

# POLITECNICO DI TORINO

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**Business Models and Partners Engagement for Smart  
Tourism**



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# 1 Abstract

The term smart has become a buzzword and lately it has even been associated to the tourism. In fact, new technologies are revolutionizing the tourism market establishing the Smart Tourism. The topic Smart Tourism is strictly linked to the topic smart city. As it will be discussed later in the work, the Smart Tourism is easier to implement in those cities that have already moved to become smart cities.

Adoption of IoT systems such as sensors and beacons are generating huge amount of digital information named Big Data. More tourism destinations should make an optimal use of big data. The tourism industry is composed by several stakeholders and thanks to the technologies mentioned before, stakeholders have the opportunity to collect useful information for themselves or for other actors. These information should be shared among them in order to create value and to exploit all the benefits of Smart Tourism. Unfortunately, without a common line and standard processes this is not simple to realize. The true challenge is to have coexisting actors which have different interests and are often in competition with each other.

The goal of this work is to analyze the state of the art of the Smart Tourism, to identify all stakeholders involved, to understand what is working or not and to understand whether there are best practices in the development of Smart Tourism projects. Starting from this overview, the work will find a meeting point that makes the collaboration advantageous for each actor involved in the different processes linked to tourism. In order to reach this result, it would be necessary to change current business models. First of all, they have to be integrated with new technologies in order to propose innovative value propositions. In addition, a new kind of relationship with partners should be thought in order to make projects sustainable.

## 2 Introduction

According to the World Tourism Barometer made by UNWTO, in 2017 destinations worldwide welcomed 1,322 million international tourist arrivals (overnight visitors), 87 million more than in the 2016. This corresponds to a robust 7% increase, well above the sustained and consistent trend of 4% or higher growth since 2010 and represents the strongest results in seven years. This strong momentum is expected to continue in 2018 at a rate of 4%-5%<sup>1</sup>. The *figure 1* shows the number of international tourist arrivals for different regions. The *figure 2* shows an overview of the increase in the number of tourists from 1950 to 2018 and a forecast until 2030.

In the past, the presence of museums, monuments, parks, historical buildings or other points of interest was often a necessary and sufficient condition to guarantee high tourist flows. The situation has changed. Nowadays the presence of points of interests is a necessary but no longer sufficient condition to let the tourism sector flourish. This because the tourists' needs have changed.

Tourists don't want to be passive as in the past, they want to be connected and to interact with the contents and to personalize them. A spread wi-fi connection is surely a great starting point but it is not enough. Modern tourists want more than information available on the web, they want live information when they are visiting on site, they want to literally to interact with the point of interest. A lot of information are already available in real time, it is all about connecting them.

A comfortable city is able to communicate with visitors, in order to make the visit easier and more enjoyable. It is also a city able to take advantage of digitalization. In fact, nowadays, information come from the crowd and each movement of tourist produces bits.

Highlighting the situation described above it is easy to understand the reason why competition in this market is getting stronger. Buhalis claimed that "tourism is becoming an increasingly competitive marketplace leaving only the best-managed destinations to prosper". However what Buhalis means with the term "best-managed" has to be clarified as

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<sup>1</sup> <http://media.unwto.org/press-release/2018-01-15/2017-international-tourism-results-highest-seven-years>

well as in what way destinations have to compete, because thinking about marketing, as the only weapon available, could be an error.

Ritchie and Crouch (2010) argued that “competitiveness is a function of wide range of elements including numbers of factors in internal and external environments which need to be combined and synergized to determine the attractiveness of a destination. Destinations are trying to form strategies that cover the entire range of tourism activities in order to become more attractive and to improve the tourism experience for their visitors”.

To achieve these results actual business models have to be reconsidered and innovated. Nowadays, as it will be discussed in the following chapters, only few cities have been able to invest and innovate, including in their strategy new technologies that, bringing smartness into tourism destination, embrace the new concept of Smart Tourism.

According to Buhalis and Amaranggana (2015), “one of the challenges in tourism sector is the presence of many stakeholders, which have different interests between one another. In Smart Tourism Destination, tourism service providers could make use of centralized information platforms in order to make better business decision”.

The main goal of this thesis is to let stakeholders become aware that in this field a collaboration between them can bring important results, which cannot be reached by a single stakeholder. Moreover, they could propose a new business model able to interconnect in a dynamic way several other stakeholders, in order to create value from tourism market increasing efficiency without losing the focus on tourists.

To identify how business models could permit to achieve the desired result, the thesis is organized as follows. Before a brief description of the world of Smart Tourism, the work shows a classification of Smart Tourism initiatives that took place in the last ten years all around the world. Thanks to specific features, some cities will show a good propensity to the implementation of the Smart Tourism. Adding these features, the thesis will define a “perfect environment” that is considered as the base for successful Smart Tourism initiatives. An analysis of business model regarding some of the initiatives described previously will follow, trying to highlight points of strength and weakness of them. From this classification, only the initiatives that have been most successful and have involved different stakeholders will be identified. Then the work will analyze what feature have in common these initiatives and define a kind of receipt to make successful Smart Tourism



project. Finally, the thesis switches to the definition of a new business model analyzing points of strength and weakness of it.



Figure 1



Figure 2

# 3 Theoretical Background

## Smart Tourism

Smart Tourism could be defined as the application of different forms of next generation ICT to the tourism industry. The three main forms of these new technologies which are vital for setting up Smart Tourism Projects are: Cloud Computing, Internet of Things (IoT) and End-User Internet Service System.

Cloud Computing is the use of hardware and software to deliver a service over a network, typically the Internet. With cloud computing, users can access files and use applications from any device that can access the Internet.

