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ORIGINAL RESEARCH

The experience co-creation in smart tourism destinations: a multiple case analysis of European destinations

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Abstract In the last years, destinations have started to redefine their role and their entrepreneurial logics, involving tourists as active co-creators of their own experiences and considering new technologies as the main tools for defining tourism products. It implies the birth of a new kind of destinations, the smart tourism destinations (STDs), in which new technologies are so extensively embedded to influence tourism experiences, enhance destinations' competitiveness and favour tourism development projects. Starting from these considerations, the main purpose of this paper is to contribute to the recent debate on innovation in tourism, by proposing an interpretative framework able to explain the way in which technological components in a STD may improve the co-creation of tourism experiences. Empirical analysis on two European STD best practices, Venice and Salzburg, conducted triangulating qualitative methods, reveals that the smart approach adopted by STDs improves the co-creation of tourism experiences by encouraging the interaction with tourists, increasing their active participation during the experience, and promoting the sharing of the experience among the tourists themselves. The paper provides interesting insights for destination managers and policy makers on how they should use innovative technologies in STDs to improve the experience co-creation.

Keywords Smart tourism destination · Tourism experience · Co-creation · Smartness

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1 Introduction

In the current era, characterized by ubiquity of technology, where computers increasingly disappear and services are seamlessly available to the users, technology is becoming fundamental also for destinations (Kuflik et al. 2015). This fast development of technology in tourism and the growing interest in the smartness of cities have increased the attention of destination managers and policy makers on the opportunities offered by the adoption of a smart strategy also at tourism destination level. In a similar context, a new typology of destination has come to light, characterized for being a smart tourism destination (STD). This concept indicates a tourism destination in which new technologies are so extensively embedded to influence tourism experiences, enhance destinations' competitiveness and favour tourism development projects (Buhalis and Amaranggana 2013; Presenza et al. 2014; Boes 2015). Bringing smartness into tourism destinations requires the use of a technological platform on which information on local resources, tourists, their actions, and their consumption habits, can be integrated and made available to several stakeholders. According to the smart approach, the technological platform is composed by three technological components: cloud computing services, internet of things, and end-user devices (Zhang et al. 2012; Wang et al. 2013).

These technologies are activated through contacts with stakeholders during multiple touch points. Stakeholders are directly engaged in the dynamic use of the platform, which works as a neural system (Buhalis and Amaranggana 2014): through the smart approach, tourists may be actively engaged with tourism service providers, and collaborate in the co-creation of their own experiences. They may, therefore, directly contribute in innovating the tourism offers (Schaffers et al. 2011; Buhalis and Amaranggana 2014).

The smart system, thus, may affect the co-creation of tourism experiences since the platform and the three technological components that compose it are able to support the collaboration with tourists and to improve their active involvement. The use of technologies before, during and after the visit and its influence on the role of tourists as experience co-creators reflect on more successful experiences: literature on tourism experience, in fact, shows that the competitiveness of destinations increases thanks to co-creation (Binkhorst and Den Dekker 2009; Neuhofer et al. 2012).

Despite the recognized positive influence of technologies on tourism experience co-creation, only few researches have investigated the influence of a smart approach adopted by STDs on the co-creation of tourism experiences. In order to fill this gap, the paper poses the following research question:

> How the use of technological components in a smart tourism destination may improve the co-creation of tourism experiences?

In particular, the paper wants to contribute to the recent debate on innovation in tourism, by proposing an interpretative framework able to explain the way in which technological components in STDs—specifically, the use of cloud computing

services, internet of things and end-user devices—may improve the co-creation of tourism experiences.

In order to reach this purpose, two European STD best practices are investigated—Venice and Salzburg. The multiple cases analysis was considered the proper methodology for this study, as it is frequently used to understand a real-life phenomenon in depth, including important contextual conditions of the phenomenon (Yin 2013) and is recognized in tourism literature as a useful approach to examine the implementation of STDs and to generate more in-depth understanding within this subject (Buhalis and Amaranggana 2014).

An interpretative framework has been elaborated to analyze the cases. It is useful to understand how the typical technological components of a STD act on the destination, influencing the experience co-creation with tourists. Cases are investigated through qualitative methods, triangulating public documents, information from tourism web sites of each destination, and in-depth interviews realized with key-informants involved in the development of smart tourism strategies of Venice and Salzburg.

The results and insights from this study provide explanations for the relationship between the smart approach of STDs and the improvement of tourism experience co-creation. The elaborated interpretative framework is useful for destination managers and policy makers to investigate what are the weaknesses and strengths of a smart approach related to the experience co-creation.

The paper is structured into five sections. After the Introduction, the second section provides an overview of the literature describing the conceptual foundations of the STD and of the experience co-creation in tourism. In the third section, the methodology and design of the empirical research are described: the multiple cases analysis is introduced, explaining the selection of best practices and the data collection. The study introduces also the interpretative framework useful to understand how the experience co-creation is strengthened in STDs thanks to the improvement of technological components. The fourth section shows the results of multiple cases analysis. Finally, the last section contains the conclusions; the implications and possible future advances of the research are also presented.

2 Literature review

2.1 The smart approach of tourism destinations

Current literature on destination management and on the impacts of ICT in tourism is focusing on the opportunities generated by the adoption of a smart approach in areas where the tourism industry is one of the primary sources of GDP.

The implementation of smartness in tourism has originated the smart tourism destinations (STDs). The STD concept derives from the development of smart cities (Buhalis and Amaranggana 2014), characterized for being cities in which the massive use of technology allows to coordinate all activities, information and services in real time, interconnect all local organizations, and improve urban efficiency (Vicini et al. 2012; Buhalis and Amaranggana 2014).

According to Gretzel et al. (2015a), "smart" is a new buzzword to describe technological, economic and social development fuelled by using new technologies. For this reason, smart cities have quickly gained international attention as a new approach able to give real answers to the needs of new models of urban development; despite this, there is no yet a unique and shared definition of the concept. According to Holland (2008), it is a fuzzy concept due to the fact that the increasing attention to this phenomenon has determined an excessive use in a not univocal way: the term is often used with different meanings depending on the different contexts and conditions of use. In order to conceptualize smart cities, many theorists have tried to individuate and explain the main characteristics of these technologically advanced cities. Among them, Caragliu et al. (2009) consider that a city may be categorized as smart when its sustainable economic growth and a better quality of life are based on three pillars: investment in human capital who actively participate in the activities and drive the smartness; development of a solid technological infrastructure that covers the whole city; dissemination of information throughout the city, which is essential for optimizing the city functions and improving the quality of life. Studies by Komninos et al. (2013), instead, focus on social innovation and spatial intelligence as the main outcomes of smart cities: innovation refers to the use of technology to enable citizens and businesses to develop and experiment innovative solutions; intelligence refers to the use of predictive applications that allow to generate more accurate decisions.

Another important study on the topic is by Cohen (2012), who proposes a model—the smart city wheel—to identify the key characteristics of a smart city, support the development of its strategies, and track its progress. the smart city wheel monitors the smartness of a city using six dimensions, defining for each of them specific indicators: smart governance, smart environment, smart mobility, smart economy, smart people, and smart living. UE decided to adhere to the smart city wheel and to use this model to define the European smart cities ranking.

Starting from the studies on smart cities, some authors (Baggio and Del Chiappa 2014) point out that the use of a smart approach can affect not only the methods of management of a smart city, but also of a tourism destination, as well as it can affect its definition. A destination, in fact, is defined as a network composed by a plurality of stakeholders, all engaged in offering services and experiences to tourists. Acknowledging the importance of new technologies in tourism, destinations are increasingly supported by a technological infrastructure that creates a digital environment able to foster the collaboration among stakeholders and to empower the transfer and sharing of knowledge (Baggio and Del Chiappa 2013, 2014). To bring smartness in tourism destinations thus means to dynamically connect the stakeholders through a technological platform on which they can exchange real-time information relating to their tourism activities (Beritelli et al. 2007, 2014). This platform facilitates the touch points with the tourists by allowing the connection through a wide range of end-user devices supporting tourism experiences.

The concept of STD finds its origins in the need to adopt smart city principles in areas with high tourist value. The first contributions on the research stream date back to the Chinese scientific literature, where the term STD was officially coined (China's State Council of Chinese Central Government). These authors emphasized

that the intensive use of technology by means of an IT platform that integrates information on tourism with information on consumption and use of resources (cfr. smart tourism systems by Zhu et al. 2014), fosters the co-created tourism experiences, improving the effectiveness of DMO communications strategies, and enhances the competitiveness of destinations (Zhang et al. 2012; Wang et al. 2013).

