periphery platforms are mostly connected to the central platforms but not to each other.

Analyses were conducted using the UCINET 6.591 software (Borgatti et al., 2002; Borgatti et al., 2018) and the network was represented using Graph Theoretic Layout 'Spring Embedding' (GTL) with NetDraw software. This arrangement uses the multidimensional scaling method (MDS) to distribute the nodes using geodesic distances and, to avoid overlapping nodes it applies a nodes repulsion function (Borgatti et al., 2018).

4. Results

4.1 Global Level Analysis

In order to better understand the global structure of the digital ecosystem and the sharing economy, a global level analysis is carried out. In the first place, four platforms-tourists networks are obtained according to the generations: Total, Y, X and BB. Then, the corresponding platform-platform networks are built from these affiliation networks. Therefore, we can compare the use of the platforms between generations.

The description of these networks is shown in Table 2. The first block (two rows) indicates the number of tourists and platforms in the affiliation networks. No big differences are observed; Y network is the largest network in terms of tourists, and BB the smallest.

The following block shows the percentage of platforms used according to different platform categories. Non-tourist sources are the most used platforms for the total of tourists and generation Y followed by Comparators, Search Engines and online travel agencies (OTAs). The most commonly used platforms for generation X and Baby Boomers are Comparators, Search Engines and OTAs followed by Non-tourist sources, although the difference is very subtle. Finally, Baby Boomers are characterised to largely use Tour Operators and Travel Agencies, fitting with the functional use of the internet that characterises this generation.

Comparators, Search Engines and OTAs and Sharing Economy are more used by Generation X than Y and BB. As previously mentioned, they take into account other opinions and discuss the characteristics of the products (Lissitsa and Kol, 2016). They prefer alternative marketing strategies over traditional marketing (Chaney et al., 2017; Kumar et al., 2018) and they are more attracted to personalised marketing, within which the sharing economy could be included.

Finally, generation Y uses more Airlines and Non-tourist sources than the other analysed generations. As mentioned above, they have grown up with Internet and social networks and use them to communicate through non-tourist platforms such as Facebook, Twitter or Instagram (Lösing, 2016). On the other hand, as they are digital natives and are able to use the internet resources as they wish, they are considered technology experts (Benckendorff et al., 2010; Bolton et al., 2013; Lösing, 2016), they can avoid intermediaries and buy directly on the websites of airlines.

The third block includes specific network metrics. For the total network, the average number of tourists who refer to two platforms simultaneously is approximately two. On the other hand, it is observed that the density (weighted) increases as the age of tourists decreases, since new generations use more platforms and have more network behaviour and the older generations usually use few platforms. The percentage of connectivity is low in the three networks; around 27% of all possible links are connected in the Y network and around 22% in the X and BB networks. Finally, although the clustering coefficient and average distance does not present significant differences between the networks, Y generation achieves the extreme values.

These results show that tourists' behaviour searching for information about destinations is quite homogeneous regardless the generation analysed. Tourists' behaviour of the Total and Y network is a little more homogeneous than that of the other two generations.

Table 2. Networks sample and Global level analysis

	Total	Y	X	BB
Number of tourists	13243	4846	4441	3516
Number of platforms	104	84	87	70
Non-tourist sources	0.331	0.364	0.311	0.306
Comparators, Search Engines & OTAs*	0.289	0.261	0.312	0.311
TTOO* y TA*	0.188	0.171	0.179	0.221
Sharing Economy	0.134	0.139	0.144	0.120
Airlines	0.048	0.053	0.043	0.035
Traditional information sources	0.011	0.011	0.011	0.072
Network density	0.276	0.271	0.227	0.216
Network density (weighted)	2.174	1.559	1.019	0.734
Clustering coefficient	0.715	0.714	0.686	0.668
Average distance	1.724	1.733	1.779	1.818

* Touroperators, Travel Agencies, Online Travel Agencies

Finally, QAP correlation is used to study the correlation among different generations. The correlation between Y-X, X-BB and Y-BB are 0.87, 0.91 and 0.77 respectively (p-value of 0.002 in the three cases). Hence, the greater the generational distance, the lower the correlation and therefore similarity between the matrices. The most similar matrices are X and BB and the ones that are least similar are Y and BB.

Closer generations, in terms of years, present a higher similarity; despite generations X and BB are more closely related than Y and X. Nevertheless, they do not present large differences.

4.2. Micro Level Analysis

Micro level analysis is applied to tourist-platform networks defined above. Table 3 presents the centralities corresponding to the four networks analysed. By comparing the results for different generations it is evident that tourists have a similar behaviour when looking for information about a destination. Degree centrality shows the number of tourists who have consulted any platform. Eigenvector centrality shows those platforms that are consulted by tourists using other central platforms.

Degree centrality reveals that sharing economy platforms are not as important as expected. Nevertheless, the most used sharing economy platforms are TripAdvisor and Wikipedia, and these are less used as the age of tourists increases. Generation X prefers to take into account opinions and discuss the characteristics of the products or services, however, Generation Y tends to use Internet to communicate and acquire information. On the other hand, Instagram appears in a prominent place among the Millennials, with a marginal weight in the case of Generation X while it is not used by Baby Boomers.

Regarding Eigenvector centrality, it should be noted that the weight of Google among Baby Boomers is nine times higher compared to the second platform, most probably because they use Internet for functional searches. The most commonly used sharing economy platforms combined with other highly used platforms are TripAdvisor, Wikipedia and Airbnb, although Airbnb gains strength within younger generations.

Tour Operators and Travel Agencies, like Apollo, Vkontake or Neckerman, are highly used by tourists but not together with other platforms. Tourists using these platforms purchase products and services related to travel and do not tend to consult other platforms.

On the other hand, SE platforms, such as Airbnb, and Comparators, Search Engines and OTAs, such as Routard, are commonly used together with other widely used platforms. As expected, these are platforms that cannot offer information about the entire destination and through which all services cannot be contracted.
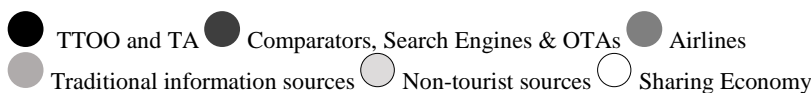
Finally, focusing on degree centrality, Facebook is used more by the younger ones than by the rest of tourists and the use of Booking increases as the age of the tourist increases. Secondly, it is observed that Y uses YouTube and Airbnb more than the other generations; X uses more Routard and Thomas Cook than generation Y and BB; and BB uses more Seznam, Sunweb and Jetair than younger generations. In addition, platforms that appear

at the first Eigenvector centrality positions are the same that occupy the first positions in Degree centrality, because they are widely used in isolation and together with other widely used platforms.

Table 3. Centralities

Degree							
Total		Generation Y		Generation X		Generation BB	
Google	0.217	Google	0.236	Google	0.210	Google	0.207
Facebook	0.136	Facebook	0.215	**Tripadvisor**	**0.151**	Booking	0.109
Tripadvisor	0.134	**Tripadvisor**	**0.158**	Booking	0.141	**Tripadvisor**	**0.094**
Booking	0.120	Booking	0.116	Facebook	0.123	Facebook	0.059
Trivago	0.047	Trivago	0.061	Trivago	0.047	Expedia	0.036
Expedia	0.034	Momondo	0.047	Expedia	0.039	Trivago	0.033
Momondo	0.031	**Wikipedia**	**0.032**	Momondo	0.026	Momondo	0.019
Wikipedia	0.020	Instagram	0.029	Ebookers	0.019	Ebookers	0.017
Ryanair	0.018	Expedia	0.029	Ryanair	0.018	Tui	0.013
Twitter	0.018	Twitter	0.028	Ving	0.017	Ving	0.013
Ebookers	0.017	Ryanair	0.025	Twitter	0.016	Apollo	0.012
Ving	0.016	Skyscanner	0.020	**Wikipedia**	**0.015**	Aurinko Matkat	0.012
Instagram	0.013	Ving	0.019	Neckermann	0.014	Startour	0.012
Apollo	0.013	Vkontake	0.019	Viajes Abreu	0.013	Ryanair	0.011
Skyscanner	0.013	Ebookers	0.018	Lastminute	0.012	Neckermann	0.011
Vkontake	0.012	Lonely Planet	0.017	Vkontake	0.012	**Wikipedia**	**0.010**
Lonely Planet	0.012	Easyjet	0.016	Apollo	0.012	Thomas Cook	0.009
Norwegian	0.012	Norwegian	0.016	Lonely Planet	0.012	Lastminute	0.009
Neckermann	0.012	Viajes Abreu	0.015	Norwegian	0.012	Twitter	0.009
Aurinko Matkat	0.012	Apollo	0.015	Edreams	0.012	Fritidsresor	0.009

Eigenvector							
Total		Generation Y		Generation X		Generation BB	
Google	0.863	Google	0.699	Google	0.775	Google	0.971
Tripadvisor	**0.303**	Facebook	0.599	**Tripadvisor**	**0.441**	Booking	0.163
Facebook	0.300	**Tripadvisor**	**0.292**	Booking	0.368	**Tripadvisor**	**0.140**
Booking	0.236	Booking	0.184	Facebook	0.217	Facebook	0.083
Trivago	0.073	Trivago	0.091	Trivago	0.085	Expedia	0.046
Expedia	0.053	Instagram	0.072	Expedia	0.078	Trivago	0.033
Momondo	0.037	Twitter	0.070	Momondo	0.035	Momondo	0.014
Wikipedia	0.037	Momondo	0.052	**Wikipedia**	0.031	**Wikipedia**	0.012
Twitter	0.035	**Wikipedia**	0.051	Ebookers	0.028	Ebookers	0.012
Instagram	0.028	Expedia	0.036	Twitter	0.027	Startour	0.012
Ebookers	0.021	Ryanair	0.029	Lonely Planet	0.025	Seznam	0.011
Ryanair	0.020	Viajes Abreu	0.025	Norwegian	0.022	Twitter	0.011
Ving	0.020	Skyscanner	0.025	Ryanair	0.021	Aurinko Matkat	0.010
Skyscanner	0.019	Ving	0.025	Skyscanner	0.021	Lastminute	0.009
Lonely Planet	0.019	Lonely Planet	0.023	Ving	0.020	Thomas Cook	0.008
Norwegian	0.017	Youtube	0.020	Routard	0.017	Sunweb	0.008
Airbnb	0.014	**Airbnb**	0.019	Lastminute	0.017	Ving	0.007
Viajes Abreu	0.013	Ebookers	0.019	Edreams	0.016	Jetair	0.007
Finn.no	0.012	Easyjet	0.019	Thomas Cook	0.014	Lonely Planet	0.007
Routard	0.012	Norwegian	0.018	**Airbnb**	0.014	Routard	0.007

● TTOO and TA ● Comparators, Search Engines & OTAs ● Airlines
● Traditional information sources ○ Non-tourist sources ○ Sharing Economy

4.3 Core-periphery structure

We apply the continuous method to detect core-periphery structures in the platforms-platforms network. The results are shown in Table 4.

As expected, the algorithm proposes TripAdvisor, Facebook, Booking and Google as the only core components for Total, Y and X, with a correlation of 0.999, 0.911 and 0.919 compared to an ideal core-periphery structure. For the BB, the core also includes Expedia with a correlation of 0.909. This indicates that BB generation uses more Comparators, Search Engines and OTAs than the other studied generations.

In a general, it is observed again that BB generation uses more Tour Operators and Travel Agencies than the rest of generations. Moreover, the most used platforms in generation Y are Non-tourist sources.