The first definition of IoT dates back to 1999. Kevin Ashton (MIT) defined IoT as “a network that can connect anything at anytime and anyplace in order to identify, locate, manage and monitor smart objects”.

Khan, Woo, Nam and Chathoth (2017) affirm that “the term end-user internet service systems incorporates all the tools and applications able to access the services related to tourism. These include applications that are oriented towards serving tourists which enable access to products and support services”.

The Smart Tourism’s main goal is to enhance the added value experiences for tourists. To better understand this concept, a simple example follows. About 20 years ago, a visitor who wanted to visit a cultural city like Barcelona could rely only on static tools such as guide books and paper maps. The drawbacks of these old tools are easily identifiable, they can't be updated and they are uncomfortable. In the recent years the situation has changed and the tourism market has been embraced by technology innovations. Nowadays a visitor who wants to visit the capital of Catalonia can count on more than fifteen mobile applications provided by the public sector and many others from the private sector. These apps can be downloaded on smartphones or on other technological devices, moreover they permit visitors to explore the city easily and to obtain useful information in order to manage, in the best possible way, their short available time. Another important aspect is that so often these apps are free and in addition they can provide real time information.

However, thinking of Smart Tourism as a simple matter of mobile applications would be limited because Smart Tourism is not only the digitalization of old processes linked to tourism but it is a much broader concept. The digitalization should be only the starting point, the big challenge is to link data generated by various sources and to extract value from them.

The flow of information between Smart Tourism and tourists is not monodirectional. Visitors are not just users of a determinate technology but they also have the opportunity to become a creator of content. In fact, during their journeys and in their decision-making and communication processes tourists contribute to the creation of a massive flow of data generated by sensors, micro-devices and cameras distributed on the urban and extra-urban areas of interest for tourists. All these data are a promising basis for making smart destinations as well as for enhancing the satisfaction of tourists through a personalized offer of products and services. The tourist is truly involved in the process of value generation.

Tourism becomes actually smart only when new technologies are incorporated in destination's points of interest. These landmarks become interconnected so they are able to share information making new scenarios possible.

The paper named "Smart Tourism: foundations and developments" wrote by Gretzel, Sigala, Xiang, Koo and published in the 2015 is one of the most cited papers on Smart Tourism. This paper define Smart Tourism as "tourism supported by integrated efforts at a destination to collect and aggregate/harness data derived from physical infrastructure, social connections, government/organizational sources and human bodies/minds in combination with the use of advanced technologies to transform that data into on-site experiences and business value-propositions with a clear focus on efficiency, sustainability and experience enrichment." The authors also wrote that Smart Tourism involves multiple components and layers of smart that are supported by ICTs. The three layers are: Smart Destination, Smart Experience and Smart Business Ecosystem.

Definitions of Smart Tourism don't come only from academic sources. It is also interesting to hear other points of view. For example, Barry Lerner, the South Pacific Regional CIO at Huawei said about Smart Tourism: "it's about enhancing the tourism, making the tourists aware about what they are getting into. With technologies like augmented reality, the tourist can actually see how he would fit into different activities offered by the city. This is happening, because the infrastructure on the city is improving. Things like 5G is enabling us to broadcast and make the experience for the tourist much more reliable. Smart Tourism

is also concerned about the safety; there are certain areas where the tourist should be or not be, also understanding and making sure the weather forecast is correct. All these things that are happening now with Smart City are enabling Smart Tourism.”<sup>2</sup>

## **Smart Tourism Destination**

It is possible to define a Smart Tourism Destination as a city able to generate value applying in an ubiquitous and organized way the concept of Smart Tourist.

The term ubiquitous is used because the concept of ST must be cover all the city. For example, the presence of a single mobile application that enhances the visit in a museum, cannot be considered enough to recognize the city as a Smart Tourism Destination. The several initiatives of ST should cover more points of interest and they must be implemented in an organized way, each initiative must be linked to the others in order to make the tourism efficient.

As described previously, a city capable of implementing Smart Tourism initiatives provides to its tourists a tourism experience of higher-quality. As a consequence, if the quality is high, a city can increase its competitiveness and it will attract a high number of visitors. The latter, utilizing what the city has to offer, generate sizeable amounts of digital data known as Big Data that, if managed in the best way, can create value for different stakeholders. From the point of view of the public sector, analyzing data with the aim of understanding visitors' behavior could be very useful in order to make the city more efficient. For example, big data can be utilized to study the flow of tourists in the city and to improve the transport system or they can be utilized to improve the safety during situations of emergency.

Even the private sector may have a beneficial interest in the use of big data, they have the opportunity to understand needs of potential customers and then offer them right services that suit users' preference in real time.

Xiang, Lamsfus and Wang (2016) claimed that “a destination is considered smart when it makes extensive use of technologies by personalizing and making tourists aware of tourism services available to them at the destination in order to improve the travelers experience and empower the tourism industry with the tourist data collected within the destination”.

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<sup>2</sup> [https://www.youtube.com/watch?v=\\_tqEAXFL33M](https://www.youtube.com/watch?v=_tqEAXFL33M)

What differentiates a smart city from a Smart Tourism Destination is that the first one doesn't take into account the presence of tourists so the focus is on citizens. A Smart Tourism Destination could be seen as a derivation of a smart city. Boes, Buhalis, and Inversini (2015) indicate that "a smart city focuses on its citizens, while a smart destination intends to improve tourist experiences through information and communication technologies (ICTs)". In their paper, Zhuang and Chao (2015) debated about the relationship between smart city and Smart Tourism affirming that the construction achievement of smart city is the foundation and support for Smart Tourism system building both on the conceptual and practical level.