Lamsfus and Alzua-Sorzabal (2013) define the STD a destination in which "the investments in human and social capital, traditional transport, and modern ICT communication infrastructure meet the social, cultural, economic, leisure and personal needs of visitors. Visitors are the short term citizens of a smart city". They, in fact, comparing the STDs with the smart cities, affirm that the notion of STD is based on the temporary nature of the visit of tourists and travelers. Lopez de Avila (2015), instead, defines the STD as "an innovative tourist destination, built on an infrastructure of state-of-the-art technology guaranteeing the sustainable development of tourist areas, accessible to everyone, which facilitates interaction with the visitor and integration into his or her surroundings, increases the quality of the experience at the destination, and improves residents' quality of life".

The birth of a STD, therefore, is not limited to a pure technology implementation, but requires complex organizational and managerial activities, through which resource sharing processes are facilitated, common strategies are developed, and the promotion of the destination by individual actors in the territory is realized. Through the analysis of three European smart cities—Barcelona, Amsterdam, Helsinki—Boes (2015) provided an holistic framework for the development of STDs, consisting of four fundamental concepts explored: human capital, leadership, social capital, and innovation.

About the STDs theme, at the ENTER Conference 2015, the features of the cloud-based ICT infrastructure to support the creation of context-aware mobile services by tourism stakeholders have been outlined (Lamsfus et al. 2015). Furthermore, it has also been discussed how to effectively manage big data and how to create the conditions so that the stakeholders are dynamically interconnected and information are used to enrich tourism experiences in real-time (Buhalis and Amaranggana 2014).

Recently, Gretzel et al. (2015b) envisioned the STD as an integral part of the smart tourism ecosystem, where technology breeds new business models, interaction paradigms and even new types of tourism businesses.

The attention of the scientific literature (Xiang et al. 2015) was then focused on STD in order to provide useful information on topics such as: conceptual foundations for STDs, knowledge transfer (Del Chiappa and Baggio 2015) and social marketing management (Buhalis and Foerste 2015); the utilities of data analytics for destination management using cases of specific destinations (Supak et al. 2015; Kladou and Mavragani 2015); the application of analytic approaches to understand the traveler's behavior (Marine-Roig and Clavé 2015; Marchiori and Cantoni 2015).

In order to understand the way in which the smart approach adopted by STDs may improve the co-creation of tourism experiences, we decided to focus on the technological aspects of STDs, which can be considered tourism destinations in which new technologies are so extensively embedded to influence tourism

experiences, enhance destinations' competitiveness and favour tourism development projects (Buhalis and Amaranggana 2013; Presenza et al. 2014; Boes 2015).

In particular, we focus on three essential technological components at the basis of the smartness of a destination: cloud computing services; internet of things (IoT); end-user internet service systems (Wang et al. 2013; Zhu et al. 2014).

Cloud computing services are important instruments for data management in the tourism industry, as they allow the access from any client to all the resources that are virtually stored and managed by cloud service providers, making software applications/services accessible anytime and anywhere (Armbrust et al. 2010, cited by Kuflik et al. 2015). Cloud infrastructures are dynamic and scalable, so are constantly reconfigured to be adapted to a variable workload, allowing the optimal use of resources (Zhang et al. 2012; Wang et al. 2013). These services simultaneously provide both open and shared information to a large number of users, and private data for the exclusive use of tourism providers. They may be applied at horizontal, vertical and transverse level. At horizontal level, their use allows the sharing of data, information, and applications useful to improve the services development processes. At vertical and transverse level, are able to provide an integrated supply system. Companies that become virtual enterprises thanks to cloud computing services broaden their scope and increase their competitiveness by optimizing their applications and the internal logics of monitoring.

The IoT is a phenomenon that is rapidly developing in the world of ICT (Buhalis and Amaranggana 2014; Atzori et al. 2010). The term was coined in 1999 by Kevin Ashton, who defined it as a network able to connect anything at anytime and anywhere, in order to identify, locate, manage and track real objects and places, defined "smart" (Mingjun et al. 2012; Lin 2011). IoT is the pervasive presence of a variety of things or objects that, through unique addressing schemes, are able to interact with each other and to cooperate to reach common goals (Atzori et al. 2010). In this sense, IoT facilitates the exchange and elaboration of information and the monitoring of activities, reducing the gap between the real world and digital realm and facilitating analysis (Chui et al. 2010).

The end-user internet service systems refer to applications supported by combinations of cloud computing services and IoT accessible through wired and wireless connections and represent all those hardware technologies that enable players in the tourism industry to use the technologies, applications and other ICT services.

Another important contribution to the topic of STD is provided by Buhalis and Amaranggana (2014), who state that smartness in STDs is strengthened by implementing tourism applications as combinations of STDs dimensions and destinations elements.

STDs dimensions are represented by the model of the smart city wheel by Cohen (2012).

Destination elements are defined by the authors as the six elements that characterize a successful destination (6 As of tourism destinations by Buhalis 2000): attractions, access, amenities, available packages, activities and ancillary services. Attractions are all attractive resources of a destination, which may be natural, artificial or cultural; access refers to the entire transportation system to reach the

destination and to move along it; amenities characterize all services aimed at facilitating a convenient stay, namely accommodation, catering facilities, and other tourism services; available packages refer to pre-arranged service bundles by intermediaries; activities refer to all activities available at destination that tourists may do during their stay; finally, ancillary services are all services used by tourists which are not uniquely related to tourism, such as banks, postal services, etc.

According to Buhalis and Amaranggana (2014), STDs are destinations in which the application of new technologies in terms of attractions, access, amenities, available packages, activities and ancillary services generates positive effects on their smartness in the dimensions of governance, environment, mobility, economy, people, and living. The ultimate goals of a similar STD are to provide value-added experiences for tourists, integrate all stakeholders at both micro and macro level, and improve the effectiveness of resources management enhancing both the destination competitiveness and the tourists satisfaction and achieving, finally, long-lasting sustainability and economic growth (Buhalis and Amaranggana 2014).

A STD is also able to facilitate the processes of experience co-creation. Thanks to smartness in tourism, in fact, tourists are active stakeholders engaged in the smart platform. Consequently, they are more informed and competent, able to activate processes of conversational marketing through social media and to contribute to the creation of content, and use end-user devices. These elements reduce the uncertainty in the decision-making process and, therefore, the risk that the tourism experience does not reflect the initial expectations.

2.2 Co-creating experiences in tourism

Co-creation of tourism experience can be described as a process that includes tourists and other possible stakeholders in the definition of unique and personal experiences, with the final goal of generating value (Salvado et al. 2011).

The tourism industry is constantly changing and tourists are more oriented to actively collaborate with service providers in order to co-create their own tourism experiences. Modern tourists, in fact, want to combine their resources with those at destination with the purpose of living experiences able to satisfy in a better way their specific needs, and are prepared to directly interact with the destination supply system in order to live custom experiences. Literature on experience co-creation in tourism revealed that at the basis of co-creation there are (Binkhorst and Den Dekker 2009; Salvado et al. 2011; Neuhofer et al. 2012): the interaction among firms and tourists, the active participation of tourists, and their need of sharing the experience with other subjects, which can be considered antecedents of the experience co-creation in tourism. The experience co-creation, in fact, depends, to a large extent, on the ability of tourists and firms to directly interact each other during all the experiential process, in order to have more stable relationships and more customized offers. Furthermore, tourists want even more to actively participate into the activities at destination, personally intervening in the building of their own experience, combining their resources, and influencing the success and competitiveness of the territory (Aho 2001; Rustichini and Siconolfi 2004; Andersson 2007; Prebensen et al. 2013). Finally, for tourists is also extremely important the sharing

of their experiences with other tourists and locals at destination, but also with relatives, friends and unknown users through social media, the Internet, and other tools (Binkhorst and Den Dekker 2009; Neuhofer et al. 2012; Brejla and Gilbert 2014).

Tourists want to co-create their experience along the whole experience process, which starts when they are still in their daily context and collect information, and continues when have come back home (Aho 2001). For many tourists, in fact, key parts of the experience are composed by the planning of the visit while are at home, and by the memory of the trip when are come back (Minkiewicz et al. 2009).