Table 4. Community Detection (Coreness)

Total		GenerationY		Generation X		Generation BB	
TripAdvisor	**0.466**	Facebook	0.557	**TripAdvisor**	**0.505**	Booking	0.515
Facebook	0.464	Google	0.426	Booking	0.496	**TripAdvisor**	**0.483**
Booking	0.437	**TripAdvisor**	**0.421**	Facebook	0.383	Google	0.386
Google	0.407	Booking	0.349	Google	0.381	Facebook	0.301
Trivago	0.204	Trivago	0.200	Trivago	0.205	Expedia	0.273
Expedia	0.165	Momondo	0.157	Expedia	0.194	Trivago	0.204
Momondo	0.140	Instagram	0.116	Momondo	0.126	Ebookers	0.125
Ryanair	0.095	Ryanair	0.109	Ryanair	0.086	Momondo	0.109
Twitter	0.093	Twitter	0.108	Ebookers	0.084	Apollo	0.107
Ving	0.083	Expedia	0.106	Twitter	0.084	Aurinko Matkat	0.093
Ebookers	0.082	**Wikipedia**	**0.094**	Ving	0.082	Thomas Cook	0.091
Norwegian	0.078	Skyscanner	0.082	Norwegian	0.076	Startour	0.084
Wikipedia	**0.075**	Ving	0.081	Edreams	0.066	Ving	0.079
Apollo	0.073	Norwegian	0.079	Apollo	0.063	Tjareborg	0.077
Instagram	0.072	Easyjet	0.074	Thomas Cook	0.062	Jetair	0.070
Skyscanner	0.070	Edreams	0.067	Lonely Planet	0.061	Lastminute	0.069
Aurinko Matkat	0.068	Apollo	0.065	Lastminute	0.060	Norwegian	0.068
Easyjet	0.067	Aurinko Matkat	0.064	**Wikipedia**	**0.058**	Neckermann	0.061
Edreams	0.060	Ebookers	0.061	Aurinko Matkat	0.058	Fritidsresor	0.061
Concentration	0.922	Concentration	0.911	Concentration	0.919	Concentration	0.909

⚫ TTOO and TA ⬤ Comparators, Search Engines & OTAs ◉ Airlines
◯ Traditional information sources ◯ Non-tourist sources ◯ Sharing Economy

The general platform-platform network chart shows the location of each platform and the distribution according to the classifications made. The four platforms belonging to the core are located in the centre. These are the most referred and correlated.

Figure 1. Final Network
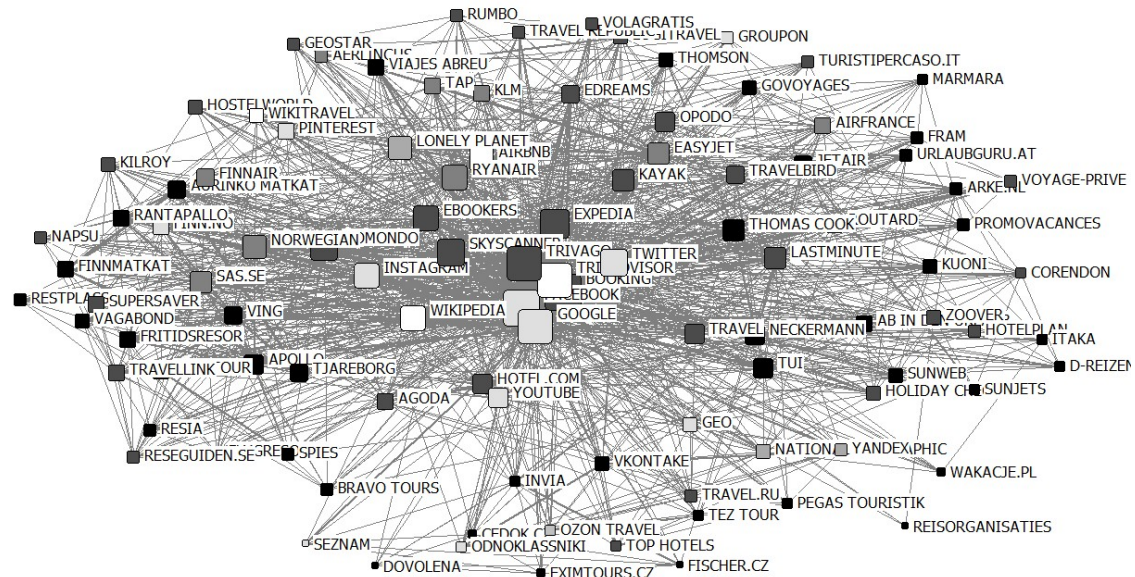
⬤ TTOO and TA   ⬤ Comparators, Search Engines & OTAs   ⬤ Airlines   ⬤ Traditional information sources   ◯ Non-tourist sources ◯ Sharing Economy

The larger the node, the greater the Eigenvector; The greater the edge thickness of the line, the higher the number of tourists using both platforms

The supplementary material shows more detailed analyses explaining the network behaviour of tourists and the digital platforms used to inform themselves about tourist destinations.

5. Conclusions

The importance of the digital economy in the tourism ecosystem and the emergence of sharing economy platforms, especially among the younger generations, are confirmed. Some sharing economy platforms have become the most important platforms in the European e-tourism ecosystem (TripAdvisor and Wikipedia), although they are not as important as expected. Information is shared through these platforms, which becomes an intangible asset for the future of information. At the same time, it becomes clear that sharing economy platforms coexist with the rest of the platforms. We are facing a dynamic and changing environment (Cohen, et al., 2014), where the digital ecosystem is growing at a significant rate, so tourism must evolve and adapt to new conditions.

The results obtained are useful for Destination Marketing Organizations (DMOs) and for tourism companies in order to design their promotion and distribution strategy in the European market. Practical implications can be drawn from the current study. Although Generation Y seems to be the most interesting generation, companies cannot forget Generation X or the Baby Boomers. It is easier to reach generation Y through Non-tourist sources such as Instagram, Wikipedia, Facebook or YouTube. In order to capture the attention of Generation X, products and services should be positioned in Comparators, Search Engines and online travel agencies (OTAs) or in SE platforms. Finally, Baby Boomers have a more functional use of the Internet and use more Tour Operators and Travel Agencies (TA) to search for information about tourist destinations.

Due to the observed generational differences, alternative approaches should be considered to attract each generation. Evidences suggest that the different generations use digital platforms in distinct ways during the various steps of the customer journey. In this sense, generation Y is characterised by its use of digital platforms mostly during the inspiration process of the journey, coinciding with the great multimedia influence that this generation receives (Benckendorff et al., 2010; Cohen et al., 2014). On the other hand, generation X makes use of these platforms mainly to compare the journey alternatives, in other words, in the phase previous to the purchase. BB mostly uses digital platforms in the purchasing phase; therefore stakeholders must find the way to increase the loyalty of these consumers and to drive them directly to their websites. This is in agreement with the tendency to make a more practical use of the Internet (Kumar et al., 2018). However, the younger generations are more likely to use the platforms in the moments previous to the purchase.

With respect to the practical implications, these results can be used to design marketing strategies that attract tourists belonging to the selected segments. This could be achieved by emphasising the presence in the sharing economy platforms and in other sources of information used, generating global actions in the various channels, taking into account the differences in use in the generational cohorts analysed.

These results confirm the complexity of the European e-tourism network where distinct types of platforms coexist and compete for market power. This study helps understand in a novel way how the tourist generations use the platforms when choosing their travel destination, and how these platforms are connected, modelling a complex network.

It is confirmed that the four most important platforms identified by David-Negre, et al. (2018) Facebook, TripAdvisor, Google and Booking, are also the most important platforms for each of the generations analysed. However, these generations show some relevant differences in the network configuration. We can conclude that destinations and tourism providers should adapt their marketing strategies by generations.

Future research should face some limitations of this study, and analyse the key performance indicators: adding conversion rates, return on investment (ROI), etc., by the various network configurations and markets. New theoretical and empirical analyses of the e-tourism ecosystem are suggested, and the network methodology offers an interesting approach to shed some light on this important scientific field. Specific individual analysis by generations for the main SE platforms such as Airbnb should also be performed. Finally, future studies should incorporate Generation Z into their analyses, since their components are already beginning to travel and will soon have a relevant role in the future of the tourism sector (Haddouche and Salomone, 2018; Skinner, et al., 2018).

Once the tourist's behaviour has been analysed during the phase prior to visiting the destination, interest arises in analysing how they act at the destination in terms of network behaviour.

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Supplementary material

Egonetworks

The Egonetwork of the platforms that have greater centrality is represented. An Egonetwork is a network of platforms that are directly connected to the platform studied. It helps us to observe the platform ecosystem that surrounds the platform of study. Figures SM1 and SM2s hows that the networks are less dense as the age of tourists increases.
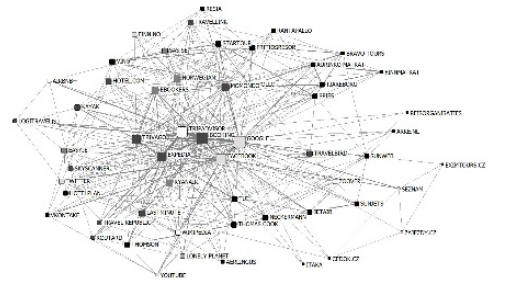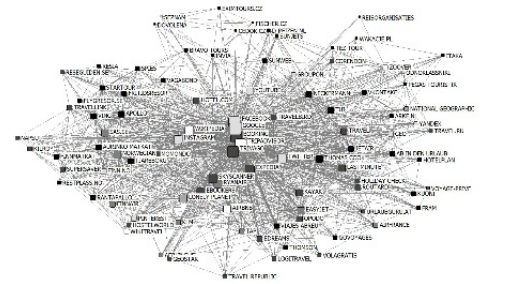
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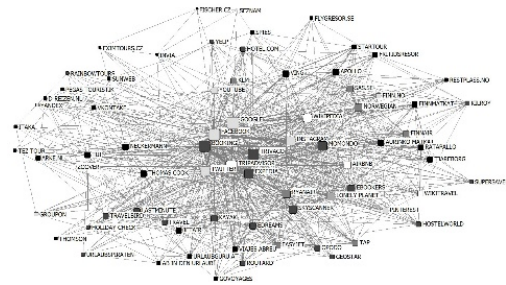
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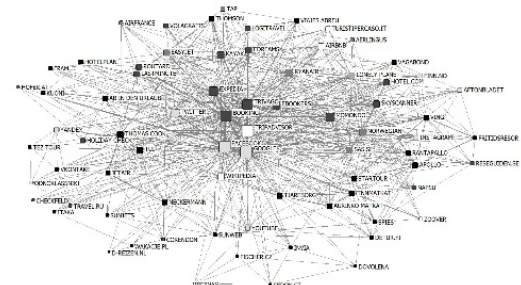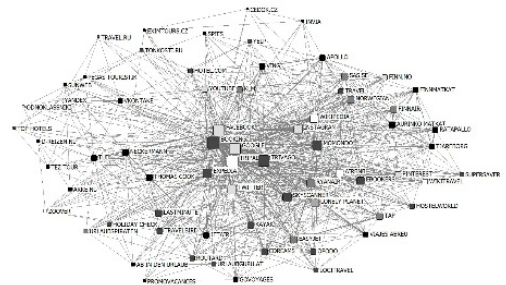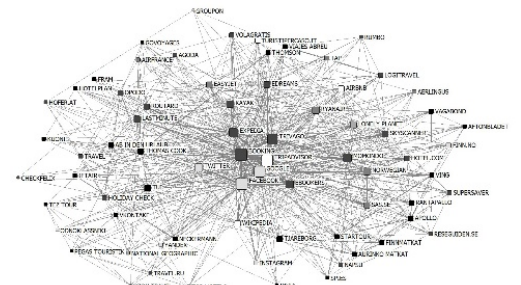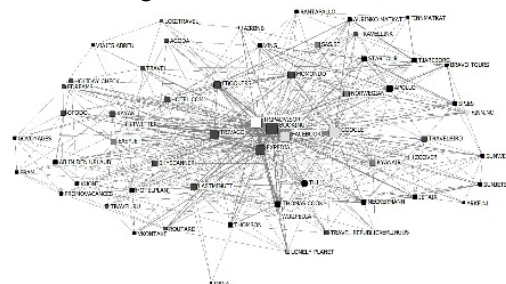
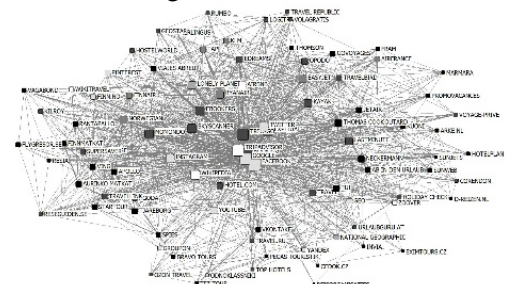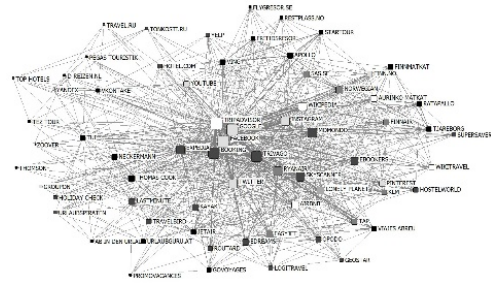BB Google