More specifically, K. Kaur and R. Kaur (2016) gave an explanation of Smart Tourism in order to get to the point with the definition of Smart Tourism Destination considering it like a platform. They affirm that "Smart Tourism is the necessity for such smart cities which possess heritage value or other tourist attractions. It requires bringing together the various stakeholders in the tourism industry through a common platform of technology hence it provides a mechanism for their cooperative functioning through information exchange and analysis. Such destinations can be equipped with sensors, cameras and other smart devices like touch screens, etc., which can collect data about tourists visiting those places. Such vast amount of data can then be stored on Cloud servers using the wireless or wired network. This data can then be analyzed and put to efficient use by the various stakeholders in the tourism sector".

In this vein, Buhalis and Amaranggana (2014) consider that "smartness, when referring to a tourism destination, requires the dynamic interconnection of stakeholders through a platform capable of exchanging real-time information related to tourism activities, with the objective of maximizing user or customer satisfaction and resource management efficiency. These activities produce a large multidimensional set of digital information, which is understood within the concept of big data, and allows national tourism organizations (NTOs) and destination marketing organizations (DMOs) to extract valuable insights".

## 4 Smart Tourism Initiatives

An overview of Smart Tourism initiatives was identified typing key words like “Smart Tourism initiative, smartness in tourism, smart destination project, tourism intelligence” on the web and in the principal search tools such as Google Scholar and Scopus.

From this set, projects that have not been implemented yet were excluded. The final result consists in a subset of fourteen Smart Tourism initiatives that took place all around the world.

The Initiatives were classified and inspired by the work carried out in the article named “A new taxonomy of smart city projects” by Perboli, De Marco, Perfetti, Marone (2014). In the paper just mentioned, the taxonomy described concerns smart city projects in general. For that reason, some adjustments to the original dimensions were necessary, taking into account the feature of Smart Tourism.

The initiative classification is carried out with two tables. The first one lists and describes the fourteen initiatives considered from this study.

Description			
Country	City	Name	Short Description
Netherland	Amsterdam	Sail Amsterdam Event	During Sail, visitors were provided with different iBeacon interactions which were based upon the individual visitors' location and their behavior during the previous days of the event. Notifications included ship information but also information about upcoming events, news and promotions which were available at the proper time. <sup>3</sup>
Spain	Barcelona	Park Güell - Official Guide	The app permits visitors to see the main sights in the Park Güell monumental area and discover Gaudi's architectural style with the help of previously unpublished texts

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<sup>3</sup> <https://opendataincubator.eu/files/2016/06/Smart-Technologies-in-Tourism.pdf>

			from the Museu d'Història de Barcelona (MUHBA), an audio guide, a detailed map, practical information and much more. The app also works without an internet connection. <sup>4</sup>
<b>Spain</b>	Barcelona	BCN IPAD TOUR	This service allows visitors to rent a tourist iPad: a new device that brings together the best apps for travelers, including 3D maps of Barcelona, on-line routes, the opening times of museums and landmarks, and automatic translators.
<b>Spain</b>	Barcelona	Mobec Hotels	Mobec Hotels is a mobility sharing system for tourists and city visitors with electric motorbikes. The project links the Mobec Point charging stations (there is one Mobecpoint Smart Motorbike Charging Station in front of the hotel) with green energy and electric mobility. The project consists on the installation of a network of charging stations for six vehicles in front of the hotels of Barcelona participating in the project, which will have six rental two-wheel electric vehicles available for the hotel's guests.
<b>United Kingdom</b>	London	Visit London app	This official London city app helps visitors to make the most of their time in London while on the move. Features include offline maps, hand-picked lists of the best things to see and to do, hidden gems and area guides, great deals and offers, and directions to help tourists navigate the city.
<b>United Kingdom</b>	London	Natural History Museum app	Thanks to this app, the legendary broadcaster Sir David Attenborough guides visitors around Hintze Hall, the central space. You'll Listen to audio guides introducing visitors to dozens of exhibits representing 4.5 billion years of natural history. The free visitor app will help tourists find their way around all galleries and give them behind-the-scenes insights of the collections. The visitor app has location-aware maps showing the

<sup>4</sup> <https://ajuntament.barcelona.cat/apps/en/park-guell-official-guide-monumental-area>

			Museum's public spaces, including cafes, shops, lifts and toilets.
<b>Denmark</b>	Copenhagen	Copenhagen Travel Guide	This app contains everything a visitor needs to visit the city. It allows users to plan their trip based on how much time they have. It also has different functionalities like the augmented reality.
<b>Italy</b>	Florence	Wall interactive display	The initiative exploits a touchscreen on the wall, in a visitor center where people can discover the most interesting cultural points of the urban area (places of worship, historical buildings, museums, monuments, etc.) and then create a customized itinerary on daily basis which can be viewed and updated via a dedicated mobile application.
<b>Brazil</b>	Natal	Find Natal	Find Natal is a smart city application that aims to enhance tourists' travel experience through a software designed to leverage the infrastructure mechanisms behind the city. Find Natal provides technologies to collect, process, share, store and analyze a vast amount of data coming from multiple parts sensing sources in order to turn data into powerful insights.
<b>USA</b>	New York	LinkNYC6	A \$200 million project designed to replace legacy phone booths with 7,500 digital kiosks throughout the city. Each kiosk will provide citizens and tourists with free high-speed Wi-Fi, along with other features that include wayfinding services for tourists and sensors to monitor environmental data.
<b>United Arab Emirates</b>	Dubai	Visit Dubai	Following three simple steps on visitdubai.com, tourists, have the opportunity to create a customized itinerary in order to optimize their tourist experience. In the first step, visitors choose what they want to visit and in the second step they organize their trip deciding when to enjoy what they have selected in the first step. The third step consists in downloading the app and then the visitors can accede to their trip plan through their smartphones.