The tourism experience process has been adapted from studies on experiences in manufacturing companies, which traditionally considers three phases of consumption process: pre-consumption; core consumption; post-consumption. Similarly, the tourism experience process is distinguished in:

1. Pre-travel phase, when the tourist is still at home, searches information, chooses the destination, and buys the offer.
2. On-site phase, when the tourist visits the destination.
3. Post-travel phase, when the tourist is back at home and reminds the trip.

Destinations and tourism firms have recognized the changes in the industry, the new active role of tourists, and, therefore, the increasing importance of experience co-creation as a key factor for reaching success. In order to encourage the experience co-creation, firms of the destination supply system have started to build and manage competitive experience environments in which tourists can actively intervene, contributing to increase the destination's competitiveness, especially thanks to the support of technology. In such a context, in fact, new technologies are more and more emerging as valid tools to support the experience co-creation: the most successful tourism experiences are those co-created with tourists and supported by high levels of technology (Tussyadiah and Fesenmaier 2009). There are several technological tools able to support the experience co-creation in the tourism context, such as websites, blogs, travel diaries, travel review websites, virtual communities, on-line booking systems, applications, on-line travel guides, etc. The use of these tools mainly depends on the tourist's needs, the experience phase she/he is living, and the place where she/he is (Gretzel and Jamal 2009; Tussyadiah and Fesenmaier 2009).

Technology, therefore, is relevant for co-creation in tourism industry, both from the demand and the supply side. As shown by the model by Neuhofer et al. (2012) (Fig. 1), ICTs are extremely able to facilitate the encounters among tourists and destinations, to enlarge the experience process in time and space, and to improve the co-creation with other stakeholders.

The model contributes to the literature on tourism experience co-creation by introducing three key elements:

1. The recognition of an extended experience co-creation space, which refers to the whole tourism experience process, including the co-creation process also in the pre-travel and post-travel phases.

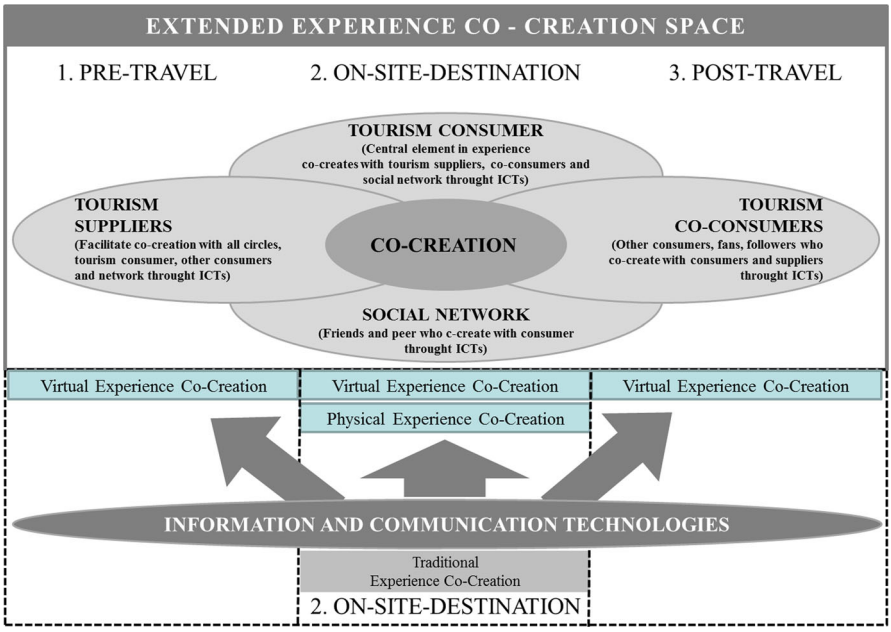

Fig. 1 Technology enhanced destination experiences. Source: Neuhofer et al. (2012)

2. The recognition of two levels of experience, due to the fact that tourists live both a physical and a virtual tourism experience thanks to the use of mobile technologies. Tourists are generally involved in the experience co-creation process at physical level when being at destination, and at virtual level when being at home. Thanks to mobile technologies, however, they may be involved in the virtual experience co-creation also in the on-site phase: during their physical experience of visit at destination, they are also technologically connected with the tourism firms, exchanging real-time information with them, modifying their plans, receiving custom offers.
3. The recognition of multiple levels of engagement: technology allows tourists to develop connections with a large number of subjects during their tourism experience. Both when being at destination and at home, in fact, they interact not only with tourism services providers and with their network of parents and friends, but also with a wider social network of followers, visitors, tourists and fans, who are interested in virtually living and sharing experiences about a particular destination.

Literature on tourism experience co-creation, then, shows how particularly relevant are mobile technologies to enhance the experience co-creation: using mobile technology (especially applications on smartphones and tablets), tourists may access to any information wherever they are and at any time. Furthermore, they may also custom their experiences and share them with others when they are still at destination (Green 2002; Neuhofer et al. 2012).

3 Research methodology

The literature review on the smart approach of tourism destinations and on the tourism experience co-creation shows that destinations and tourism firms have recognized the importance of technology for the strengthening of tourism experience co-creation.

What is still unexplored is the way in which technological components in STDs may improve the co-creation of tourism experiences. In order to fill this gap, the paper focuses on the technological aspect of smartness and investigates how it is able to enhance the experience co-creation in a tourism context. The research strategy used is multiple cases analysis (Eisenhardt 1989; Yin 2003) that was considered the proper methodological strategy in this study, as it allows in-depth insights into emerging fields and is used to understand a real-life phenomenon, including important contextual conditions of the phenomenon (Yin 2013). Furthermore, the multiple cases analysis is recognized in tourism literature as a useful approach to investigate the implementation of a STD and to generate more in-depth understanding within this subject (Buhalis and Amaranggana 2014). In this research, the STD has been considered the proper unit of analysis to understand the role of technology in improving tourism experience co-creation in a smart context.

3.1 STDs' selection

Venice (IT) and Salzburg (AT) are chosen as the two best practices to investigate, due to their relevant positions (respectively, 1 and 2 out of 77) in the ranking of smart cities based on the touristic attractiveness. Since the smart approach has been widely investigated in the urban context, the choice to refer to a smart city ensures the presence of a smart approach. Furthermore, the high value of tourism development verifies if the smart city may be considered a relevant destination, ensuring that the study is conducted in a significant tourism context.

The European smart cities have been individuated thanks to the European Smart City Index elaborated since 2007 by the Wien University of Technology, the Delft University of Technology, and the University of Ljubljana (http://www.smart-cities.eu). The Smart City Index is the result of a standardized combination of six dimensions of smartness (Smart economy, smart mobility, smart environment, smart people, smart living, and smart governance) divided into 28 domains and measured by 81 indicators.

In 2014, the European Smart City Index was applied to 77 European cities characterized for being of medium size, recognized on a global level and with accessible and relevant databases. One domain of the 'smart living' dimension is the 'touristic attractiveness', calculated using the indicator 'Importance as tourist location', a score which takes into account the number of beds available, the number of nights spent in the touristic facilities, and the appreciation reflected by the touristic guide Michelin. In order to individuate the smart cities with the highest value of 'touristic attractiveness', they were classified on the basis of this domain.

Table 1 European smart cities ranking—Venice and Salzburg (out of 77 smart cities). Source: http://www.smart-cities.eu

Smart ranking	Venice	Salzburg
Smart economy	33	27
Smart people	63	24
Smart governance	68	29
Smart mobility	32	2
Smart environment	59	27
Smart living	8	1
Total position	46	10

The first two cities ranked in this new classification—Venice and Salzburg—were selected as best practices. Their high development in the tourism industry is confirmed by the number of overnight stays per resident: in 2014 the historical centre of Venice received 114 overnights per resident (http://www.comune.venezia.it) and Salzburg received 18 overnights per resident (http://www.wien.gv.at/english/administration/statistics/tourism.html). It is important to underline that the two cities have very different positions in the European Smart City Index (Table 1).

Considering their total positions, Salzburg ranks 10 out of 77, while Venice ranks 46. Salzburg, therefore, is one of the top10 European smart cities of medium size and is the first Austrian smart city, followed by Innsbruck (ranked 13), Linz (ranked 14) and Graz (ranked 16). Salzburg has a strong smartness in all the six dimensions: it is ranked 1 in smart living, 2 in smart mobility, and is in the first 30 positions for all the other dimensions; the weakest position is for smart governance, ranked 29. Among the 28 domains, it has strongest values in ethnic plurality (smart people), cultural facilities, and touristic attractiveness (smart living). These values show how Salzburg is implementing its smartness in all the aspects of the city, which encompass not only the needs of tourists, but also those of the citizens.