Total Google

Y Booking

X Booking

BB Booking

Total Booking

Figure SM1. Egonetwork

● TTOO and TA ● Comparators, Search Engines & OTAS ● Airlines ○ Traditional information sources ○ Non-tourist sources ○ Sharing Economy

The larger the node, the greater the Eigenvector; The greater the edge thickness of the line, the higher the number of tourists using both platforms

Y TripAdvisor

X TripAdvisor

BB TripAdvisor

Total TripAdvisor

Y Facebook
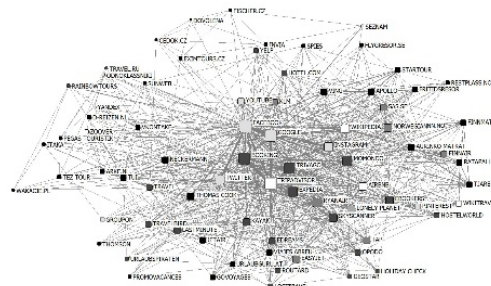
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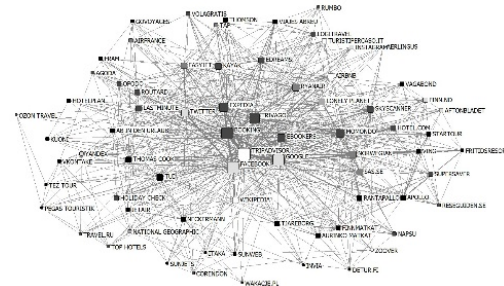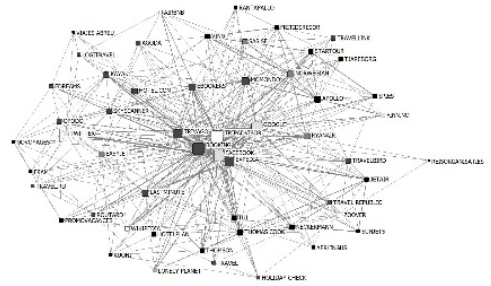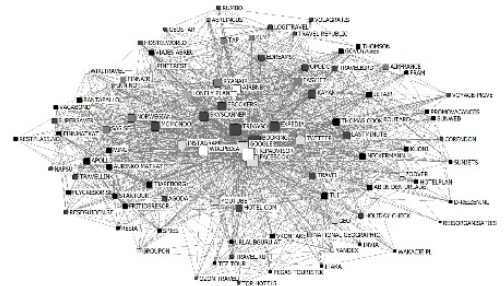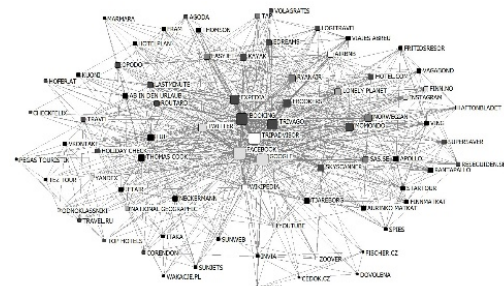
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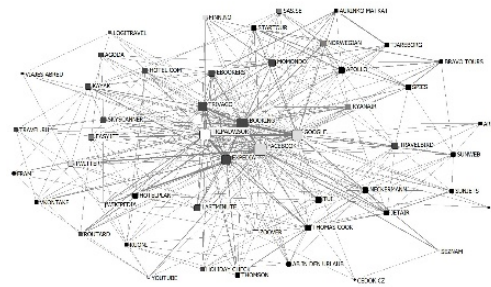
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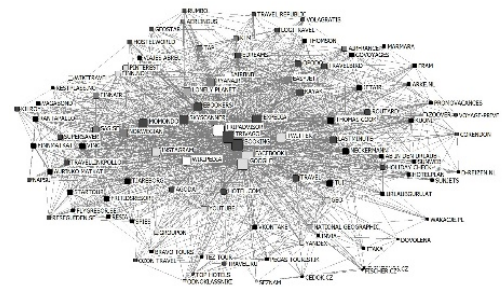
Figure SM2. Egonetwork

● TTOO and TA ● Comparators, Search Engines & OTAS ● Airlines ● Traditional information sources ○
Non-tourist sources ○ Sharing Economy
The larger the node, the greater the Eigenvector; The greater the edge thickness of the line, the higher the number of tourists using both platforms

The average of tourists using two platforms simultaneously is greater as the age of the tourists decreases, regardless of the platform studied. It is observed that both in the network and in the results of the global analysis shown in Table SM1, in most cases, the density of Egonetworks for BB is lower than in the other two generations. Note that the Egonetwork of sharing economy, TripAdvisor, is more dense for the generation Y than for the rest of generations and is also more dense than the rest of the platforms studied for Y.

The percentage of connected platforms among all possible connections varies according to the analysed Egonetwork, but they all range between 34.6% and 25.6% of connections. In addition, regardless of the generation studied, the highest percentage of connections always appears for the TripAdvisor and Google Egonetwork. Clustering Coefficient is around 0.7 for all the analysed data and the Average Distance around 1.7, therefore, the homogeneity is similar in all networks.

On the other hand, in the last rows we can see the percentage of use of the platforms by categories, where the airlines and the traditional sources of information are the least used platforms in all cases. The percentage of all categories is similar for each generation regardless of the platform analysed within each generation. The two most commonly used categories are Comparators, Search Engines and OTAS and Non-tourist sources, however, in Baby Boomers the Comparators, Search Engines and OTAS gain importance and the Non-tourist sources lose it.

It can be concluded that the generation that uses the most Tour Operators and Travel Agencies is BB generation, with the exception of the TripAdvisor network. The one that uses the most Comparators, Search Engines and OTAS is BB. The one that most consults Airlines and Non-tourist sources is Y. The one that most uses Traditional information sources is X. Finally, sharing economy platforms are widely used by the generation Y together with Booking; by generation X together with Facebook and Google; and by the generation BB together with TripAdvisor. These results have a high degree of coincidence with the results of Table 2 (main document).

Table SM1. Global level analysis for Egonetworks

	Facebook				Booking			
	Total	Y	X	BB	Total	Y	X	BB
Network density (weighted)	2.249	1.722	1.231	1.129	2.441	2.060	1.367	0.919
Network density	0.284	0.288	0.257	0.291	0.304	0.334	0.284	0.262
Clustering coefficient	0.712	0.722	0.693	0.723	0.718	0.717	0.702	0.686
Average distance	1.716	1.712	1.743	1.709	1.696	1.666	1.716	1.738
% TTOO y TA	22.488	19.595	21.996	23.680	20.589	15.896	18.537	26.999
% Comparators, Search Engines & OTAS	32.187	27.974	36.553	38.033	33.338	30.436	37.389	38.961
% Airlines	7.437	8.586	4.274	4.411	7.655	8.883	7.086	3.721
% Traditional information sources	1.373	1.225	1.624	0.000	1.415	1.306	1.646	1.015
% Non-tourist sources	24.107	29.651	22.218	20.752	24.142	29.793	21.257	16.421
% Sharing Economy	12.409	12.969	13.336	13.124	12.862	13.686	13.613	12.884
	Google				TripAdvisor			
	Total	Y	X	BB	Total	Y	X	BB
Network density (weighted)	2.434	1.877	1.286	0.989	2.597	2.154	1.326	1.032
Network density	0.293	0.313	0.257	0.256	0.316	0.346	0.275	0.292
Clustering coefficient	0.721	0.723	0.729	0.726	0.720	0.730	0.710	0.698
Average distance	1.707	1.687	1.743	1.744	1.684	1.654	1.725	1.708
% TTOO y TA	22.465	18.871	22.127	27.186	20.981	17.550	21.008	20.819
% Comparators, Search Engines & OTAS	31.514	28.364	33.394	35.266	33.105	29.264	35.720	41.435
% Airlines	7.527	8.716	6.825	5.070	7.691	8.953	6.882	5.416
% Traditional information sources	1.394	1.267	1.373	1.046	1.422	1.286	1.633	1.117
% Non-tourist sources	24.561	29.612	22.337	18.631	23.875	29.323	20.519	16.825
% Sharing Economy	12.539	13.170	13.495	12.801	12.925	13.623	13.763	14.387

* Touroperators, Travel Agencies, Online Travel Agencies

CHAPTER 3

UNDERSTANDING TOURISTS' LEISURE EXPENDITURE AT THE DESTINATION: A SOCIAL NETWORK ANALYSIS

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CHAPTER 3

Understanding tourists' leisure expenditure at the destination: a social network analysis

Abstract

The aim of this study is to identify spending patterns of tourists in relation to the leisure activities performed throughout their day-by-day stay at the destination. Using the methodology of social network analysis (SNA), a tourists–activities bipartite network was identified following a pattern known as core–periphery. The effect of this structure (including typology, number, and timing of performing the activities) on tourism expenditure is analysed using a multiple regression model, to which were added different sociodemographic variables and other variables related to travel. In order to better understand the portfolio of activities, four examples of networks are studied and visually represented. This study reveals that through SNA between tourists and activities, we can study the behaviour of tourists in a novel way.

Keywords: Social Network Analysis; Leisure Activities; Core-Periphery; Tourism Expenditure; Portfolio of Activities; Tourist Behaviour; Ego Network; Geo-Marketing; Cross-Selling; Tourist Diary

1. Introduction

Explaining the impact of one single activity, performed by one tourist, on the destination's expenditure is a straightforward analysis. However, it is not so simple when trying to understand, at the same time, the network of numerous tourists performing different andmultiple activities day-byday at the destination, and the impact of these relationships on the destination's final expenditure. Furthermore, traditional analyses do not allow capturing and representing in a visual way those paths of the network that may need further investigation. A new approach is needed to conveniently tackle this complex interconnected network (Stienmetz and Fesenmaier, 2015). In this context, the aim of the present study is to identify the common patterns of tourists' behaviour that imply an influence on tourists' expenditure on leisure activities. Thus, a social network analysis (SNA) through a bipartite network is developed in order to properly explain this issue.

This analysis not only considers the bipartite network (tourist–activities), but also some explicit patterns of tourists' behaviour: types of activities, frequency, and timing.

Expenditure at the destination depends on the activity specifically performed (Brida and Scuderi, 2013; Mehmetoglu, 2007; Pouta, Neuvonen, and Sievänen, 2006). Furthermore, the frequency of the performed activity also has an influence on the final expenditure (Wang and Davidson, 2010). Finally, the moment when the activity is performed during the tourists' holidays (Aguiló Perez and Juaneda, 2000), at the beginning or during the middle– final part, can have an important impact on tourists' behaviour and expenditure.

This study has been conducted based on a questionnaire aimed at tourists visiting Gran Canaria (Canary Islands, Spain), a leading destination in the European tourist market (Moreno-Gil and Martín-Santana, 2015). Interestingly, and contrary to most studies, the tourists filled in these questionnaires daily during their stay at the destination, thus reducing the possibility of forgetting any details of their experience. In order to properly understand the impact of this network on the expenditure, additional aspects also have to be considered. Thus, several variables (sociodemographic, related to the destination, and psychological) are studied, following previous literature. To perform the analysis, a series of social network community detection algorithms have been employed in order to identify activity groupings. On the other hand, a multiple regression model was further used to identify a pattern in tourist expenditure in relation to various explanatory

variables. Finally, ego networks were represented to visualise some activities related to a significant influence on the expenditure.

The main contribution of this study relies on the fact that it jointly analyses activities and tourists. Specifically, the analysis of the portfolio of daily leisure activities of the same group of tourists, conducted on a daily basis using this methodology, means a novel approach in dealing with this research topic in tourism literature. Thus, the portfolio of activities is analysed from the tourists' perspective, and without applying a traditional product-management approach, following the recommendations of Vargo and Lusch (2004) for a new dominant logic for marketing. The results do not only allow us to identify the impact of leisure activities on tourist expenditure at the destination, but they also lead to a better understanding of visitor behaviour. Furthermore, this analysis enables destinations to design their marketing strategies and manage and make dynamic the portfolio of leisure activities in order to increase the final expenditure at the destination.

2. Literature review

2.1 Social Network Analysis in tourism

We can think of a network as a set of nodes, and as a set of relations and bonds between those nodes (Hogan, 2008). Network analysis is used to study connections between different entities that interact in a specific environment. SNA takes place when relations between people, organisations, groups, and so on, are measured. The aim of SNA is to study the characteristics of the interactions between the individuals (González- Díaz, Gómez, and Molina, 2015; Wasserman and Faust, 1994), revealing the importance of these bonds.

Networks can be studied on different levels, from the global analysis of the whole network to local analysis. Global analysis of a network aims to describe the characteristics of the network, and detect groups and subgroups based on specific methods. Local analysis compares individuals by means of centrality algorithms to find the most relevant ones according to specific criteria.