<b>South Korea</b>	Seoul	i Tour Seoul App	i Tour Seoul offers information on every aspect of Seoul travel. Browse directories of tourist attractions, stores, restaurants, hotels, and more. Furthermore, there are weather information, transit information, tourist information centers locations, and great tips on where to go and what to do in Seoul.
<b>South Korea</b>	Seoul	Deoksugung, in my hands	The app contains 1,634 items related to Deoksugung Palace including photos and videos, as well as 3D images using Augmented Reality. It also offers sign language video guides for people with hearing problems and provides information on nearby tourist attractions. <sup>5</sup>
<b>China</b>	Dunhuang	Dunhuang	Dunhuang periodically attracts a problematic number of tourists. Therefore, Smart Tourism was implemented to improve service quality during the peak season and attract more tourists in the off-season, promoting city governance and sustainable economic growth. <sup>6</sup>

In the second table, the initiatives described previously are classified based on: technological tools necessary to their implementation, stakeholders involved, who is responsible for the management and lastly on the phase in which the initiative influences the tourist experience.

The use of phases to examine tourist experiences was element of study for several authors (see Borrie & Roggenbuck, 2001; Botterill & Crompton, 1996; Fridgen, 1984; Graburn, 2001; Li, 2000). Even Rossman & Chlatter (2000), in their leisure studies, affirmed that leisure is a multi-phased event. A model presenting this phasing of experience was developed by Clawson and Knetsch (1996) and applied to tourism (see Cohen, 1979; Graburn, 2001). The five distinct and interacting phases included in the C&K model are: anticipation, travel to site, on site activity, return travel and recollection. However, it is necessary to highlight that, those studies are dated and as a consequence they do not take in consideration the advent of technology in the tourism sector.

<sup>5</sup> [http://english.visitkorea.or.kr/enu/AKR/FU\\_EN\\_15.jsp?cid=1786566](http://english.visitkorea.or.kr/enu/AKR/FU_EN_15.jsp?cid=1786566)

<sup>6</sup> <http://e.huawei.com/sg/videos/global/2016/201612131051>

For the sake of simplicity this study will split the tourist experience in three macro phases. The three macro phases are: travel planning, on-site and post sharing. Travel planning covers everything that helps potential visitors to find information and to plan the trip. On-site regards everything that enhances the experience during the trip. The post experience phase regards everything that allows visitors to share their experiences, photos or reviews when the trip is finished.

Looking at the column “Management” it is possible to identify who is responsible for the implementation of the initiative. The initiative could be carried out by just one actor or could require the collaboration of two or more entities. They can be private companies cooperating for the realization of a shared project, public entities or a mix of them.

<b>Name</b>	<b>Tools</b>	<b>Stakeholders</b>	<b>Management</b>	<b>Tourist's Experience Phase</b>
Sail Amsterdam Event	IoT (Beacons) Mobile Application	Tourists Government Private Companies	Mixed	On-site
Park Güell - Official Guide	Mobile Application	Tourists Government	Public	On-site
BCN IPAD TOUR	IoT Mobile Application	Tourists Government	Public	On-site
Mobec Hotels	IoT Cloud Computing	Tourists Government Private Companies	Mixed	On-site
Visit London app	Mobile Application	Tourists Private Companies	Mixed	On-site
Natural History Museum app	Mobile Application	Tourists Government	Public	On-site
Copenhagen Travel Guide	Mobile Application	Tourists Private Company	Private	Travel planning On-site
Wall interactive display	IoT (Wall Interactive Display) Web Application	Tourists Government	Public	Travel planning On-site

Find Natal	Web and Mobile Application Cloud Computing	Tourist Citizens Government	Public	On-site
LinkNYC6	IoT Cloud Computing	Tourists Citizens Government Private Companies	Mixed	On-site
Visit Dubai	Web and Mobile Application	Tourists Government	Public	Travel planning On-site
i Tour Seoul App	Mobile Application	Tourists Citizens Government Private Company	Public	On-site
Deoksugung, in my hands	Mobile Application	Tourists Government Private Company	Public	On-site
Dunhuang	IoT Cloud Computing	Tourists Government Private Company	Public	Travel planning On-site

## Overview

The majority of initiatives analyzed were implemented by the public sector who governs the territory. Almost all of them examine the creation of mobile and/or web applications utilized to enhance the experience in museums or thinking how to help visitors in the city. These initiatives request modest investments which are often affordable by the public sector. The latter, thanks to these apps, can improve management efficiency, strengthen competitiveness and increase social profitability of tourism. Furthermore, the public sector can obtain a whole series of data that could be very useful.

For example, in the case of Find Natal, the app has been running since the beginning of the 2014 FIFA World Cup. Although Natal was not the location for the World Cup knockout stage, Natal hosted four games in the group stage with an average attendance of 40,000 fans at each game. In total, Natal received around 173,000 tourists during the World Cup period. The high number of tourists puts severe pressure on the urban infrastructure and services related to transport, safety and water consumption. In order to handle such pressure the Find Natal was created not only to supply comprehensive information about local attractions to visitors, but also to support the monitoring of tourist movements during their visits in Natal

through a process of collecting, processing, sharing, storing and analyzing the tourists behavior.(Cacho, Mendes-Filho, Luiz, Lopes, 2016)

There are also some initiatives managed together by the public and the private sector. This happens mainly when the public sector has previously carried out specific investments. Such investments make the environment inclined to host successful and more complex kind of Smart Tourism initiatives. Examples of these investments are the installation of innovative sensors network, wi-fi zones and optical fiber network.