Venice is in lower positions in all the smart dimensions compared with Salzburg, but is the first smart city among the Italian cities, followed by Verona (ranked 49), Trento (52), Trieste (53), Perugia (57), Padova (61), and Ancona (65). As for Salzburg, also Venice shows its better position in smart living (is ranked 8) and its worst position in smart governance. Apart the eighth position in smart living, its positions range from the 38 in smart mobility to the 68 in smart governance. The best values are registered in the domains touristic attractiveness, cultural facilities (smart living), and international accessibility (smart mobility).

3.2 Research design

In order to understand the way in which technological components in the STDs Venice and Salzburg may improve the co-creation of tourism experiences, an interpretative framework has been elaborated (Fig. 2). It is based on the literature review on STDs (Buhalis and Amaranggana 2013) and on tourism experience (Neuhofer et al. 2012) presented in the previous section.

The proposed framework may fill the current gap in literature, providing a better understanding of the way in which technological components in a STD may

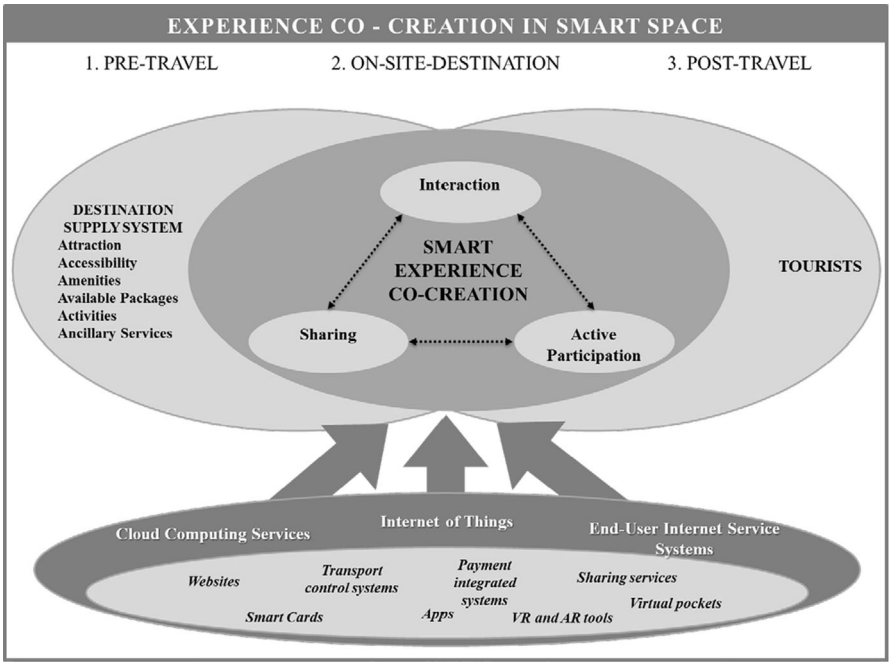

Fig. 2 Experience co-creation in smart tourism destinations. Source: our elaboration

improve the co-creation of tourism experiences. It considers that the typical technological components of a STD act on the six dimensions which identify a destination, influencing the experience co-creation with tourists. In the lower part of the framework, there are the technological components of a STD, characterized by cloud computing services, IoT, and end-user internet service systems, and by the technological tools related to them. These components, in fact, are at the basis of innovative technological tools (i.e. websites, transport control systems, smart cards, apps, etc.) implemented by the destination supply system in order to enhance the visit experience.

The upper part of the framework shows the tourism experience co-creation space as a result of collaborative encounters between the destination and its tourists, not only when the tourist is at destination, but also when she/he is at home preparing the trip or remembering it. The destination supply system is here represented through its main dimensions, summarized by the 6A's framework by Buhalis (2000). The experience co-creation is represented through the three antecedents able to improve and facilitate the co-creation of tourists: the direct interaction with tourism services providers, the active participation during all the experience process, and the need of sharing the experience with a wide network of subjects.

The arrows show that an integrated and coordinated implementation of the three smart technological components in the 6A's of the destination allows to increase the experience co-creation at all the phases of the experiential process acting on the three antecedents of experience co-creation.

According to the interpretative framework proposed, the empirical analysis started with the individuation of the main features of a destination according to the 6A's framework by Buhalis (2000). This phase was useful to ensure that the smart cities selected are also destinations: relevant elements in attractions, access, amenities, available packages, activities, and ancillary services have been individuated in both the cases, allowing to define Venice and Salzburg as STDs. Subsequently, the role of technology in enhancing the experience co-creation in a smart approach has been studied. The use of cloud computing services, IoT, and end-user internet service systems have been investigated identifying the main technological tools developed by the destinations and the tourist firms. Their functionality has been studied taking into account the phases of the experience process during which they can be used (pre-travel, on-site, and post-travel), and which of the six dimensions of the A's framework they are related to. Finally, the way in which these technological tools improve the co-creation of tourism experiences is investigated.

Cloud computing services are useful to connect all the 6A's of the destination and support the experience co-creation even if tourists not always perceive the use of a cloud system. These services, in fact, facilitate the transfer of information and allow the access to stored data that are useful for the creation of customized experiences. The support of cloud computing services to the experience co-creation is verified during all the experience process: in the pre-travel phase, when tourism firms promote their offers and potential tourists define the modalities of visit; during the visit, due to the fact that cloud computing services allow real time changes; and in the post-travel phase, since the exchange of data and information generates other data which can in turn be stored in the system and further shared.

The development of IoT in tourism, and especially the use of QR, RFID and NFC codes, influences the experience co-creation especially in the on-site phase, by giving tourists the opportunity to enjoy wide functions in each of six As dimensions, such as mobile payments, provision of information, access permissions, object identification, geo-location services, etc. The evolution of IoT is connected to the semantic web, allowing the creation of platforms that, using an interactive and participative system, simplify the transfer of data from tourists to operators and vice versa, facilitating the sharing of information (Gutiérrez et al. 2013).

As far as the end-user internet service systems is concerned, the traditional PC still plays an important role, mainly in the pre-travel phase: potential tourists usually organize their journey at home, by visiting websites, choosing the most convenient available package, defining the activities to do, and checking the available ancillary services. However, currently, mobile devices are radically transforming the industry: smartphones and tablets are able to satisfy many of the needs of tourists during the visit, as the opportunity of following travel routes, of sharing their position, of booking amenities and paying tickets, etc. Through mobile technologies, tourists also share the experience with others by accessing to applications in order to post photos, write opinions and reviews, and ask for suggestions. Mobile devices represent a huge opportunity for tourism providers to interact with their customers and to collect information at any phase of the experience process. Finally, the end-user internet service systems may also be wearable devices (i.e.

SmartGlasses, etc.), which allow the total immersion of tourists in the visit, amplifying their experience both on site and before or after their stay at destination.

Data collected to apply the interpretative framework to the cases of Venice and Salzburg were obtained combining secondary sources (reports, public documents, information from destination web sites) and in-depth interviews realized with key-informants involved in the development of smart tourism strategies of Venice and Salzburg, namely representatives of the Venice's Municipality related to the economic development for tourism and planning and control areas, and the CEO of Salzburg Tourism Promotion (Tourismus Salzburg GmbH).

Interviews were conducted in the period February–May 2015 and lasted approximately 60 min; a 'courtroom' procedure has been used in which questions were concentrated on facts and events, rather than on respondents' interpretations (Eisenhardt 1989). Interviews followed a semi-structured interview guide aimed at gathering information on how the implementation of a smart approach has influenced the co-creation of experiences in tourism. The guide has allowed to individuate the main elements of interviews which, combined with secondary sources, allowed to triangulate data thereby enhancing the reliability of cases analysis (Yin 2013). The qualitative method was applied, which in literature is often considered particular beneficial for the generation of intensive, detailed examinations of a case (Bryman 2008; Yin 2013).

4 Research results

4.1 Venice as STD

The number of inhabitants of Venice was 264.579 in 2014 (http://www.comuni-italiani.it). It is one of the most famous destinations in Italy: its cultural resources and its spectacular lagoon attract every year more than 2.6 million of tourist arrivals and registers 6.4 million of overnight stays only in the historical centre (Comune di Venezia 2014). Due to its beauties, Venice is inscribed since 1987 in the UNESCO World Heritage list, as an extraordinary architectural masterpiece in which even the smallest building contains works by some of the world's greatest artists.

Furthermore, Venice is well organized as tourism destination with relevant key factors in all the dimensions of the 6As' framework (Table 2).