Tourism is, by definition, a phenomenon of exchange and relations. Specifically, a tourist destination is a complex system in which multiple components are interconnected – transportation, attractions, restaurants, tourists, and so on (Pavlovich, 2003; Sainaghi and Baggio, 2014). These relationships are a fundamental element in the understanding of the

tourism phenomenon. Based on this statement, there are many authors enhancing the importance and utility of SNA for tourism research and its great potential (Baggio, Scott, and Wang, 2007; Casanueva, Gallego, and García-Sánchez, 2016). Therefore, the tendency in management and planning of tourist destinations is to use analytical methodologies that integrate the perspective of SNA to improve the understanding of the relations within the destination (Merinero-Rodríguez and Pulido-Fernández, 2016; Scott, Cooper, and Baggio, 2007). Nonetheless, studies that use SNA in tourism are still scarce (Baggio, Scott, and Cooper, 2010; Casanueva et al., 2016).

Previous literature on SNA has adopted different approaches. Some of the first papers based on applications of SNA in tourism research focused on detecting key actors in the network. Pavlovich (2003) studied the evolution of a developing tourist destination. Specifically, the study focuses on the relationship between tourism organisations in order to identify their restrictions and opportunities. It was concluded that strong links are needed between destination organisations so that the information flows and destination resources are also promoted. Pforr (2006) searched for reputation bonds, cooperation, and information exchange to find the important tourist actors in the network. This study tries to explain the dynamics of tourism policy taking into account public, private, and non-profit actors as well as their interactions.

Other authors studied the structural characteristics of the network. Shih (2006) analysed them examining the connections between tourist locations of different destinations according to tourist guides, where destinations are considered as nodes and the tourist routes between destinations are treated as links. Based on the structural characteristics identified for each destination, a series of services and tourist facilities are proposed for each destination. Baggio (2013) performs an analysis of monthly overnight stays for Italy and the Italian island of Elba, and transformed the temporal series in a network to find structural and dynamic characteristics of both destinations. The aim was to observe those properties that were transformed and those that remained unchanged over time. González-Díaz et al. (2015) used centrality indicators to analyse the variations in the structure of tourist accommodation demand through the flow of tourists between different regions. Their aimwas to highlight the role of the non-hotel accommodation in the configuration of the regional tourism networks in Spain.

Finally, other papers have searched for tourists' behaviour patterns based on SNA. Hwang, Gretzel, and Fesenmaier (2006) found different tourist behaviour patterns depending on tourists' origin and familiarity with the destination for multi-destination journeys. They argued that travel between destinations can be better understood in terms of relational networks. Smallwood, Beckley, and Moore (2012) studiedmovement patterns for visitors in a marine park in order to improve planning and management of the destination and minimise their impact on natural resources. Stienmetz and Fesenmaier (2015) studied tourists' behaviour patterns in order to establish an economic value for certain tourist attractions. Specifically, they used different centrality metrics and triad census to study the relationship between the total expenditure of visitors and the attractions visited. Zach and Gretzel (2011) analysed the structure of a network of places the tourist had visited in northern Indiana, detecting a pattern known as coreperiphery.

The objective of their study was to make recommendations to improve the services offered and the experience of the tourists at the destination. Finally, Asero, Gozzo, and Tomaselli (2016) studied tourists' mobility between different Sicilian destinations based on SNA, and found a common pattern. They studied the structural equivalence and ego networks of those destinations with greater centrality.

In the preceding discussion we could observe that SNA is a useful and efficient methodology for studying different touristic aspects, proposing approaches and novel responses regarding tourism. Three main differential approaches were applied in the literature: detecting key actors in the network, structural characteristics of the network, and tourists' behaviour patterns. However, previous studies have not yet considered the use of SNA to classify tourists according to the pattern of activities followed, and how this pattern influences tourist expenditure.

The present study aims to fill these research gaps. It analyses the connections between tourists and the activities they perform at the destination, and how the position of a particular individual in the tourist–activity network influences expenditure. Daily information on the tourists was gathered through personal questionnaires. Unlike previous contributions, this study uses SNA to take into consideration not only the relationship between the activities or places visited, but also between activities and tourists. In addition, the present study analyses the impact of these activities on

expenditure. Finally, based on the different patterns detected, a series of market strategies can be proposed for each type of tourist.

2.2 Tourists' expenditure at the destination

Income derived fromtourists' expenditure at a destination represents an important part of the total income of many countries' economy (Brida and Scuderi, 2013; Hung, Shang, and Wang, 2012; Pouta et al., 2006; Pulido-Fernández, Cárdenas-García, and Carrillo-Hidalgo, 2016; Thrane and Farstad, 2012). Tourism destinations have the need to increase tourists' expenditure due to its great economic impact. This awareness increases in periods of economic crisis, because tourists reduce their expenditure (Eugenio-Martin and Campos-Soria, 2014). Research on the income derived from tourists' expenditure at the destination is of great importance as it plays a part in the economic engine of many destinations (Brida and Scuderi, 2013). This research helps to improve marketing management (Lin, Mao, and Song, 2015; Nicolau and Más, 2005), planning of the market segmentation (Lin et al., 2015), and itmaximises income at the destination (Medina-Muñoz and Medina-Muñoz, 2012).

Tourism expenditure depends on different variables. Based on the reviews conducted by Wang and Davidson (2010) and Brida and Scuderi (2013), a variety of determinants can be observed for tourism expenditure. Most of the authors agree in clustering them into four main groups of variables: economic, sociodemographic, related to the journey, and psychographic or psychological.

The most commonly used explanatory variables in the literature are those related to sociodemographic factors (Brida and Scuderi, 2013; Medina-Muñoz and Medina-Muñoz, 2012; Seiler, Hsieh, Seiler, and Hsieh, 2003), and the following authors are among those who have used different sociodemographic and cultural variables: Alegre and Cladera, (2010); Hung et al. (2012); Laesser and Crouch (2006); Lin et al. (2015); Medina-Muñoz and Medina- Muñoz (2012); Mehmetoglu (2007); Nicolau and Más (2005); Pouta et al. (2006); Seiler et al. (2003), and Thrane and Farstad (2012). Of the most employed sociodemographic and cultural characteristics (age, education, number of family members, etc.), gender and nationality have been used particularly frequently (Brida and Scuderi, 2013; Wang and Davidson, 2010). Thus, this study is analysing gender and the nationality of tourists.

With regard to economic factors, the more widely employed are income and price (Wang and Davidson, 2010), but also others such as financial problems, taxes, and so on (Dolnicar et al., 2008; Hung et al., 2012; Lin et al., 2015). In any case, none of these factors on its own can fully explain tourism expenditure.

Besides the sociodemographic and economic factors, psychological factors also affect tourism expenditure, although their analysis in the literature is scarce due to the difficulty in obtaining this information. Some authors employing this method are: Aguiló Perez and Juaneda (2000); Laesser and Crouch (2006); Medina-Muñoz and Medina-Muñoz (2012); Mehmetoglu (2007); Nicolau and Más (2005); Wang and Davidson (2010). One variable closely related to this emotional and cognitive perception of the destination is destination image (Carballo, Araña, León, and Moreno-Gil, 2015). Destination image is understood as the information, beliefs, impressions, attitudes, and emotional thoughts an individual has in relation to a place (Hudson, Wang, and Gil, 2011), and it plays a critical role in explaining tourist behaviour.

Finally, the factors related to the journey have also been used widely due to their paramount importance in explaining expenditure (Brida and Scuderi, 2013). Among this aggrupation, the determinants more widely used are length of stay and previous experience on journeys, although other determinants have also been used including accommodation, activities, destination, information sources, transport, and so on. Some of the authors using these factors are: Alegre and Cladera (2010); Jang, Cai, Morrison, and O'Leary (2005); Laesser and Crouch (2006); Medina-Muñoz and Medina-Muñoz (2012); Mehmetoglu (2007); Nicolau and Más (2005); Pouta et al. (2006); Pulido-Fernández et al. (2016); Seiler et al. (2003); and Wang and Davidson (2010). This study uses accommodation category, typology, and location of the accommodation, and specifically focusses on leisure activities.

Of the four groups of factors (economic, sociodemographic, psychological, and related to the journey), variables related to the journey are the ones where Destination Marketing Organisations (DMOs) are more likely to influence and generate a real impact in the short term through activities relating to them. Additionally, among the key performance indicators for any destination, expenditure at destination is possibly the variable over which DMOs have more control to change and make a mark. DMOs can apply external and in-destination promotion measures, product development, and management, and so

on (Jang et al., 2005). Therefore, it is increasingly important for destinations to understand which variables have a greater influence on tourism expenditure (Seiler et al., 2003). This makes tourism expenditure a key variable to be carefully managed by any destination (Cárdenas-García, Pulido-Fernández, and Pulido-Fernández, 2016). Finally, of the expenditures made during their holidays at the destination, leisure activities represent the higher tourist expenditure of many destinations.

2.3 Tourist expenditure on leisure activities at the destination

Besides its critical role, few studies have addressed tourism expenditure in relation to the activities performed by the tourists at the destination (Brida and Scuderi, 2013; Cárdenas-García et al., 2016; Mehmetoglu, 2007; Pouta et al., 2006; Pulido-Fernández et al., 2016). However, the strategic planning of the activities' portfolio at a destination is a key topic (Mehmetoglu, 2007; Mok and Iverson, 2000). Thus, the adequate management of the portfolio can lead to even higher expenditure per tourist in the destination than previously planned (Mehmetoglu, 2007), while the influence of the destination on the expenditure at the tourist's own country is usually negligible. The reduced previous analysis of this issue in the literature is due to the difficulty in obtaining information, which requires a detailed tracing of the tourists, or questionnaires of a considerable length, as well as the methodological difficulty of analysing complex relations within a portfolio of activities and groups of tourists.

The research on how activities affect a destination is diverse, although the studies covering this topic in the literature, among the studies on tourism expenditure are is yet reduced. In this aspect, interestingly, Mehmetoglu (2007) studies the relation between a series of activities performed in nature by national tourists in Norway and the individual daily expenditure per tourist. In this study, a logistic regression is made with the dependent variable being daily personal expenditure. Principal components were used to reduce the number of variables followed by a logistic regression. The author identifies the activities that influence the tourist's expenditure. However, methodologically, the use of principal components does not allow the analysis of the influence of each of the activities separately and in networks, being the recommended use of SNA.

Pouta et al. (2006) studied the variables influencing expenditure on accommodation and activities on wildlife journeys to Finland. The surveys were carried out through telephone surveys and the distribution of questionnaires by mail. The tourists answered a series of

questions related to the type of journey, accommodation, and activities performed on their most recent wildlife journey. First, a comparison was made searching for patterns of wildlife journeys to observe the relation between the type of journey (high or low cost) and outdoor activities, and the tourists' and destinations' characteristics. Afterwards, a logistic regression was performed. Pouta et al. (2006) concluded in this comprehensive study that tourists with high expenses were related to higher income, middle age, first visits, wildlife tourism, longer distance to the residence, longer stays, and performing activities such as skiing, hiking, and camping. The study is also restricted to national visitors and focused on wildlife tourism. Methodologically, filling out the questionnaires after the experience introduces the possibility of forgetfulness on the part of tourists.

In their study, Jang et al. (2005) used the variables expenditure, income, types of activities, seasonality, and rent. Surveys were conducted on French homes of people who had stayed in North America or Canada over the last three years. Expenditure included transport to destination, accommodation, food, leisure, and shopping. First, they analysed the income level and then considered its effects on activities, seasonality, and expenditure. A principal component factorial analysis and a path analysis were performed. Jang et al. (2005) concluded that, besides income, the main activities influencing the journey's expenditure were "nature", "beach and outdoor", and "entertainment". This study is limited by the lack of differentiation between expenditure at origin and in-destination as expenditure at origin usually constitutes a large share of the total expenditure. Therefore, expenditure at the destination should be analysed separately.

More recently, Pulido-Fernández et al. (2016) analysed the effect of cultural activities on tourist expenditure. A random sampling method was used where tourists were asked about expenses associated with daily activities, socioeconomic characteristics, journey characteristics, and satisfaction. A Poisson regression was conducted to analyse the data where the dependent variable was daily expenditure per tourist. This illuminating study concluded that some specific activities have a greater influence on expenditure than others. In this study, the effect of each activity (cultural activities) on destination expenditure was analysed. However, the method does not allow for jointly analysing the portfolio of activities and considering the relationship between them.