The private sector is reluctant about these sizable investments because they represent the long term and considered too risky as it would mean to invest in technologies that could become obsolete in short period.

To overcome this reluctance, the public sector should encourage private-sector investment on new Smart Tourism partnership models that will reduce the short term cost of investment in technology and ensure that any risk and reward considerations are appropriately balanced. In fact, when there are the right prerequisites, the private sector has a propensity to participate actively in projects which could bring them advantages in the short term.

The Sail Amsterdam Event is an example of that. The premise is that Amsterdam has state-of-the-art technological systems and is considered one of the smartest cities in Europe. In this case, the Netherland's capital wanted to perfectly manage an important event that has been rushed by around 2,3 million of visitors. The event represents the largest public event in the Netherlands. In the 2015 SAIL Amsterdam edition, the new beacon technology was implemented for the first time on such a scale. During SAIL, visitors were provided with different iBeacon interactions which were based upon the individual visitor's location and their behavior during the previous days of the event. Notifications included ship information but also information about upcoming events, news and promotions which were available at the proper time. (Nabben, Wetzels, Oldani, Huyeng, van de Boel, Fan, 2016)

The public sector properly exploited this project. In fact, the increasing amount of people in the city center must be managed not only to retain positive tourist experiences but also to ensure safety. In order to guarantee a proper safety, the crowd management is essential especially in a city with a lot of narrow alleys like Amsterdam.

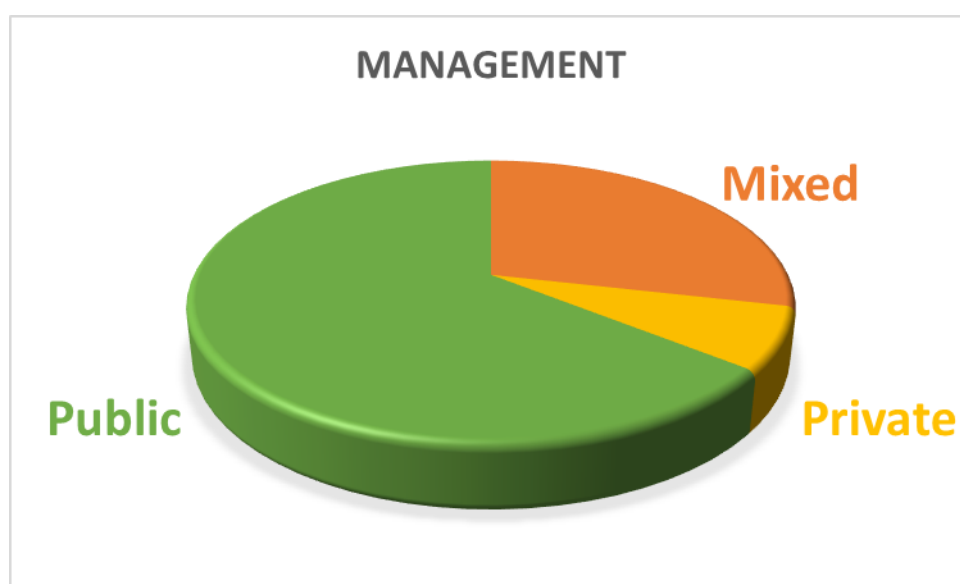
This project was helpful in order to gain a clear picture of where visitors were and which way they were moving. As well as iBeacon, other technologies were implemented for this goal such as: counting cameras, Wi-Fi/Bluetooth tracking, GPS sensors and social media

analysis. Placing these tools at strategic points, it was possible to number the visitors walking in both directions. This allowed the crowd management team to obtain useful information. Those visitors, who had their Wi-Fi or Bluetooth turned on, could be tracked via the Wi-Fi network and gave information of which routes people walked and how long it took them to get to a certain point.

Even the private sector took advantages on this initiative. In fact, as described by Nabben, Wetzel, Oldani, Huyeng, Boel and Fan (2016), “iBeacon technology was used for promotion purposes during SAIL by several partners/sponsors because they wanted to gather more attention on their brand name/product. With the iBeacon network, partners and sponsors were able to enhance their knowledge of where their customers were located which provides them with an opportunity to send out “highly contextual, hyper-local, meaningful messages and advertisements”.

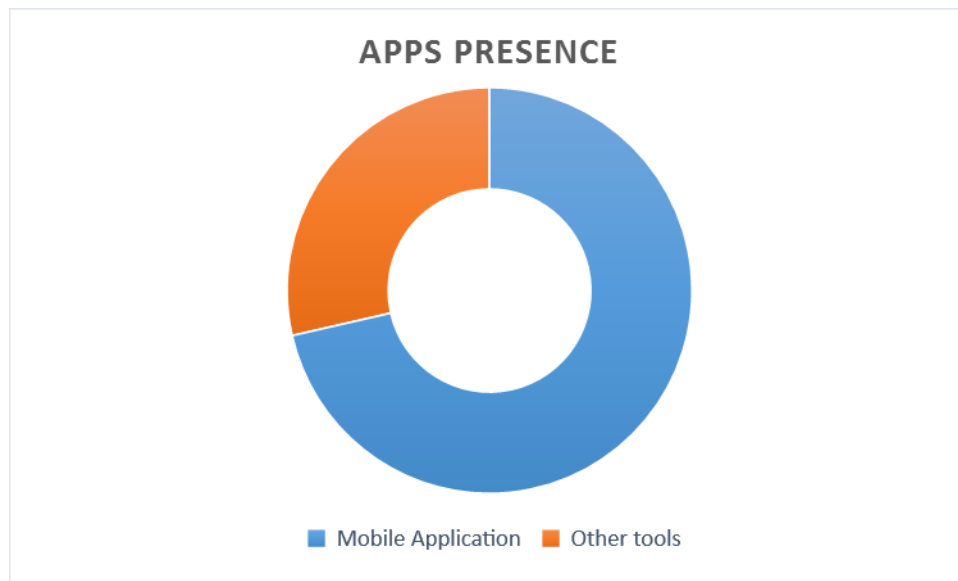
## Quantitative Analysis

In this section, thanks to the use of graphs, the work will analyze, at a quantitative level, the collection of case studies listed in the previous tables. The main focus will be as always to emphasize the different characteristics observed during the process of comparison, between the public projects and the public-private projects.