The importance of tourism for Venice, and the awareness of its priceless historical heritage, encouraged the Administration in adopting a smart approach able to improve the life of citizens and tourists, which allows to characterize it as a STD.

The drivers considered to empower the role of Venice as STD are classified into two categories (Bettini 2013): existent assets and skills. As for the assets, since the last decades of XX century the Municipality allocated many investments in technological infrastructures to offer innovative services to citizens and tourists. Among these, the most important are the broadband, allowing a high-speed access to the Internet, and the WiFi, allowing to access to the Internet everywhere, through mobile end-user devices.

Table 2 Six A's dimensions of Venice destination. Source: our elaboration on data by Comune di Venezia (2014) and Provincia di Venezia (2014)

Six A's framework	The A's of Venice
Attractions	10 museums and picture galleries are related to the Civic Museums Foundation, 5 museums and galleries are related to the State Museums Circuit, 15 churches are related to the Chorus Circuit, and more than 50 churches, church museums, historical buildings and bridges are in the city
Access	In 2013 the Harbour of Venice recorded 1225 arrivals of cruise ships and ferry boats (2,073,953 passengers), the Airport of Venice recorded 1,683,900 passengers on national flights and 6,691,965 on international flights, and almost 7 million of tickets for urban mobility were sold
Amenities	The city records in 2013 425 hotels—almost 70 % of them 3 or 4 stars—and 2552 other accommodation; in 2011 there were almost 1000 restaurants and 700 bars
Available packages	There are many national and international tour operators specialized in the organization and promotion of holiday packages which combine the cultural visit of Venice with leisure activities, naturalistic walks, and the knowledge of local traditions
Activities	The most important events organized in Venice are the FilmFestival, the Biennale and the Carnival; in 2014 Venice dedicated 9 days to fairs and exhibitions, 13 to traditional events, 317 to dance and theatre events, 566 to music events, 368 to film festivals
Ancillary services	Venice has all the services that are vital for the development of a city but are also able to support the tourism industry (waste removal, car renting, etc.)

Regarding the skills, the Municipality is still investing in specialist knowledge with the objective of offering strategic services related to culture, transports and leisure activities with high use of technology.

Other factors adopted by Venice for the development of its smartness are (Bettini 2013):

1. Services offered into integrated proposals based on a coherent integration and on a shared logic of ticketing.
2. Development of strong synergies among the local firms in order to avoid duplication and waste.
3. Definition of a demand-centric strategy, in order to allow the access to technological services for different targets (sms, Apps, print-at-home systems, printed tickets, QRcode, Smartcards, etc.).
4. Definition of anytime-anywhere technologies.

The commitment of Venice in developing a smart strategy to improve the visit of the city and the life of its citizens has been recognized through several prizes. It won the smart cities 2012 Prize by Smau di Milano as one of the most innovative cities at national level; it was classified as second city in the category of smart mobility in the ICity Rate 2012 by ForumPA and as third smart city in Italy by Fondazione Ambrosetti. Furthermore, the smart approach of Venice is also supported by important companies, such as Google, as affirmed by an interviewed:

> "When Google decided to test its wearable backpack with a camera for the street view, Venice was chosen as the second place of test after the Grand Canyon".

The data collection and interviews allow to individuate several technological tools that are strategic for the success of tourism in Venice. These tools are related to the smartness of the city, as they are based on cloud computing services for ensuring a secure storage of data across the network of tourism stakeholder and use IoT to facilitate the exchange of information. Furthermore, many of these tools are developed to be accessed by any end-user internet service system. Once individuated the technological tools, the study focuses on the understanding of how these are able to empower the 6 As dimensions of the destination and to positively influence the level of experience co-creation for tourists during the whole experience process (Table 3).

The main technological tool able to guide the tourists of Venice along all the experience process is VeneziaUnica App. It is part of the wider project VeneziaUnica, aimed at managing the tourist information and the e-commerce related to Venice.

The App is useful during the pre-travel phase, as it allows tourists to organize itineraries, read information about the city, and check the transport. In this phase, the tool mainly impacts on activities, suggesting six itineraries. The co-creation level is emphasized through the active participation that users may experience: they may organize their own visit paths by using the "favourite" section, and may have fun with riddles on the resources of Venice. VeneziaUnica App is useful also in the on-site phase, as it provides a detailed description of all tourist and cultural services, empowering amenities and attractions dimensions; furthermore, it allows to check where to take the ferry boats and their timetable, acting on the access dimension, and dedicates a section to ancillary services, with telephone numbers for emergencies, transport and services. The App also improves the dimension available packages, since users may buy on line the integrated ticket VeneziaUnica CityPass. During the visit the App allows the users to directly contact the cultural and tourist operators by telephone and email or using the links to the specific websites; users may also change their visit ideas, by showing on a map with tracking system all the Attractions and Amenities near their position and the directions to reach them. Finally, in the on-site phase, as well as in the post-travel phase, users may use the App to share opinions, photos and information with other users. Thanks to these functionalities, VeneziaUnica App impacts on the tourism experience co-creation by facilitating direct interaction of tourists with the destination supply system, improving the active participation, and supporting the sharing of the experience: the tool impacts on all the three antecedents of tourism experience co-creation.

Another tool which is part of the VeneziaUnica project is VeneziaUnica.it, the official tourism website of Venice which recorded 1,312,187 visits in 2013, 22.4 % more than the previous year. It enhances the pre-travel phase by providing all the most important information about the resources in the city and the auxiliary services, acting on the Attraction and Ancillary Services dimensions. Furthermore,

Table 3 Experience co-creation in Venice STD. Source: our elaboration

Name	Technological tool	Tourism experience phases	Six A's framework	How increase smart co-creation experience
VeneziaUnica App	App	Pre-visit On-site Post-visit	Attractions Access Amenities Available packages Activities Ancillary services	Active participation "Favourite" section to custom the visit Riddles on the resources of Venice to solve Geo-location system to individuate the near resources and how to reach them Interaction Telephone numbers and email address to directly contact the services providers Links to providers' websites Sharing Opinions, photos and information may be shared with other users Opinions, photos and information may be shared with other users
VeneziaUnica.it	Official website of tourist promotion	Pre-visit On-site Post-visit	Amenities	Active participation City pass to custom according to own needs Interaction Contact information of hotels and restaurants in the city Sharing Direct link to social media pages to share information and own position, ask for advices, rate the website, or participate to photo contests
VeneziaUnica City Pass	Smart card	On-site	Attractions Access Available packages Ancillary services	Active participation Creation of custom visits by mixing different options of transfers, waterbuses, cultural circuits, and public services
Centro Maree	Alert service App	Pre-visit On-site	Ancillary services Access Activities	Active participation "Favourite" section to indicate the places about the user wants to be informed Limit to be alerted customized by the user "Favourite" section to indicate the places about the user wants to be informed

Table 3 continued

Name	Technological tool	Tourism experience phases	Six A's framework	How increase smart co-creation experience
Argos	Navigation control system	On-site	Access	Active participation
				Monitor of the traffic level in the Grand Canal according to custom information
				Individuation of "favourite" taxi stops that the user wants to reach
				Individuation of a specific taxi boat by inserting its license number
Telepago	Virtual pocket	On-site	Access	Active participation
				Custom amount of money in order to pay the parking
Bike sharing	Sharing service	On-site	Access	Active participation
			Activities	Checking by internet of the real-time availability of bikes in a specific stop station
				Smartcard that allows to take the bicycle in a bike station, to use it, and to return it in any bike station of Venice
Subway	ebook project	On-site	Activities	Active participation
				Downloading of eBooks
Iris	Web site	On-site	Ancillary services	Active participation
		Post-visit		Possibility to leave Comments and proposals
				Possibility to upload photos and to use the geo-reference system to specify where is the problem
				Interaction
				Direct interaction with the city administration

the website allows to buy the VeneziaUnica CityPass, creating a custom card through a selection of different tickets options. In this way, tourists may directly interact with the local firms, since are indicated all the contact information of hotels and restaurants in the city; furthermore, they may create the city pass most fitting with their needs.

VeneziaUnica.it is also in a mobile version, useful during the visit at destination: in 2013, 154,231 visits by tablets and 40,311 by smartphones were recorded. It allows to immediately know the "not to be missed" events and to create and buy the CityPass. Users of the website are directed to the social media pages to share information, ask for advices, rate the website, localize themselves, or participate to photo contests. VeneziaUnica.it, therefore, enhance the tourism experience co-creation supporting the direct interaction with tourism services providers, the active participation of tourists, and the sharing of the experience with other users.