In conclusion, there is a clear relationship between tourism expenditure and the type of activity performed (Kruger, Saayman, and Manners, 2012). Moreover, the number of

times (frequency) that each activity is performed also influences expenditure (Wang and Davidson, 2010). Finally, if the activity is performed at the beginning of the holidays, this can change the tourist's behaviour pattern during the remainder of the vacation time and the final impact on expenditure (Aguiló Perez and Juaneda, 2000). Moreover, when dealing with these issues in previous studies, there is a predominant focus on studying one single market, and information is gathered after a considerable lapse of time between the time when the activities and the expenditure took place and when the questionnaire was completed, with no daily tracing.

Additionally, previous methodological analysis does not result in an understanding of the role of all the activities within the context of their relationship with other activities (Jang et al., 2005). Thus, the SNA applied in this study to classify the activities is a novel method. This study analyses the typology of the activities connected through the behaviour of the tourists and how they relate to other activities. Therefore, this study examines a series of behaviour patterns to detect groups of tourists according to the activities they perform, and it analyses expenditure according to the group to which they belong. Finally, following the literature, other variables are included to explain expenditure: sociodemographic and cultural (age and nationality), related to the journey (typology category and location area of the accommodation, and leisure activities), psychological (image), and variables calculated using SNA.

3. Methodology

3.1 Data

The information was gathered through a questionnaire, during a four-month period. The questionnaires were given to the tourists at their arrival at Gran Canaria's airport. Nationalities, age, and gender were selected proportionally to the regional statistics (ISTAC, 2015). The tourists completed the surveys throughout the stay so they could answer a series of questions by the end of each day. They answered the questionnaire daily including questions relating to the activities they had engaged in. In this way the forgetfulness effect is avoided. The questionnaire consisted of three parts and gathered a wide range of information, including sociodemographic characteristics (age, gender), and cultural information (nationality), daily characteristics of their journey (lengths of stay, accommodation type and category, location), daily expenditure, and psychological perceptions, such as image of the destination.

Overall destination image was measured using one single item, following Baloglu and McCleary (1999). The expenditure at the destination (accommodation was excluded as the focus of this research is on leisure activities) was included in the local currency (Euros). Activities to be included were selected in a two-step process. Firstly, DMOs representatives, tour operators, and leisure companies were interviewed, obtaining 35 main activities (including both general activities like "I ate at a restaurant outside the accommodation", "I went to the beach", and specific visits to places and attractions, "I've visited Maspalomas Beach"). Afterwards, a focus group with 10 tourists was conducted, and the list of main activities reduced to 27 (Table 1). With the purpose of understanding the relationship between activities and final expenditure at the destination, both activities involving a specific expense ("I ate at a restaurant outside the accommodation") and those free of charge ("I went to the beach") were considered. The latter do not mean a direct expenditure in themselves, but can imply indirect spending transportation, etc.) or stimulate other expenses (food and beverages, etc.).

On the last day of their stay, the tourists returned the surveys and received a hamper with local gastronomic products as a reward for their participation. A total of 550 surveys were delivered, and 483 were successfully collected after their holiday.

3.2 Tourist–activities network

From the information gathered through the questionnaires, an affiliation network was built connecting tourists with activities. This bipartite network includes two node categories, namely tourists and activities. A tourist is connected to an activity if he or she performed such an activity during their stay. With this network it is possible to detect communities or typologies of tourists according to the activities engaged in during their stay.

Table 1 Percentage of tourists who have performed core and peripheral activities and frequency.

Variable	Description	Total tourists		Core tourists		Peripheral tourists	
		Rate	W	Rate	W	Rate	W
Total activities							
Core activities							
Pool	I've been at the pool	0.89	4.08	0.94	4.20	0.84	3.86
Walk	I've walked around the tourist area	0.88	3.65	0.97	3.98	0.78	3.09
Shopping_centre	I've visited a shopping centre	0.87		0.96		0.75	
Beach	I went to the beach	0.81	3.19	0.92	3.49	0.68	2.66
Own_trip	I went on a trip on my own	0.77	2.84	0.91	3.16	0.61	2.21
Maspalomas_beach	I've visited Maspalomas Beach	0.75		0.88		0.59	
Restaurant	I ate at a restaurant outside the accommodation	0.75	3.80	0.86	4.07	0.61	3.38
Night	I enjoyed night life yesterday	0.56	3.25	0.65	3.52	0.45	2.76
Cuisine	I've tried the traditional Canarian cuisine	0.54		0.72		0.31	
Mogán_village	I've visited Mogán village	0.52		0.69		0.31	
Shopping	I went shopping	0.49	2.63	0.62	2.79	0.34	2.18
Peripheral activities							
Passive	I've stayed all day at the accommodation without leaving	0.45	2.42	0.42	2.36	0.49	2.45
Theme_park	I've visited a theme park/ leisure centre	0.44	2.20	0.56	2.39	0.28	1.86
Las Palmas de Gran Canaria city (LPGC)	I've visited Las Palmas de Gran Canaria city	0.41		0.59		0.18	
Market	I've visited a local market	0.40		0.54		0.24	
Org_tour	I've been on an organized tour	0.30	1.73	0.37	1.84	0.22	1.45
Car	I rented a car	0.30		0.42		0.15	
Sport	I've practiced sports (tennis, golf, aquatic)	0.30	2.27	0.42	2.29	0.15	2.33
Vegueta_historic quarter	I've visited Vegueta	0.23		0.33		0.10	
Tejeda_village	I've visited Tejeda	0.22		0.30		0.12	
Arucas_village	I've visited Arucas	0.22		0.29		0.13	
Canteras_beach	I've visited Las Canteras Beach	0.21		0.32		0.06	
Teror_village	I've visited Teror	0.20		0.27		0.10	
Culture	I've attended a cultural event	0.20		0.27		0.10	
Agaete_village	I've visited Agaete	0.18		0.27		0.05	
Museum	I've visited a museum	0.14		0.19		0.08	
Health	I've visited a health or beauty centre (spa, thalassotherapy)	0.08		0.11		0.04	
		Total tourists		Core tourists		Peripheral tourists	
Average of performed activities by tourists		12.12		14.83		8.79	

(Rate) Rate of tourists who have performed each activity.

(W: weight) The average number of times the activity is performed.

There are different methods to detect network communities. Based on a two-mode network, such as the one presented in this study, a direct pathway Direct Method can be used. The Direct Method uses an algorithm to adjust the data to an ideal core–periphery matrix. The core includes nodes which are highly interconnected and the periphery includes nodes which are more connected to the core than amongst themselves. From this matrix, tourists and activities which pertain to the core and to the periphery can be identified simultaneously. The advantage of this methodology relies on the use of the full information about relationships between activities and tourists.

Alternatively, it can be converted into two one-mode networks, on the one hand the tourists and on the other the activities. If the conversion to one mode is chosen for the tourists' network, these are connected if they have activities they performed in common. In the activities network, these are connected if they have been engaged in by the same tourists.

Within the one-mode conversion there are two pathways: structural equivalence and regular equivalence model (Borgatti, Everett, and Freeman, 2002; Borgatti, Everett, and Johnson, 2013). The structural equivalence identifies those actors who are identical in attitude and behaviour, that is to say, they have links with the same actors and therefore can substitute them. If we erase the tags corresponding to the tourists who are structurally equivalent it is impossible to identify who is who because these tourists carry out the same activities. The regular equivalence is like structural equivalence but less strict. Two actors are regularly equivalent if they have the same type of relationship with othr actors without necessarily being the same individuals (Borgatti, Everett, and Freeman, 1996). The structural equivalence method does not have a fixed quantity of groups to detect, so as a result there will be as many groups as the methodology detects.

However, when seeking two groups, core and periphery, the regular equivalence model must be used. This analysis (regular equivalence model) can be conducted in a categorical or continuous way. The categorical form adapts the data from our network to a pre-formed core–periphery matrix to identify simultaneously which tourists or activities belong to the core and which to the periphery. The continuous form estimates a coefficient (coreness) of each node, and arranges them from closest to furthest, and proposes a core with those nodes with the highest value.

The aim of the community detection methods described above is similar to that in the classical clustering analysis, which has been recently used to find market segments according to tourism expenditure (Lima, Eusébio, and Kastenholz, 2012; Oh and Schuett, 2010; Sun, Hao, Fong, Law, and Yu, 2016). Specifically, all these methods try to detect categories or groups in data. When using one-mode networks, the algorithms to obtain groups are also similar to hierarchical and non-hierarchical clustering methods. The difference lies in the data source, which describes the dichotomous relationships among nodes in the case of networks analysis, instead of variables and observations in clustering analysis. When using two-mode networks (e.g. tourist–activities network) the core–periphery detection methods depart more from the clustering algorithms. Instead of obtaining decomposable modules, the method predetermines the global structure of the whole sample, and assigns a node to the core or periphery by comparison with an ideal core– periphery network.

Through SNA the betweenness degree of the tourists was also calculated. This is a metric assigned to every tourist in the sample and is determined by his or her position in relation to the whole structure of the tourist–activities network. Specifically, the normalised betweenness degree of a tourist is the number of geodesic trajectories that pass through a certain node, inversely weighted by the total number of equivalent paths between the same two nodes. A geodesic trajectory is the shortest path between a pair of nodes (Borgatti et al., 2013), that is to say, the shortest path which links two tourists or activities. Betweenness-degree represents the level on which tourists connect to different groups of tourists. In this study, non-normalised betweenness was employed – this is defined simply as the number of geodesic trajectories passing through a node. Finally, the estimation of the betweenness-degree and the detection of the communities were conducted using the UCINET 6.591 program (Borgatti et al., 2002, 2013).

3.3 Econometric model

The relation between the dependent variable (expenditure) and the explanatory variables was analysed using a multiple regressionmodel. Based on the literature review, the following explanatory variables were used: gender, age, nationality, overall image of the destination, type of accommodation (hotel, non-hotel), category of accommodation (1–5 stars), area of the accommodation (five main tourist resorts), and length of stay (days). In

order to achieve the goals of this study, the different activities carried out during the stay were included. Finally, estimation variables calculated from the SNA were also added.

Due to the fact that certain tourists perform more activities than others, estimation variables were calculated for both total tourist expenditure and mean tourist expenditure per activity as dependent variables. In this way it is possible to observe the difference between total expenditure and the expenditure relative to all the activities conducted. The mean tourist expenditure per activity is the total expenditure of each tourist divided by the total number of activities that he or she has performed during their stay.

4. Results

In order to achieve the goal of this research, results are presented in three sections: firstly, an explanation to better understand the general bipartite network of leisure activities and tourists, including typology, frequency, and period when the activity was performed; the analysis of the impact of the activities and other key variables on expenditure (total and average); and finally, a fine tuning analysis of some networks of activities and their visual representation in order to better understand the tourists' behaviour and its impact on the expenditure at the destination.

4.1 Understanding the structure in the tourist–activities network

Different types of community detection algorithms were applied to the database, always resulting in two groups. Had the one-mode projection been used, the information concerning the relationship between specific tourists and activities would have been lost. In order to avoid this circumstance, the Direct Method by means of the two-mode network was considered, analysing tourists and activities together. This division clearly demonstrated that tourists and activities followed the pattern core–periphery. This pattern includes two groups of activities: those performed more often by the tourists (known as "core activities") and those that are performed less often (known as "peripheral activities"). On the other hand, it includes two groups of tourists: those who carry out mainly core activities ("core tourists"), and those who carry out both core and peripheral activities ("peripheral tourists").

Table 1 shows these two groups. "Core Activities" usually contains those activities closer to the accommodation. The second group, "Peripheral Activities", is characterised by activities performed in areas removed from the accommodation, and others that are

simply less popular. The percentage of tourists who have performed each activity can be observed in the first column. The weight of the activity (W) (second column) can be defined as the mean number of times an activity is performed, provided it is an activity that can be performed more than once.

The most performed activities were "I've been at the pool", "I've walked around the tourist area", and "I've visited a shopping centre"; while the least performed were "I've visited a museum" and "I've visited a health or beauty centre". Significant difference-means were observed between activities performed by core and peripheral tourists respectively according to the Mann–Whitney U test. In conclusion, the percentage of tourists who performed any activity is higher between core tourists than between peripheral tourists, except for "I've stayed all day at the accommodation without leaving", which applies mainly to peripheral tourists.