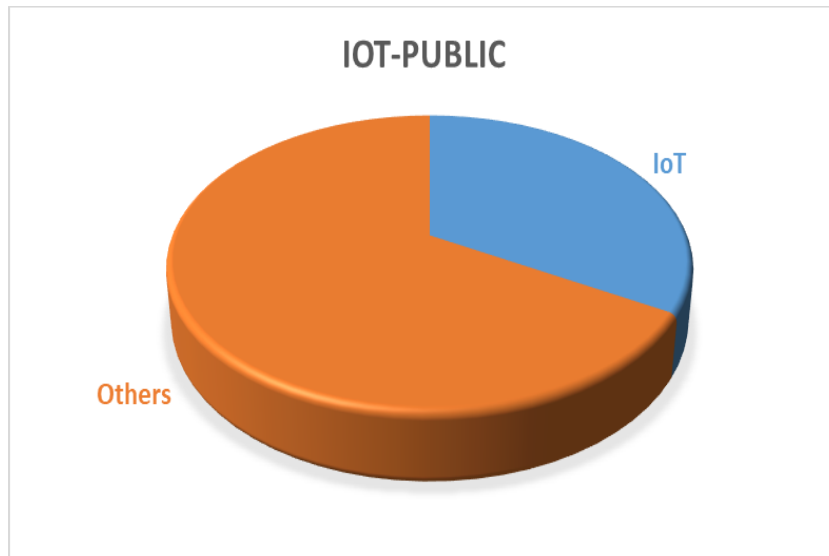
*Graph 1: Percentages of projects managed by Public, Private and Mixed sector*

The first graph shows that most of the projects, that have been implemented so far, were managed by the public sector only; about 64%. The percentage of projects carried out by public-private partnerships is about 29%. A little portion of the cake is dedicated to projects managed by the private sector only. In fact, the private sector is generally not interested in carrying out and managing Smart Tourism projects. It has interest in developing new technologies or platform in order to sell them to the public sector.

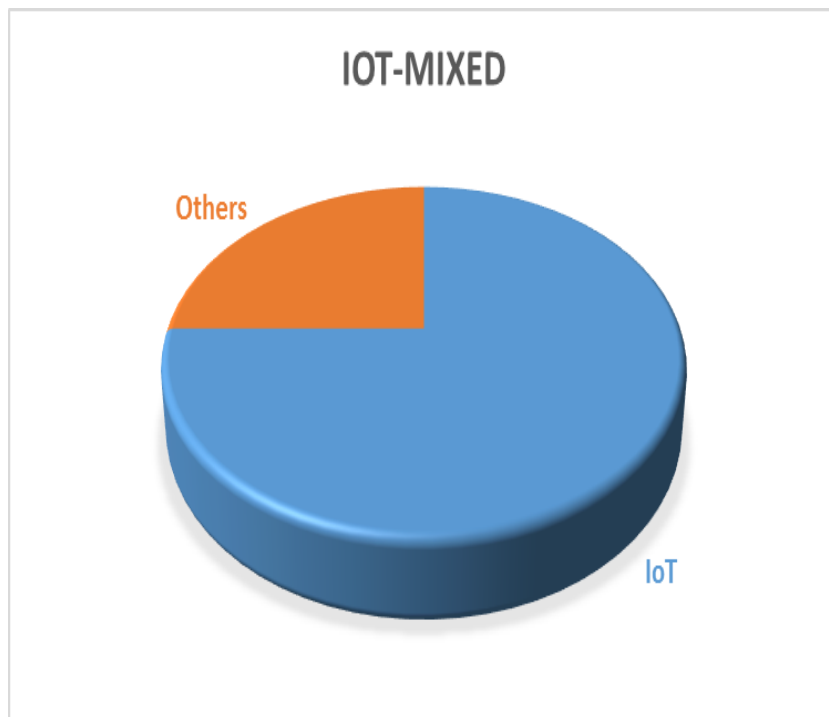


*Graph 2: Percentage of ST initiatives that included the use of Mobile Applications*

The graph 2 shows that most of the initiatives, about 72%, included the use of mobile applications. Moreover, in a world where the two third of population own a smartphone, it is easy to understand the reason why, smartphones are the best tools to make the visitors interact with the Smart Tourism initiatives. In addition, the use of mobile application is the most economic and the easier way to collect data.