The smart card of VeneziaUnica project is VeneziaUnica CityPass, which is used during the on-site phase. It is an integrated ticket composed by a RFID card, which allows the access to the public transport and to the cultural and tourism services. It acts especially on the available packages dimension, allowing the combination of the other As' dimensions, and positively influences the experience co-creation through the improvement of the tourists active participation: tourists may create their custom visits by mixing different options of transfers, waterbuses, cultural circuits, and public services. The different levels of active participation are ensured by the possibility of buying a pre-arranged city-pass for tourists who do not prefer customization:

> "There is a continuous fight among tourists who prefer to select their visit options and tourists who do not: some tourists want a pre-arranged card".

Venice dedicates particular attention to the adoption of smart tools in the on-site phase through a series of technologies particularly able to act on the Access and Activities dimensions.

In order to alert citizens and tourists, the Tide Centre by the Venice Municipality created an alert system, improving the Ancillary Services dimension: the system informs over 40,000 individuals sending emails or SMS if water exceeds the customized limit specified by the user. The Tide Centre developed also the Hi!Tide App, which provides detailed tide forecasts, indicating the level of water and realizing charts and reports. The App encourages the tourism experience co-creation by empowering the active participation of tourists, who can select their "favourite" places they want to be informed about; it impacts both on the on-site and on the pre-travel phases, by providing information for the current day and the subsequent two, allowing tourist to be prepared when arriving in Venice.

The Municipality also realized ARGOS, the Automatic and Remote Grand Canal Observation System, which contributes to the development of traffic management policies, acting on the Access dimension. The system is based on automatic vision technologies and on a number of survey cells deployed along the Grand Canal. Providing real-time pictures, the type and position of each boat circulating in the Grand Canal can be determined. The co-creation level is empowered through the active participation of tourists, who can use ARGOS to monitor the traffic level in the Grand Canal and to individuate the taxi stops they want to reach; they also may search for a specific taxi by inserting its license number.

Another tool that influences the level of active participation of tourists in the Access dimension is Telepago, the parking system realized by the Mobility Services Company of Venice. Tourists may activate the service by paying a defined amount on a virtual pocket and may use it to pay their car parking in the city, calling through the mobile phone or sending SMS.

The Mobility Company contributes to the smartness of the Venice also with the implementation of the bike sharing service, which acts on the access and activities dimensions, influencing the active participation level of tourists. Tourists access the service using a smartcard that allows to take the bicycle in a bike station, to use it to visit the city or just to move around and to return it in any bike station of Venice. Tourists may also check by internet the real-time availability of bikes in a specific

stop station. The service will be implemented in the future with more interaction with tourists:

> "In the future we will do even better because it will be possible to book in advance both the departure and the arrival bike stops".

Participation during the visit is also emphasized by the Subway project. It is based on the placement at the ferry terminals and at the station of panels which show the available eBooks and the QR-codes to download them: tourists may use the codes to free download eBooks on their mobile devices and read them while are waiting for the ferry or when are on board.

Finally, Venice developed the IRIS system—Internet Reporting Information System—in the Ancillary Services dimension. It is a web 2.0 communication channel through which citizens and tourists may inform the Municipality about problems related to the urban maintenance. The system works through a web application accessible both by mobile devices and by pc, so tourists and citizens may use it during the visit or after. Users may leave comments and proposals, upload photos and use the geo-reference system to specify where is the problem. Until its launch, in 2008, IRIS received 22,542 warnings and 17,861 of these have already been concluded. The system improves the experience co-creation, encouraging the active participation of tourists and the interaction among them and the city administration.

Furthermore, it has to be underlined that the Municipality of Venice is strategically aimed at using technologies and tools already implemented in other contexts and cities, in order to be sure about their efficiency:

> "The city may use what already exists. It's more convenient to make agreements with companies that have already implemented technologies and adapt them to the characteristics of Venice"; "We thought to use what already exist […] the public sector may offer the WiFi and the private companies have to insert the contents. It's the philosophy of do it less".

4.2 Salzburg as STD

Salzburg is one of the main centres of Austria for historical, artistic and cultural heritage resources. It owns 148,420 inhabitants in 2014 (http://www.citypopulation.de), which are renowned for their hospitality. The city is known throughout the world for its baroque architecture and since 1997 its historic centre is a UNESCO World Heritage Site. Its identity is linked to the figure of Wolfgang Amadeus Mozart and is worldwide known for hosting a famous classical music festival. These elements make Salzburg a tourism destination of appeal for tourists from around the world, and its success is supported by key factors in all the six dimensions of a destination (Table 4).

In recent years, Salzburg has faced a development process in a smart perspective. In this context, a master plan was realized, which starts from the empowerment of sustainability related to the environmental and mobility aspects, but impacts also on all the other areas of smartness (governance, living, people, etc.). This led to

Table 4 Six As dimensions of Salzburg destination. Source: our elaboration

Six A's framework	The A's of Salzburg
Attractions	Salzburg is rich in cultural sites: historic buildings, churches, castles, museums, art galleries. The major attractions of the city are: the fortress Hohensalzburg, the birthplace and the home of Mozart, Hellbrunn Castle, the museum of contemporary art on the Mönchsberg, the museum of natural sciences, the Salzburg Zoo, the Salzburg Cathedral and the crypt with the tombs of the Archbishops of Salzburg
Access	It is ensured by the presence of an international airport served by several low cost airlines and by the opportunity to arrive at the hub of Monaco and Vienna. The city also has an important railway station and is accessible by car from different directions: Germany, Italy and the rest of Austria. Internal mobility is ensured by an efficient urban transport system, a dense network of roads, and bike paths easy to use
Amenities	Salzburg has a decent range of accommodation suitable for different targets: families, athletes, musicians. Amenities on the urban area include breweries, cafes, trendy bars, taverns and elegant restaurants
Available packages	There are many international incoming operators that offer packages with overnight stays proposals and many visits to Salzburg's main resources
Activities	There are many spas and wellness centres, ski resorts and other facilities for winter sports; all these activities are useful to increase the intensity of the tourism experience at destination
Ancillary services	The city has institutions and offices directly responsible for the promotion and organization of tourism (Tourismus Salzburg GmbH), but also for all the additional services to support tourism (banking, telecommunications, hospitals, etc.)

obvious positive changes also in tourism, which benefits from the implementation of projects and innovative products and services able to increase the value of local resources.

The success of this strategy is confirmed by important awards, such as the Smart Access City Award in 2012 and The Energy Globe Award in 2013 for the district of Lehen.

In tourism, stakeholders are focusing their efforts in achieving objectives of liveability, intelligent networking, sustainable mobility and open collaboration, as explained in the "Master Plan 2025—Smart City Salzburg".

The main smart tools adopted by the Municipality of Salzburg, the institute for tourism promotion in Salzburg (Tourismus Salzburg GmbH) and other tourism firms, may be grouped into three macro-categories: Website, Smart Card and App. These have been studied through secondary sources and interviews, in order to understand the destination dimensions in which they act and how they influence the tourism experience co-creation. Results are summarized in Table 5.

Salzburg.info represents the main tourism website of Salzburg; it is dedicated to leisure tourism and is based on a cloud technology that stores data on all 6As of the destination; data are managed and coordinated in an integrated manner, according to the needs of different users, and allowing the exchange of information among all the stakeholders. This tool, in fact, provides in-depth information about city attractions, different types of accommodation, and how to access to different options for domestic travel. It also provides information on public service and promotes tourism

Table 5 Experience co-creation in smart tourism destination Salzburg. Source: our elaboration