The most frequently repeated activities on average per tourist were: "I've been at the pool", "I ate at a restaurant outside the accommodation", and "I've walked around the tourist area". Surprisingly, the activity "I've been at the pool" is a more popular activity than "I went to the beach". However, activities such as "I've been on an organised tour" and "I've visited a theme park/leisure centre" were less often repeated on average per tourist. Core tourists, on average, tend to perform those activities more often which are more commonly engaged in. However "I've stayed all day at the accommodation without leaving" and "I've practiced sports" were more often performed on average among peripheral tourists. The Mann–Whitney U test shows that the number of times the activities have been performed on average is significantly different between core tourists (2.30) and peripheral tourists (1.40). This allows for the identification of different profiles of peripheral tourists, namely those who regularly stay at the accommodation (passive) and those who are very active, either practising sports regularly, or visiting "remote" places at the destination. This means that they do not perform more activities on the same day. The following activities, namely staying at the accommodation, practising sports, and visiting remote places, can be considered as excluding activities that help to explain the core–periphery model.

In order to properly consider the timing when the activity was performed, two different variables were created based on those activities which were reported daily. On the one hand, the "beginning activity" variable (b), which takes the value "1" if the activity was

performed during the first two days, and "0" in any other case. On the other hand, the variable "remaining activity" (r) takes the value "1" if the activity was performed from the third to the last day, and "0" in any other case. This separation was conducted in order to further observe if having performed an activity during the first days or during the remainder of the stay, had a significant influence on the expenditure.

As expected, Table 2 shows a higher percentage of tourists performing each activity from the third day onwards, except for some activities. Specifically, the percentage of tourists who have stayed at the pool is the same for both periods, while "I've walked around the tourist area" is greater for the first two days. These activities can be considered as "opening activities", meaning a destination "baptism". The same is observed when only core tourists are considered. However, the percentage of peripheral tourists who have gone to the beach during the first two days is higher than in core tourists.

Table 2 Activities performed by timing (beginning–non-beginning of the holidays).

Description	Variable	Rate of tourists Total	Rate of core tourists	Rate of peripheral tourists
Core activities				
I've walked around the tourist area_i	Walk_b	0.78	0.88	0.65
	Walk_r	0.74	0.83	0.63
I've been at the pool_i	Pool_b	0.80	0.84	0.75
	Pool_r	0.80	0.84	0.75
I went to the beach_i	Beach_b	0.63	0.70	0.54
	Beach_r	0.70	0.85	0.52
I enjoyed night life yesterday_i	Night_b	0.35	0.41	0.27
	Night_r	0.48	0.56	0.39
I went shopping_i	Shopping_b	0.30	0.40	0.19
	Shopping _r	0.43	0.56	0.28
I went on a trip on my own_i	Own_trip_b	0.50	0.63	0.34
	Own_trip_r	0.68	0.80	0.54
I ate at a restaurant outside the accommodation_i	Restaurant_b	0.56	0.63	0.47
	Restaurant_r	0.68	0.80	0.54
Peripheral activities				
I've stayed all day at the accommodation without leaving_i	Passive_b	0.24	0.16	0.32
	Passive_r	0.37	0.36	0.39
I've visited a theme park/leisure centre_i	Theme_park_b	0.21	0.25	0.16
	Theme_park_r	0.38	0.50	0.24
I've been on an organized tour_i	Org_tour_b	0.11	0.13	0.09
	Org_tour_r	0.26	0.32	0.20
I've practiced a sport (tennis, golf, aquatic)_i	Sport_b	0.16	0.23	0.08
	Sport_r	0.20	0.28	0.11

Activities evaluated on a daily basis performed during the first two days of the stay (beginning -b) or not at the beginning of the stay (remaining-r).

Table 3 describes the additional variables used for the regression analyses to explain expenditure. The highest total expenditure was found for core tourists. However, the highest mean tourist expenditure per activity was found among the peripheral tourists.

This may be due to the fact that core tourists perform more activities, as can be observed in Tables 1 and 2. However, peripheral tourists invest more time and money consuming activities such as sports and visits to remote places. However, this difference requires further analysis, and two different regressions were conducted in the next section to explain total and average expenditure.

Considering expenditure explanatory variables, no significant differences were found between core and periphery tourists based on their gender. The mean age of core tourists is slightly higher than that of periphery tourists. The perceived image is high for both groups, as more than 36% of core and peripheral tourists rated the image with a "6" or higher value. Length of stay - with a mean of 9 days – does not present a significant difference; visit the destination per 9 days (mean). On average, core tourists stayed in Gran Canaria for longer periods, which allowed them to perform more activities. Tourists from the United Kingdom (UK) represented the higher percentage in this study. They also form part of the peripheral tourists more often than Spanish tourists. As for accommodation, more than 50% of the tourists stayed in hotels, while some 40% stayed in apartments or bungalows. The most common category for the total and peripheral tourists was 4-star hotels (40.7% and 46.2% respectively). This percentage was slightly lower for core tourists (36.3%) due to a higher dispersion in the accommodation category, which ranged from two to five stars. Most of the tourists stayed in the south of the island (97%), and mainly in the areas known as "Playa del Inglés" and "Maspalomas". Finally, core and peripheral tourists had great differences in the betweenness-degree. This implies that core tourists connect different groups of tourists and share activities with them (mass tourism), while peripheral tourists can be considered as niche tourists.

Table 3 Description of the variables used in the regression

Variable	Description	Total Tourists	Core Tourists	Peripheral Tourists
		351	193	158
Nº tourists	Number of tourists		Mean	
Total tourist expenditure	Average total expenditure by tourists (€)	519.86	605.95	414.70
Average tourist expenditure per activity	Average total expenditure per activity by tourist (€)	45.62	42.34	49.63
Gender	1= male, 0= female	0.44	0.46	0.41
Age (years)	Ranges: 1= 16-24, 2= 25-34, 3= 35-44, 4= 45-54, 5= 55-64, 6 > 64	3.24	3.30	3.15
Length of stay (days)	1= 1-5, 2= 5-8, 3= 8-15, 4>15	2.24	2.34	2.11
Perceived Overall Image	Scale 1-7: 1 = very negative image and 7 = very positive image	5.80	5.76	5.84
	Nationality			
United Kingdom (UK)	I'm from UK (Rate)	0.46	0.37	0.56
Spain	I'm from Spain (Rate)	0.16	0.24	0.06
Germany	I'm from Germany (Rate)	0.15	0.17	0.13
Sweden	I'm from Sweden (Rate)	0.07	0.06	0.08
Finland	I'm from Finland (Rate)	0.06	0.06	0.05
Netherlands	I'm from Netherland (Rate)	0.04	0.03	0.05
Denmark	I'm from Denmark (Rate)	0.05	0.05	0.04
	Type of accommodation			
Hotel	Tourists staying at hotel (Rate)	0.56	0.54	0.58
Apartment/Bungalow	Tourists staying in apartment/bungalow (Rate)	0.44	0.46	0.42
Accommodation category	Range 1-5	3.07	2.97	3.18
	Accommodation area			
Playa_del_Inglés_area	Tourists staying in Playa del Inglés (Rate)	0.40	0.37	0.43
Maspalomas_area	Tourists staying in Playa de Maspalomas (Rate)	0.34	0.34	0.32
Mogán_resort	Tourists staying in Mogán (Rate)	0.13	0.12	0.15
San_Agustín_resort	Tourists staying in San Agustín (Rate)	0.10	0.13	0.05
Las_Palmas_city	Tourists staying in Las Palmas de Gran Canaria (Rate)	0.02	0.02	0.03
Betweenness	Average degree of betweenness of tourists	61.46	110.58	1.47

4.2 Explaining expenditure

Table 4 shows the results of the two regressions that were performed, one with the tourists' total expenditure during their stay in Gran Canaria, and another with the mean tourist expenditure per activity.

As shown in Table 4, the variables affecting tourism expenditure, both total or per activity, are almost the same, although there are more influential variables for the average tourism expenditure per activity than for total expenditure.

Table 4 Determinants of tourism expenditure at the destination (total and average).

Log – Coefficients	Total tourist expenditure (log)	Average tourist expenditure per activity (log)
C	5.079***	4.117***
Core tourists	-	-31.296***
Germany	-0.487***	-0.504***
Finland	-0.272*	-0.325**
Total weight of activities	0.021***	0.023***
Hotel	-0.272**	-0.164**
Perceived overall Image	-	0.065*
Betweenness	-	0.001**
Age	0.066***	0.062***
Accommodation category	0.108*	-
San_Agustín_resort	0.223**	0.232**
Maspalomas_beach	0.155**	0.212***
Vegueta_historic_quarter	-	-0.191**
Culture	-	-0.196**
Pool_r	-0.271***	-0.215***
Shopping_r	0.156**	0.128*
Beach_r	0.167**	0.167**
Restaurant_r	0.194**	0.209***
Them_park_r	0.225***	0.204**
Them_park_w	-0.085***	-0.099***
Passive_w	0.034*	-
Walk_w	-0.064***	-0.057***
R^2 adjusted	0.282	0.289
Observations	351	351
F-statistic	9.611	8.477
Prob(F-statistic)	0.000	0.000

*Level of significance 10%; **level of significance 5%; ***level of significance 1%.
r: the activity was performed on the remaining days; w: can be defined as the mean number of times an activity is performed.

It should be noted that the variable "core tourists" has a negative influence on the average tourism expenditure per activity. This confirms that core tourists perform more activities, but have less expenditure on average per activity than peripheral tourists. Among the nationalities analysed, the mean expenditure of German and Finnish tourists is lower than the mean expenditure of tourists from other nationalities. Age and some specific locations at the destination also have a positive impact on expenditure. As expected, the more often an activity is performed, the greater the total expenditure, but the average expenditure per activity will also be higher.

On the other hand, staying in a hotel has a negative impact on tourists' expenditure at the destination. It is probable that those tourists who stay in a hotel have booked half–full board or all-inclusive, while in other types of accommodation they do not have that option. The perceived image of the destination also positively influences the average expenditure per activity, although only slightly. Tourists with high betweenness have a

larger average tourism expenditure per activity, and they connect different groups of tourists. By sharing activities with different groups, total expenditure is higher.

Regarding the impact of different typologies of leisure activities on total expenditure, "I've been at the pool" between the third and the last day has a negative effect on total expenditure; however, all the remaining activities have a positive effect on expenditure. On the other hand, when analysing the average expenditure per activity, "I've visited Vegueta", "I've attended a cultural event", or "I've been at the pool" between the third and the last day, have a negative effect. "I've been at the pool" seems to have a non-expenditure connotation that implies a further analysis (to be performed in the next section). Nonetheless, the rest of the activities: "I went to the beach", "I've visited a shopping centre", "I've visited a theme park/leisure centre", and "I ate at a restaurant outside the accommodation", have a positive effect on expenditure per activity. "I ate at a restaurant outside the accommodation" is the variable with a higher impact on expenditure and requires a further analysis of this network. Finally, having performed any activity during the first two days has no direct implications for tourist expenditure. This invites an analysis to see if there is any indirect effect on expenditure produced by these initial activities, depending on the network configuration.

Regarding the activities that have been repeatedly performed (frequency), the number of times that a tourist has "visited a theme park/leisure centre" or "walked around the tourist area" has a negative effect on expenditure. It seems that those tourists who buy multiple-day entrance passes to theme parks or usually go strolling around the destination, tend to spend less. Paradoxically enough, the activity "I've stayed all day at the accommodation without leaving" has a positive effect on total expenditure, although its influence is limited. This result raises two interesting questions: (1) can any particular activity explain the results by itself, or (2) is it the specific network configuration that requires a greater focus?

4.3 Understanding the portfolio of activities from the tourist's approach: ego networks analysis

For a better understanding of the positive or negative influence that the activities have on total tourism expenditure and average tourism expenditure per activity, the ego networks of some activities with significant influence have been represented below. An ego network shows the set of activities that are directly connected to the analysed activity,

which we call "ego activity" (Borgatti et al., 2013). Through this analysis, the portfolio of leisure activities from the tourist's perspective can be further studied in depth, while it allows the visual management and research of the activities (empirically driven and theory-based) in addition to the linguistic explanation (Bell and Davison, 2013). These visual analyses also favour marketing and management research dissemination to reach multiple audiences (Scarles, 2010). The visual portfolio can be understood as the observed whole activities performed by the same tourist or group of tourists.