Graph 3: Presence of IoT in projects managed by the public sector

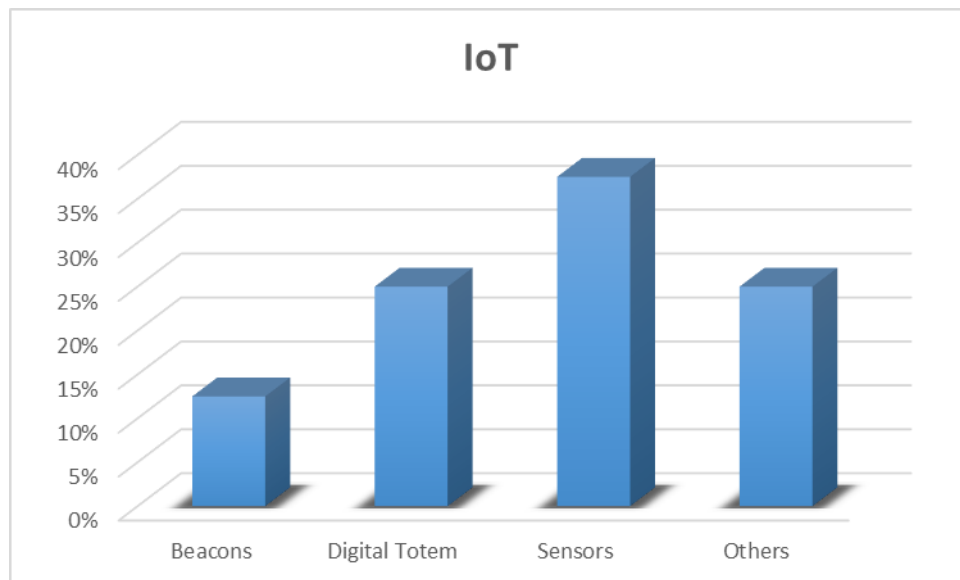


Graph 4: Presence of IoT in projects managed by both public and private sector

When the public sector implements a Smart Tourism initiative, it rarely includes the latest technologies into the project. Talking about smart cities and Smart Tourism, an example of modern technologies is the IoT and the previous statement is confirmed by the graph 3.

On the contrary, the graph 4 shows how the IoT has been much employed when the Smart Tourism projects came from a mix management composed by public and private sector. In fact, the IoT was employed in the 75% of cases.

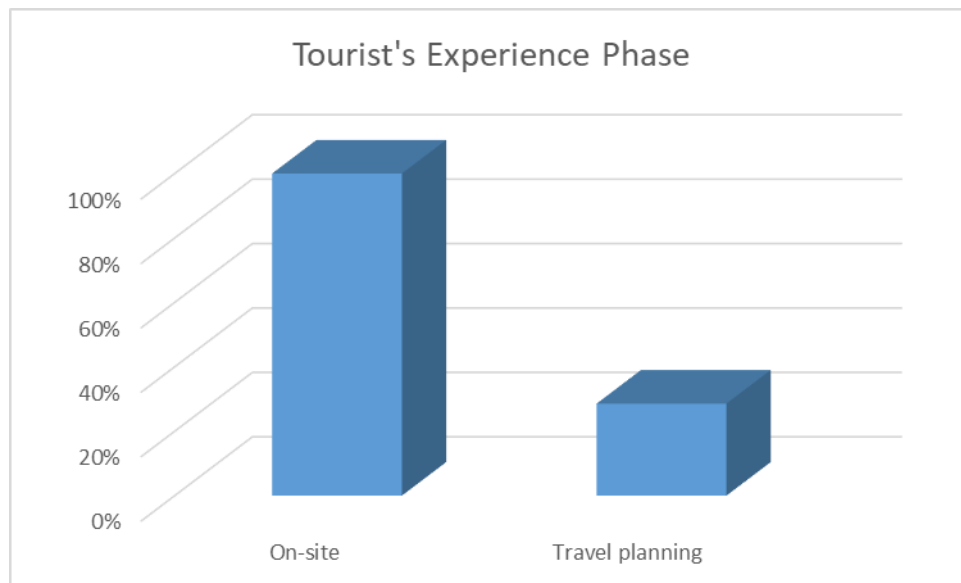
These two graphs above are very important and interesting for the goal of this thesis. They show how the presence of a public-private partnership incentives the use of these up to date technologies. These technologies are challenging both from the point of view of costs and from the know how needed to implement and to manage them.



*Graph 5: Percentages of projects that used Beacons, DT, Sensors and others tools among the IoT projects*

The IoT includes all the tools that can be connected and as a consequence they are able to collect data. The graph 5 shows which are the technological tools most used from Smart Tourism initiatives. In the first position, there are networks of sensors that are used a lot even in the case of smart city projects. These sensors are spread into the city and they are very useful in order to collect big size of data, most of them regard live information. Beacons are used very often, they are sensors that take advantages of the Bluetooth technology, are able to collect data and also to send messages to the visitors' technological tools.





*Graph 6: Percentages of projects focused on On-site and Travel planning experience*

The graph 6 shows as the 100% of initiatives were dedicated to the on-site experience. Some of them were useful also for the travel planning phase. Likely, the focus on this phase will be increased in the future. This because the development of technology will increase the opportunity to enhance the tourist's experience even in the pre-stage of the journey. For instance, the use of augmented reality could be the right technology to pursue tourist to visit a Smart Tourism Destination.

## 5 Perfect Environment

From the analysis conducted ahead, some cities seem to be more suitable than others in the implementation in Smart Tourism projects. Analyzing these cities, common elements that allow the creation of successful Smart Tourism initiatives can be identified. Smart Tourism Destination can be seen as the union of three layers including: Infrastructures, Big Data Management and Living Lab Platform.

### Infrastructure

The infrastructures play a vital role in the realization of a Smart Tourism project as they represent the grounds to the development of technological services. Investments of large sums of money are often required in the construction of technological infrastructures, for instance in the case of cable networks, sensor networks, wi-fi zones and others.

The most interesting initiatives took place in cities where the public sector carried out investments making the environment inclined to the Smart Tourism business.