Name	Tool	Tourism experience phases	Six A's framework	How increase smart co-creation experience
http://www.salzburg.info/com	Official website for leisure tourism	Pre-travel On-site destination Post-travel	Attractions Access Amenities Available packages Activities Ancillary services	Interaction Each user can directly interact with key players of destination supply, using booking system, phone numbers, e-mail address Active participation Users can select route and choice activities to do on the basis of available time and money, and also their needs and interests Sharing Users can share all kind of data and information (pictures, videos, opinions) by generalist and thematic social media linked on this official website
http://www.salzburgcongress.at/com	Official website for business tourism	Pre-travel On-site destination Post-travel	Access Amenities Activities Ancillary services	Interaction Each user can directly interact with key players of meeting industry of the destination, using booking system, phone numbers, e-mail address Active participation Website allows to users to create their own meeting VR creates conditions for a more immersive experience Sharing Website allows the sharing of photos and video accessing to Facebook via link or using the specific App
Salzburg Card	Smart card	On-site destination	Attractions Access Available packages Activities	Interaction Tourists can choice a wide range of basic services of the card Active participation Tourists may integrate basic services of the card with other custom services, defining actively their own visit
Salzburg City Map with Guides and POI Salzburg City Offline Street Map CityMaps 2Go Salzburg Map and Walking Tours Salzburg Street Map Offline Salzburg Walking Tours and Map Maplets—maps for All National Parks, Subway, Ski Resorts and more	App	Pre-travel On-site destination Post-travel	Attractions Access Amenities Activities Ancillary services	Interaction Each visitor can gather information about the destination and the areas with greater tourist importance Active participation Visitors can build personalized maps on the basis of their interests Sharing It's possible to share information and maps directly through the App or connecting to generalist/thematic social media

Table 5 continued

Name	Tool	Tourism experience phases	Six A's framework	How increase smart co-creation experience
Salzburg (city) travel guides Salzburg travel guide Salzburg travel guide—tripwolf Salzburg travel guide offline Salzburg portal and guide Travel book Salzburg Welt Reiseführer WorldExplorer World Travel Guide by Triposo Geolover—travel guide	App	Pre-travel On site destination Post-travel	Attractions Access Amenities Available packages Activities	Interaction Each visitor can gather information about destination POI and interact with every actors of destination supply system Active participation Visitors can build personalized routes and choice Access Services, Attractions, Activities and Amenities on the basis of their needs Sharing It's possible to share any information about own travel experience directly through the App or connecting to generalist/thematic social media
Mozart's birthplace: TextGuide Mozart's residence AudioGuide/Mozart's residence TextGuide Mozarteum InfoGuide	App	On site destination Post-travel	Attractions	Interaction Visitors can directly interacting with providers of services related to the Austrian composer, by immersing themselves in virtual reality spaces Active participation Each visitors can personalised our visit, choosing the favourite lyrics and music to listen during the tours Sharing It's possible to share the visit experience through easy-access to social media
Salzburger Mittagsplaner	App	Pre-travel On site destination Post-travel	Amenities	Interaction Users interact with the providers (restaurants, pubs, bistros, cafes) collecting information about location, menu and prices Active participation Users can build their experience, by choosing seats and deciding what to eat Sharing Users can exchange opinions and preferences with other users
Toozla	App	On-site destination	Activities	Active participation Each tourists have to choose among several tales that characterize the different places to visit, basing the choice on personal preferences

packages, events and leisure activities organized in the city.With regard to the influence on tourism experience co-creation, each user can directly interact before, during and after the tourism experience with the key players of the destination supply system, using the booking system, or simply by phone numbers, e-mail and links to specific websites. Furthermore, users may create a wide range of packages and select among different typologies of accommodation, tourist routes and

ancillary services that fit their specific needs. It is also possible to select routes and activities on the basis of the available time, the interests and the type of trip, and access to several virtual tours over the city at 360°. The website provides tourists also with the opportunity to register themselves in a newsletter to be always updated about events and news, and allows the activation of the RSS feed, thanks to which each device automatically detects new articles posted. Finally, users may share pictures, videos, opinions and judgments with easy access to generalist and thematic social media. These functions affect the active participation of tourists and their need to share the experience with other, positively acting, consequently, on their experience co-creation. Access to the website can be from any type of End-User device, from traditional PCs to last generation tablets and smartphones, confirming that the tool can be used during all the phases of the experience process.

A similar architecture is used also for http://www.salzburgcongress.at/de/, a website totally dedicated to business tourism. Cloud services that are the basis of this front-end instrument include data on how to access to the conference centre and the hotel services, on how to attend a meeting or scheduled conferences. The website is designed to be used by any device and the real innovation is the use of 3D technology to show in virtual reality the centre and its many features. A similar smart tool is able to improve the experience co-creation: the use of virtual reality fully involves the potential user in the tourism product and the website allows each user to create his own experience by choosing the meeting room and several services to support the event: equipment, catering, etc. The website also allows the sharing of photos and video accessing to Facebook via the website link or using the specific App.

Another technological tool that contributes to the smartcitization process of Salzburg is the SalzburgCard, a smartcard with a microchip that stores the services purchased. It is a tool developed in the Available Packages dimension, but acts also on Access, Attractions and Activities dimensions, as is based on a payment-integration system which includes integrated tickets for public transport and the main attractions of Salzburg; in addition, the smartcard allows to benefit of discounts on tourism tours, events and exhibitions. The SalzburgCard is based on the use of Cloud Services, which are essential to favour the integration of services and the exchange of information among the actors involved in the system. Tourists may not only choose from a wide range of basic services of the card, but may also integrate them with other custom services, actively participating in the definition of their visit and in the co-creation of their experience while are on-site.

The third category of tools that improve smart tourism in Salzburg is represented by the applications (Apps), as in many smart cities.

The strategic choice of Salzburg's tourism governance is based on the provision of a wide range of Apps (almost 50)—not only institutional—among which the tourist may express her/his preferences, taking into account both the moment of use and her/his needs.

On Table 4, Apps have been grouped into five groups. The first group is about interactive maps of the city; the second group contains Apps of interactive travel guides; the third group contains Apps exclusively dedicated to the figure of Mozart;

finally, the last two Apps are analysed separately, as they may not be classified as maps or travel guides.

Seven Apps are dedicated to maps and contain geo-referred artistic and cultural sites, as well as geographical information on accommodation and other amenities. Twelve Apps are, instead, dedicated to interactive guides, allowing the access to geo-referred points of interest (POI); the Apps allow also to create and book custom itineraries. These applications act on the access, attractions, activities and amenities dimensions and increase the level of tourism experience co-creation thanks to the use of IoT (in particular, QRcode and RFID technologies), a cloud computing service which allow to share information, and the opportunity to access to them by mobile end-user devices.

These technological tools encourage the interaction between the user and the destination, providing the opportunity to co-create a custom experience with tourism and cultural actors on the territory. Some Apps also allow the use of 3D technology, encouraging a total immersion in the experience both in the pre-travel and on-site phases. Furthermore, the Apps about maps allow to book trips and tours by comparing different possible solutions, and Apps about interactive guides allow to include or exclude POIs depending on tourist's own needs. Both the typologies of Apps provide the opportunity to share tips and recommendations; some Apps have the "travelogue" function, which allows to create and share pictures, videos and emotions about the lived experience.

The third group of Apps is dedicated to Mozart and develops on the Attractions dimension; these Apps can be downloaded using QRcodes, and all the content is stored on-line thanks to a cloud computing service. Tourists may be involved in the co-creation of their experiences by directly interacting with providers of services related to the Austrian composer; by immersing themselves in virtual reality spaces; by choosing the favourite lyrics and music to listen during the tours; by sharing the experience through easy-access to social media. Finally, other two Apps have been investigated. The Salzburger Mittagsplaner App is an application developed in the Amenities dimension; it is dedicated to restaurants, pubs, bistros and cafes of the old town of Salzburg. It may be accessible by several mobile end-user devices, is based on a cloud platform and involves the use of QRcodes and RFIDs. It has a positive role on the experience co-creation, as allows to tourists to directly interact with the providers and to actively intervene in the experience, by choosing seats and deciding what to eat. Furthermore, the application contains functions to share the experience, exchanging opinions and preferences with other users.

The last App, named Toozla, is not institutional but is equally interesting for the study of experience co-creation since encourages an immersive approach, allowing tourists to walk streets and visit places accompanied by tales. This App, developed on the Activities dimension with a smart approach—with cloud computing services and IoT—stimulates active participation in the experience thanks to the opportunity that tourists have to choose among several tales that characterize the different places to visit, basing the choice on personal preferences.

In the study of tourism experience co-creation, it is also important to include, in addition to these technological innovations, the fundamental role of the infrastructure provided by public and private actors: "We have implemented free WLAN on

various tourism hot spots and in various sights and museums". There are, in fact, many places in the city that allow free access to the public on line network without the need to enter personal data and ensuring maximum safety.