There are different ways of representing an ego network. Thus, the position of the nodes is relocated depending on the item observed. In the current study, the graph theoretic layout (GTL) "Spring Embedding" method was used to better visualise the position of the ego activity in relation to the other activities, since it optimises two criteria simultaneously. On the one hand, this approach uses the multidimensional scaling (MDS) method to distribute the nodes using geodesic distances. Nodes with a high geodesic distance between them (minimum number of links connecting them) are weakly connected and are separated in the graph. Conversely, those with a low geodesic distance are strongly connected and are located together. In order to avoid this superposition and to be able to observe all the nodes of the graph, this method also applies the node repulsion function (NR) through which a separation is created between nodes (Borgatti et al., 2013). However, for the ego network "I've visited Vegueta", the MDS method has been used exclusively because the visibility of the nodes was sharp enough.

Four activities were selected to be studied and represented: "I ate at a restaurant outside the accommodation", "I've been at the pool", "I've visited Maspalomas Beach", and "I've visited Vegueta". These activities were selected as examples because they have a significant influence on expenditure (see Table 4) and they are very popular (Tables 5 and 6 show the number of tourists who have performed the ego activities and each of the related activities). They also represent different leisure activities (generic and specific attractions), diverse typologies (cultural versus sun- and beachrelated), core and peripheral activities, with direct and indirect expenditure associated, and portray different effects (positive and negative) on expenditure (total and average). The visual representation of the relationship between these activities and others helps to better understand these contrasting results.

Table 5 Number of tourists who performed "I ate at a restaurant outside the accommodation" and "I've been at the pool" and related activities.

Restaurant	Number of tourists	Pool	Number of tourists
Shopping_centre	214	Pool_b	248
Pool_b	192	Shopping_centre	245
Walk_r	192	Maspalomas_beach	216
Pool_r	189	Walk_b	215
Walk_ b	188	Walk_r	211
Maspalomas_beach	182	Beach_r	201
Beach_r	181	Own_trip_r	194
Own_trip_r	179	Restaurant_r	189
Restaurant_b	173	**Beach_b**	175

Number of tourists who performed both activities at the Restaurant_r or Pool_r ego network. Connections between two activities are shown when at least 160 tourists carry them out jointly.

Table 6 Number of tourists who performed "I've visited the Maspalomas Beach" and "I've visited Vegueta" and related activities.

Maspalomas beach	Number of tourists	Vegueta historic quarter	Number of tourists
Shopping_centre	237	LPGC	78
Walk_b	219	Shopping_centre	74
Pool_r	216	Walk_b	71
Walk_r	205	Beach_r	71
Beach_r	200	Maspalomas_beach	68
Own_trip_r	185	Pool_r	67
Restaurant_r	182	Walk_r	65
Beach_b	178	Mogán_village	61
Mogán_village	151	Own_trip_r	60
Cuisine	148	**Pool_b**	57
Restaurant_b	148	Beach_b	57
Night_r	137	Cuisine	56
Own_trip_b	135	Own_trip_b	51
Market	121	Shopping _r	51
LPGC	119		
Shopping _r	117		
Theme_park_r	105		
Passive_r	94		
Night_b	94		
Shopping_b	84		
Vegueta_historic quarter	68		
Tejeda_village	68		
Org_tour_r	67		
Canteras_beach	64		
Arucas	59		
Theme_park_b	58		
Sport_r	57		
Passive_b	56		
Teror_village	53		
Culture	51		
Agaete_village	51		

Number of tourists who performed both activities Maspalomas_beach or Vegueta_historic quarter ego networks. Connections between two activities are shown when at least 50 tourists carry them out jointly.

On the one hand, one group of ego activities was initially studied: "I ate at a restaurant outside the accommodation" – restaurant_r; and "I've been at the pool" – pool_r (Figure 1a–b). These activities were both performed between the third and the last day and have

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an opposite influence on the total expenditure. On the other hand, the other ego activities analysed (Figure 2c–d) are: "I've visited Maspalomas Beach" and "I've visited Vegueta" at any moment during the visit. These two activities are very popular tourist highlights at the destination, and they have an opposite influence on the average expenditure.

The first conclusion derived from Table 5 is that both activities relating to the variables (restaurant_r and pool_r) are frequently performed by the tourists. The main difference between the two ego networks is that those tourists who were at the pool between the third and the last day, had also gone to the beach during the first two days.
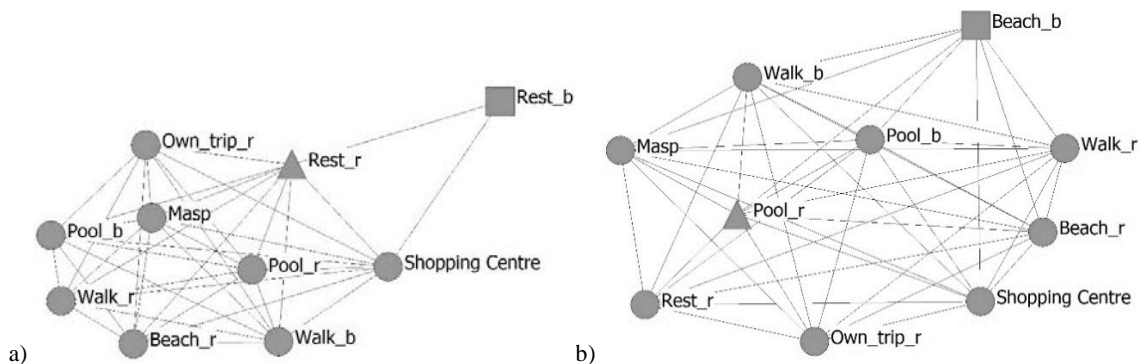
Fig. 1 Ego networks (a) "I ate at a restaurant outside the accommodation" and (b) "I've been at the pool".

Ego networks (a) "I ate at a restaurant outside the accommodation" between the third and the last day (Restaurant_r) and (b) "I've been at the pool" between the third and the last day (Pool_r). Connections between two activities are shown when at least 160 tourists carry them out jointly. The triangle represents the ego activity and the square represents those activities that differ between the two ego networks. Masp: Maspalomas_beach; Rest: Restaurant.
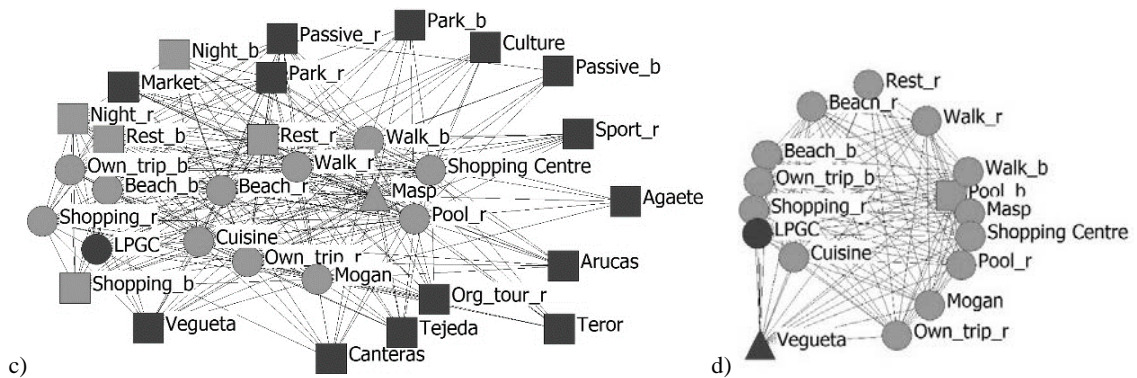

Fig. 2 Ego networks (c) "I've visited the Maspalomas Beach" and (d) "I've visited Vegueta".

Ego networks "I've visited the Maspalomas Beach" at any time of stay (Maspalomas_beach) and "I've visited Vegueta" at any time of stay (Vegueta_historic quarter). Connections between two activities are represented when at least 50 tourists carry them out jointly. The triangle represents the ego activity, the grey colour the core activities, the black the peripheral activities (see Table 1) and the square represents those activities that differ between the two ego networks. Masp: Maspalomas_beach; Rest: Restaurant; Park: Theme_park; Vegueta: Vegueta_historic_quarter; Mogán: Mogán_village; Tejeda: Tejeda_village; Teror: Teror_village; Canteras: Canteras_beach.

However, those tourists who ate at a restaurant outside the accommodation between the third and the last day, had also done so during the first two days of their stay.

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Moreover, Figure 1a–b shows that the activity "I ate at a restaurant outside the accommodation" between the third and the last day is the activity that connects the dense group of the network with the activity "I ate at a restaurant" during the first two days. Thus, the ego network presents, on the one hand, a homogeneous group including the ego activity, and on the other hand, isolated from the other activities, "I ate at a restaurant" at the beginning of the holidays.

There are no other significant differences between the two ego networks because both include a homogeneous group of activities. All the activities that appear in both ego networks are considered core activities. However, the ego activity in the ego network "I've been at the pool" is more integrated into the whole network.

In summary, this analysis helps to identify how a small change in the portfolio of activities can be associated with a great difference in the final impact on expenditure. The activity "I ate at a restaurant outside the accommodation" from the third day onwards entails a higher expenditure for itself and because it is accompanied by performing the same activity in the first two days. However, the activity "I've been at the pool", associated with "I went to the beach" at the beginning of the holidays, results in a lower expenditure. These results highlight the importance of the activities performed during the first two days, as they can determine different behaviour patterns, repeating the initial activities from that moment on (Verplanken and Wood, 2006). This is particularly important on holidays where new habits are acquired (Woodside, Cruickshank, and Dehuang, 2007), finally configuring alternative portfolios, where small differences can produce a significant impact on expenditure. Thus, inspiring tourists to go to a restaurant at the beginning of their holidays, besides staying at the pool or going to the beach, may involve significant differences.

On the other hand, Figure 2c–d represents the ego network of "I've visited Maspalomas Beach" at any time during the stay, with a positive influence on the average expenditure per activity, and the ego network of "I've visited Vegueta" at any time of the stay, with a negative influence on the average expenditure per activity.

Table 6 shows the number of tourists that have performed each of the activities and the ego activities under study. The main difference that can be observed is that the ego network of "I've visited Maspalomas Beach" includes more activities than the other network. The ego activity with a negative influence on average expenditure per activity

(Vegueta_historic quarter) is related to performing fewer activities, and the activity "I've been at the pool" during the first two days; however, "I've visited Maspalomas Beach" at any moment of the stay is not related to this activity.

The ego network "I've visited the Maspalomas Beach" shows two distinct groups: one where activities are tightly connected to each other and to "I've visited Maspalomas Beach"; and the other group, where the activities are mainly related to visiting other places, less connected to the ego activity and thus located farther away. In addition, the ego activity is highly integrated with the rest of activities since it does not present a marginal position. This is a very popular activity in conjunction with other activities.

The ego network "I've visited Vegueta" is a much less dense network than "I've visited Maspalomas Beach" since many activities do not appear in this ego network. It is also evidence of the existence of two different groups – one closer to the activity "I've visited Vegueta", and another group much farther away. In this case, the ego activity is located on the margin in comparison with the rest of the activities, and not integrated in any group. All the activities that appear in this ego network are core activities except "I've visited Vegueta" and "I've visited Las Palmas de Gran Canaria city" (where Vegueta is located).

The main differences between the two networks is the density, because one network contains many more activities than the other, and the location. "I've visited Maspalomas Beach" occupies a central position within the network, while "I've visited Vegueta" is located in a borderline place.

In summary, "I've visitedMaspalomas Beach" is a central activity at the destination. Therefore, tourists who perform this activity carry outmany activities, leading to an increase in expenditure. This analysis reveals the importance of visiting the destination's iconic places (Maspalomas sand dunes and beach comprise the main iconic places of Gran Canaria) and how visits to these iconic places increase the expenditure, possibly due to their emotional effect on the tourist. Thus, Maspalomas can play the role of a boundary spanner within the destination. Cross-promotional marketing campaigns with this attraction can have a significant impact on the network configuration. However, "I've visited Vegueta" is an isolated activity, weakly connected to the rest, and performed by passive tourists who therefore have lower expenditure. This activity could be promoted to niche tourists or better integrated in the portfolio by bundling activities besides other

marketing actions in order to strengthen connections to this attraction on the network periphery.

5. Conclusions and implications

This study analyses the relationship between tourists' leisure activities and their expenditure at the destination. In order to achieve this goal, firstly, a general SNA is conducted of the portfolio of leisure activities performed by the tourists. After identifying the impact of these activities on tourism expenditure, an in-depth network analysis of four key activities is performed. This methodology follows a paradigm shift, as suggested by the service-dominant-logic (Vargo and Lusch, 2004) where the portfolio of activities is managed according to tourist behaviour patterns. Importantly, tourist behaviour is understood as the touch points with the destination that are experienced by the traveller, where the expenditure is analysed not only according to individual destination activities and attractions, but also when these activities are linked, and combined to produce the overall tourist experience.