4.3 Comparison between Venice and Salzburg as STDs

Venice and Salzburg have been chosen for the empirical analysis due to their relevant positions (respectively, 1 and 2 out of 77) in the ranking of smart cities classified on the basis of the domain Touristic Attractiveness, which is part of the smart living dimension according to the European Smart City Index. Although their good positions in this ranking, the two cities present very different positions in the European Smart City Index by the Wien University of Technology, the Delft University of Technology, and the University of Ljubljana. According to this ranking, which is the result of a standardized combination of six dimensions of smartness divided into 28 domains and measured by 81 indicators, Salzburg ranks 10 out of 77, while Venice ranks 46 out of 77. Salzburg, therefore, is one of the top10 European smart cities of medium size, while Venice is in the medium–low positions of the ranking. It underlines a more advanced commitment of Salzburg in the development of smart strategies able to encompass multiple aspects of the city, from the mobility, to the governance, to the environment, to the economy, to the people and the general aspects of life. Venice, instead, is not still strong in the development of a smart approach able to encompass all the aspects of the city: it presents negative value of smartness in the dimensions Smart people, smart governance, and smart environment. Its importance as cultural tourist destination reflects in the adoption of a smart approach almost exclusively in the dimension smart living, associated to the domains touristic attractiveness and cultural facilities.

Despite that, results show that, also in the tourism context, Salzburg presents a more advanced level of smartness compared to Venice.

The smart strategy of Salzburg as STD is based on a unique tool—the official tourism website—in which are gathered all the technological tools able to improve the tourism experience, also those not managed by the city administration. The technological tools are quite equally developed on the six dimensions of the destination. In particular, the smart strategy applied by Salzburg focuses mainly on the enhancement of activities, but great importance is also dedicated to access, amenities, and attractions. Less attention, instead, is dedicated to ancillary services and available packages. As regards Venice, the dimensions attractions and amenities are currently insufficiently implemented from a technological point of view, making the visit still related to a traditional approach. This weakness could be overcome through technological tools that allow tourists to experience the cultural resources in an innovative way, such as, for example, the augmented reality, the creation of kinect stations, the use of innovative glasses in closed spaces, or the establishment of touch-screen panels and innovative displays in open spaces. The main effort of smart approach in Venice is concentrated on the dimension Access, with the development of several technological tools. It is due to the fact that two of the most relevant peculiarities of the city are its lagoon and its small streets, which reduce the

use of cars, making necessary the use of ferry boats and bikes, and allowing the development of smart strategies related to these more sustainable transports.

Findings show that Salzburg's smart strategy is able also to cover all the tourism experience process, supporting the experience before, during, and after the visit, even if it devotes less attention to the pre-travel phase. This is due to the fact that Salzburg has focused its strategy to a great extent on Apps, which are generally used during the visit, or after it. Technology implemented in Venice, instead, is able to enhance especially the on-site phase. The Municipality has first of all realised its proprietary network of fibre optics, broadband, and WiFi, with the purpose of allowing its tourists and citizens to be on line at each moment and in every place of the city; secondly, it has realized and supported the majority of the technological tools able to enhance the experience of visit in the city. However, Venice does not pay sufficient attention to the post-travel phase: only VeneziaUnica App and the IRIS system are developed to share photos, information, and alerts also after the visit. It is a big weakness in the smart approach of Venice: the post-travel is one of the most important phases of tourism experience, being the moment in which the tourist reflects, forms her/his opinions, creates her/his memories and decides to come back and to spread a positive or negative word of mouth, which widely influences the destination image.

With respect to the way in which the smart approach adopted by STDs may improve the co-creation of tourism experiences, it is important to underline that almost all the tools implemented by Salzburg support the experience co-creation: almost all the Apps, websites, and other services favour a direct contact of tourists with the local tourism providers, stimulate an active participation to the experience, and encourage users to share the experience with other individuals, by posting reviews and comments, uploading photos and videos, or allowing the geo-localization. The smart approach implemented by the Municipality of Venice has not yet a so strong impact on the experience co-creation level. Nevertheless, it has a positive impact, especially as regards the active participation of tourists: almost all the technological tools facilitate an active role of tourists, which may intervene in the co-creation of a more personalized experience thanks to the opportunity to choose among different options. Policy makers of Venice should favour the diffusion of new technologies in the hospitality system able to promote a direct interaction with the demand side, and should encourage the promotion of innovative services related to souvenirs and local products. The case of Venice also revealed a weakness in the use of technology related to the opportunity of sharing the experience. It is a relevant problem, as sharing the tourism experience is a strategic way to spread the image of the destination to other potential visitors: it is fundamental that policy makers and DMOs of Venice consider tools enabling the tourists to share in real time and also after the visit their experience, opinions and emotions, both through text and images. In this way, they would become testimonials of the tourism experience at destination and would collaborate to strengthen its competitiveness. Furthermore, through the information and images that tourists share with others, the DMOs could know more about the tourists' behaviour and their level of satisfaction, improving the weaknesses and focusing in the communication of the more valued resources and services.

It has to be underlined that both Salzburg and Venice are committing their efforts and resources in the construction and promotion of a competitive STD and that the analysed initiatives are not single and separated tools realized in a disorganized way, but are the result of a careful and focused administrative strategy.

Both the cities recognize technology a fundamental driver for tourism: "My opinion is that if we do not use technology, we may also close with tourism [in Venice]. Real and virtual elements have to talk to each other, it is no more possible to develop only real or only technological aspects"; "[…] we are living in a fast world driven by new technologies offering new applications almost every day".

5 Discussion and conclusion

In an attempt to contribute to advancements in the smart destination and experience co-creation literatures, the present work aims at explaining the way in which technological components in a STD may improve the co-creation of tourism experiences.

The study was conducted on two European STD best practices—Venice and Salzburg—through a multiple cases analysis triangulating public documents, information from tourism web sites, and in-depth interviews realized with key-informants involved in the development of smart tourism strategies of the destinations.

The empirical analysis started from the individuation of the main features that characterize the cities as destinations, by using the 6A's framework by Buhalis (2000). Subsequently, the smart strategies enabled by the cities have been investigated, as well as the main technological tools according to a smart approach, and their role in enhancing the experience co-creation.

The empirical analysis developed through the application of the elaborated interpretative framework to the two case studies, reveals that Venice and Salzburg used cloud computing services, IoT and end-user internet service systems to develop several technological tools able to enhance the experience co-creation of their tourists. Findings also show a positive influence of the smart approach adopted by the two destinations on the tourism experience co-creation: the technological tools implemented by Salzburg and Venice in the dimensions which characterize a destination are able to improve direct interaction, to encourage active participation, and to support the sharing of the experience with a wide network of subjects.

These results are interesting both at theoretical and managerial level.

Theoretical implications of the study are related to the investigation of the role of smart technologies in influencing the experience co-creation in tourism. The interpretative framework elaborated is useful to understand the link between the six dimensions of the destination, the smart components of a destination, and the antecedents of the experience co-creation: the active participation of tourists, the interaction with service providers, and the sharing of the experience with other subjects. It may be considered a starting point to better understand the role of smart technologies in the experience co-creation: findings, in fact, reveal that the experience co-creation may be implemented using the smart technological

components in one or more of the six'As destination dimensions, during one or more phases of the experience process, and improving the interaction, the active participation, or the sharing of their tourists. Destinations can also strategically decide to focus on one of these co-creation antecedents, in order to generate positive effects on the co-creation. However, the co-creation experience is strongest, if destination supply system, in a coordinate way, decides to apply smart technological components in all the six'As, during all the experience process, acting on all the three co-creation antecedents. Furthermore, findings show also that a territory that adopts a smart approach in all its aspects is able to develop a more successful smart approach at tourism level.

The study presents also practical implications. The proposed interpretative framework, in fact, may be considered a useful tool for policy makers and destination managers to understand the level of smartness of a destination. Policy makers may use it to individuate how dimensions of a destination may be improved by a smart point of view, and which technologies have to be used to enhance a specific co-creation antecedent. Furthermore, the framework may be used to individuate the strengths and weaknesses of the smart approach implemented by a destination and to compare the effectiveness of a smart strategy with those of competitors.

Further research needs to be done in order to improve the proposed framework. Due to the explorative nature of this study, quantitative studies will be carried out in the future, aimed at investigating how much a smart approach influences the tourism experience co-creation and at confirming the direct interaction with tourism services providers, the active participation, and the sharing of the experience as main "antecedents" of the experience co-creation. Also surveys on the tourists will be conducted in the future, in order to compare the study results with the perceptions of tourists and to demonstrate the role of smartness in influencing the tourism experience co-creation. Furthermore, future research will be dedicated to study other cases of STDs according to the proposed framework.

At any rate, this initial research hopes to open new paths of enquiry and to generate advancements on experience co-creation in tourism, especially in STDs.

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