Leisure activities were analysed according to typology, frequency, and timing of their performance. The empiric results identified a network of relations between tourists and performed activities known as a core–periphery pattern. Core activities are the most repeated by tourists, while peripheral activities are performed less frequently. The results indicate that core activities are located mainly near the accommodation, and peripheral activities are remotely located. Some peripheral activities were identified as "excluding activities" (staying at the accommodation, practising sports, and visits to remote places), meaning that they may reduce the performance of other activities. These activitieshelp to explain the core–periphery model. Regarding the moment when activities were performed, some "opening activities" ("I've been at the pool" and "I've walked around the tourist area", plus "I went to the beach" for peripheral tourists) were identified. These activities are frequently performed during the first two days of the stay, likely conditioning the configuration of the network of activities.

The core–periphery model that describes the distributional pattern of leisure activities delineates the relationships between tourists and the surrounding environment through the activities they perform. It confirmed that both the number and the type of activities performed had an influence on total tourist expenditure. Significant differences with tourist expenditure between the two types of tourists were found. Tourists performing

mainly core activities also perform a greater number of activities, and have a higher total tourist expenditure and lower mean tourist expenditure per activity. However, peripheral tourists have a lower total expenditure as they perform fewer activities, but a higher mean expenditure per activity, as they seem to be more focussed on time- and money-consuming activities, such as practising sports and visits to remote places. Therefore, the destination should promote the increase in mean expenditure per activity of core tourists, and the number of activities performed by peripheral tourists, for instance, by means of bundling and joint promotions of these tourist activities. Core tourists seem to show a more homogeneous behaviour, connecting different groups of tourists by means of the most popular activities they share (mass tourism), while peripheral tourists' patterns fit better into the category of "niche tourists". If the connection (betweenness) is raised among peripheral tourists, it may produce a greater expenditure at the destination.

Likewise, some activities were found to generate less total expenditure and average expenditure per activity, such as passive activities ("I've been at the pool" and "I've walked around the tourist area"), but also the less frequently performed and contemplative ones (visit Vegueta old quarter or attend to cultural events). It seems necessary to increase tourists' active role in the activity, and involve them jointly in other more frequently performed activities in order to influence the destination's expenditure and thus fight the "hotel-pool staycation" (the most popular activity at the destination). In contrast, some activities generate a higher total expenditure and mean expenditure per activity, such as "I've visited Maspalomas Beach" or "I ate at a restaurant outside the accommodation".

While performing any activity during the first two days has no direct implications for tourist expenditure, these "opening activities" may generate a significant change in the portfolio of activities. For instance, the visit to iconic attractions (Maspalomas beach in this study) at the beginning of the holidays may result in a more dense network and higher expenditure. Moreover, eating at a restaurant at the start of the holidays, instead of or besides going to the beach, may produce a significant change in the configuration of the network.

Regarding the managerial implications for DMO managers, these results facilitate product development strategies for the portfolio of leisure activities in collaboration with the different stakeholders (identifying potential partnerships that may not have been considered otherwise) to increase the expenditure at the destination. For instance, creating

bundle packages which combine core and peripheral activities, and incorporating some "excluding activities" – practising sports and visiting remoted places – in the package. In addition, the results help to better design the in-destination promotional activities, and the efficient management of the activities portfolio, with the aim of boosting expenditure at the destination, and the economic benefits of tourism for the local population. Thus, information offices can actively promote the activities that are more expenditure-oriented (Araña, León, Carballo, and Moreno-Gil, 2016). For instance, "opening activities" such as "eating at a restaurant" should play a key role in the marketing strategy. Thus, tourists could receive a special discount or incentive for performing these activities at the beginning of their holidays. Moreover, "baptism activities" (the pool, Maspalomas beach) play an important role as promotional displays for other activities, acting as boundary spanners. DMO managers can encourage expenditure on the portfolio of leisure activities by giving bonus points and other incentives through the application (app) of the destination, and increase the tourist's betweenness by actively managing social media and "sharing and social" activities.

From the methodological point of view, the contribution of this paper is based on the use of SNA in the study of the relationships between tourists and activities (both generic and specific attractions) and expenditure. This is a new methodology that complements other techniques to detect market segments, such as factorial and clustering analyses. The bipartite network analysis with SNA allows the identification of the portfolio of day-by-day activities configuration, and facilitates the visual representation of the network to be managed. SNA helps to better understant the tourist behaviour patterns, to finally manage the portfolio of leisure activities. The relevance paradox occurs when researchers and practitioners alike are searching only information that is relevant to them (the activities). However, SNA may present new information that was not perceived as relevant, because the decision-makers did not have it already, and its relevance only becomes apparent after the information is revealed.

Finally, some limitations to be overcome in future studies need to be considered: the existing relationship between the groups of activities, tourist segments and the geographic localisation of the activities, and how this complex system of relations has an influence on the economy of different communities, needs to be analysed; in order to better understand the cause–effect relationships between tourists and activities, experiments need to be conducted at the destination and data need to be traced from social media; SNA

should be compared with alternative interesting methodologies – machine learning, copula (Tang, Ramos, Cang, and Sriboonchitta, 2017; Ye, Zhang, and Law, 2009; Zhang, Zhang, and Kuwano, 2012) to study the tourism market; and other variables such as economic ones (prices, incomes), and additional activities to explain expenditure should be introduced.

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CONCLUSIONS

In this thesis, the importance of analysing consumer behaviour is highlighted, taking into account the interconnections between the multiple agents during the different stages of the customer journey: how tourists acts before and during their trip, since it is an iterative and dynamic cycle (Lemon and Verhoef, 2016).

The main general conclusions derived from the first chapter are:

1) In the search for the most important sources of information for the e-tourism ecosystem, four key platforms belonging to the European platform network were identified: Google, Facebook, Booking and TripAdvisor, where Google is considered as the main gateway to that ecosystem. None of these platforms corresponds to the traditional agents of the sector.

2) The behaviour of European tourists in terms of seeking information on tourist destinations is diverse according to nationality. Europe can be described, on the one hand, as a fragmented market in terms of some sources of information and, on the other hand, as a single market for the four major platforms.

3) Methodologically, the study helps to understand from an innovative approach the use of the platforms belonging to the European tourism ecosystem and how the platforms are interconnected through a complex network.

In a practical way, tourism companies and Destination Marketing Organisations (DMOs) can use the information resulting from this work to improve their segmentation and communication strategy, both in conventional media and through social media and others. For example, when it comes to these four platforms (Google, Facebook, Booking and TripAdvisor), known as the big four, destination managers must employ common marketing strategies for almost all the countries. However, managers should also use marketing strategies adapted to each of the source markets studied since differences in the use of the platforms by countries were identified.

The main general conclusions derived from the second chapter are:

1) The European digital economy is a complex system in which different types of platforms coexist and compete. The most important platforms for all the generations are Facebook, TripAdvisor, Google and Booking, although some relevant differences in the network configuration of each generation are also shown.

2) Although sharing economy platforms are not as important as expected, some of them are among the most relevant platforms in the European e-tourism ecosystem. Information of travel behaviour shared through these platforms becomes management knowledge for the future.

3) Generational differences are observed in the use of digital platforms. Generation Y commonly uses more non-tourist information sources, which can be associated with the moment of inspiration. Generation X commonly uses more Comparators, search engines, online travel agencies (OTAs) and sharing economy platforms (SE), most of them associated with the phase prior to the purchase. Finally, Baby Boomers (BB) use more Tour Operators and Travel agencies (TA), which we could associate with the purchase phase. Younger generations tend to use more digital platforms before the time of purchase.

The results of the second chapter help to design specific marketing strategies for each generation. Destination Marketing Organisations (DMOs) must carry out their promotions in certain media depending on the target generation, since the information search behaviour differs.

It is concluded that despite the attractiveness of Generation Y in relation to its extensive interaction with networks, marketing actions cannot forget Generation X, since they seek personalisation, quality and have greater purchasing power. However, if the intention is to reach the Millennials, companies must become part of their lives by forging emotional ties with them through, for example, social networks, motivating them and making them participants.

The first two chapters have great practical implications on the marketing strategies since they help to choose the key platforms to reach certain segments of tourists, as well as contribute to the literature on information platforms.

The main general conclusions derived from the third chapter are:

1) Both the type and the number of activities carried out at the destination influence the total tourist expenditure.

2) Tourists who carry out the most popular activities fit the pattern of mass tourism, with a homogeneous behaviour. Tourists who carry out peripheral activities conform to the definition of "niche tourists".

3) Some activities named "opening activities" were also identified, mostly during the first two days of the holidays, and which probably influence the configuration of activities carried out during the same.

This study also involves a methodological contribution when applying the social network analysis (SNA) together with other techniques for the study of the relationships between tourists, activities and spending. This analysis helps to create a better understanding of behaviour patterns and a more efficient management of the portfolio of activities.

The results obtained in this third chapter enable the managers of the DMOs to choose the strategies to be used for the development of products for the portfolio of activities with the objective of increasing destination spending and the economic benefits of tourism for the local population. It was concluded that destination managers should promote the increase in the average expenditure per activity of tourists who perform more popular activities and the number of activities carried out by tourists who perform more peripheral activities. For example, creating packages that combine central and peripheral activities, and incorporating some "exclusive activities" (not combined with others, such as, playing sports and visiting remote places) identified in the package.

It is recommendable to increase the active role of tourists after verifying that "passive and contemplative activities" generate less expense per activity and are less frequently performed. In addition, information offices should actively promote activities that are more cost-oriented, granting incentives in this regard.

Finally, future research lines and some limitations of this thesis are presented.

This thesis, like any partial study of a complex social phenomenon, has different limitations. Among them, we highlight the scope and methodological limitations. For example, the thesis does not take into account all stages of the customer journey. We have covered the first two, but we would have to investigate in the post-visit stage. Methodologically, the thesis lacks a longitudinal analysis due to the dynamic and changing nature of the sector. Other traditional methodologies such as cluster or canonical analysis could have been implemented to complement the analysis. Despite including several generations, the Z generation has not been taken into account in this thesis, however, this generation will play a crucial role in the future of tourism (Haddouche and Salomone, 2018; Skinner, Sarpong and White, 2018). On the other hand, it would be possible to arrive at a better understanding of tourism expenditure taking into account the

average expenditure per activity. Different indicators were used in the realisation of the thesis, however others could be included such as tourist income.

Future studies should continue to analyse the complexity of this European network, both before, during and after visiting the destination. Specifically, we propose these future research lines:

1) Including additional indicators such as conversion rates, return on investment (ROI), prices, income and other activities, differentiate nationalities and generations during the visit to the destination, and include all the generations in the previous stage to the destination visit.

2) Perform more theoretical and applied analysis related to e-tourism and social network analysis.

3) Analyse how tourists use the platforms to inform themselves about activities, restaurants, etc., at destination, or track activities through social networks once tourists arrive at the destination.

4) Inquire about the activities carried out to be able to plan routes through the location of the activity and observe the geographical distribution of these.

5) Differentiate the use of sharing economy platforms with economic transaction from those that do not have economical transactions.

6) Relate the exact cost of the activities to the satisfaction of tourists to know their disposition to pay.

7) Perform separate analyses for those tourists staying in the most touristic areas of the destination and those staying in non-touristic areas.

8) Methodologically, other behaviour or grouping patterns can be used. SNA is a fairly young and growing tool (Casanueva, Gallego and García-Sánchez, 2016) that in some cases must be complemented with alternative methodologies such as Logit, Cluster analysis, Canonical analysis, etc.

9) Expand the geographical area of research, apply such research to other areas such as the US, South America, Australia, etc. or conduct the study in more limited areas.

10) Perform longitudinal studies to see if the use of platforms by tourists while searching for information on destinations evolves over time. Tourist agents must be in constant analysis because of the very dynamic and changing nature of the

sector, especially with the rise of the Internet. The emergence and extinction of digital information sources is constant.

11) In order to close the customer journey cycle addressed in this thesis, future research projects will analyse the "post visit" to the destination stage, specifically, the image that tourists have about the destination will be studied once they have returned home.

The methodology presented in this thesis helps to achieve a better understanding of how the agents of the European tourism ecosystem interact, a strategic factor for the success of a tourist destination. From this thesis, several strategies are recommended to improve the segmentation, communication, promotion and distribution used in a digitalised, multicultural and global environment, that help to optimise and develop products and services and to improve the competitiveness of the destinations, and with special attention to the behaviour of the consumer before and during the travel.

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