The involvement of governments is necessary not only in order to contribute to the funding but also to clear the administrative work to modify the urban hard infrastructures. Nevertheless, the accessibility to technology allows private actors to develop low-cost ICT infrastructures. (Zarlenga, Capdevila, 2015)

A good example of city that has invested in technology will follow. Since the 90s, Barcelona city council has been planning and investing in the modernization of its infrastructures to adapt them to the current citizens' needs, mainly in terms of integrating the ICTs. For example, the communication infrastructure optical fiber project was initiated in 1994, and today, it covers 325 km acting as a backbone for the city. Barcelona also provides Wi-Fi connection in public spaces and is equipped with sensor networks configured to be accessible for different goals and providers. In addition, specific districts of Barcelona were modernized because the city council has decided to invest in the installation of new infrastructures through a Special Infrastructure Plan (SIP). This plan had the intention to pursue big firms dedicated to the knowledge and technology-based industries.

The total cost of the plan was funded by landowners (60%), the city's public-service operators (30%) and city council (10%). A public-owned company, called 22@Barcelona municipal company, was created by the city council in order to manage the planning, the execution of the infrastructures as well as the relationship between the town-planning authority and the developers (Oliva, 2004).

So often important investments in infrastructures are carried out in partnership with IT Companies such as Siemens, Cisco and IBM. In the last years, these partnerships have become common because IT Companies have developed a specialized know-how about smart cities and their infrastructures. For that reason, relying on these companies which have already dealt with similar situations, can be a big advantage.

As it will be described later, the case of New York is a perfect example of that. The idea of public sector including in its business model a consortium of IT companies, each specialized in a different field, could be a winner idea.

## **Big Data Management**

In the second layer, the focus is on the importance of data. A consequence of the first layer is that a city which embraces new technologies, makes the process of collecting data easier. Data is an essential ingredient for a Smart Tourism Destination. Both public and private sector organizations are becoming more aware of the value of data. Moreover, it is very important that information are made available to those who are interested. Then in this layer the focus is not on collecting data, but on driving knowledge from data and empowering all parties.

Access to data in the field of Smart Tourism is something of vital importance because the shortage of data is a difficult obstacle to bypass. Another obstacle could be the privacy of data but this topic will be discussed later.

Moreover, it is necessary to regulate and to define a process that permits to switch from the collection of data to their use in order to create value. It is also important to underline that not all data should be shared and opened, but only those which are relevant.

Some cities like Copenhagen, Amsterdam and Dubai have already dealt with the problem of big data management. In particular, Dubai Open Share Framework 2017 is a Dubai's

Government initiative and it has interesting features that could be taken as an example for other cities.

The detailed description of these initiatives is contained in the paper named “Smart city and Smart Tourism: A case of Dubai”. A short summary based on that paper will follow. First of all, it should be emphasized that Dubai, in the past, had enormous amounts of data that were unstructured, disorganized, and with very poor or scarcely linkages. The Dubai Data initiative addresses both public and private sectors. The management role was given to the government. The aim of this initiative is not to have the most data, but to achieve the greatest value from data, creating new opportunities and improved experience for all.

The responsibility of developing the city’s technological infrastructures was entrusted to a cross-governmental committee. It was 2014 when the “Open Data Committee” (ODC) was created. The eight organizations included in the ODC are: Dubai Smart Government Department, Department of Economic Development, Dubai Police, Dubai Roads and Transport Authority (RTA), Dubai Municipality, Department of Tourism and Commerce Marketing, Telecommunications Regulatory Authority, and Dubai Centre for E-Security.

The main goal of the ODC is to make the data available to those organizations that could benefit. In the meantime, the tutelage of the privacy of data was secured across the city. To reach this goal, the introduction of cross-city data sharing techniques was needed.

The inertia of organizations to share data was the first obstacle to this initiative. In fact, mainly because of the culture and work habits, many organizations were reluctant to take part in what they saw as a major limitation to their competitiveness.

In order to bypass this obstacle, the ODC focused its efforts in switching the mindset of key players from being conservative to being less traditional. The message that the committee tried to communicate was that data can be more useful if utilized as a public good rather than as a private resource.

The ODC introduced the idea of “Dubai Data”. This concept was thought to facilitate the process of data sharing and classification. The data processed are those with a governmental nature and with a relationship with the culture and the societal life of the city.

This standard is based on the idea that the ownership of data that are used by the city in any aspect, such as its economy, culture, education, business or people, belong to the city itself and not to a particular entity. In October 2015, the Dubai Data Law was introduced and the Dubai Data Establishment (DDE) started his activities.

The Dubai Data Establishment is committed to developing an advanced knowledge ecosystem around data in Dubai, elevating data analysis and data science abilities for the public and private sector and unlock the greatest possible value from Dubai data. Not all set of data are equal but they have different grade of importance and confidentiality. Based on these features, a set of information is associated to a category. The five categories are: Open Data, Shared Data, Confidential, Sensitive and Secret (*figure 3*). The process that leads to the classification of each set of data is showed in the *figure 4*. The platform is accessible to everybody simply utilizing the web (<http://dubaidata.ae/>). Non-sensitive data are available even without special agreement with the people in charge of the platform. For example, data concerning property land distribution, property building distribution, people flow and even public transport ridership are available to everybody.

As a result of open and shared data, government organizations can effectively collaborate with each other as well as with citizens and the private sector. According to the Dubai Data Economic Impact Report, it is estimated that, by 2021, open and shared data will add \$2.8 billion to the economy every year, which is equivalent to US\$1000 per person and approximately 1% of Dubai's forecasted GDP in 2021<sup>7</sup>. The areas to benefit from this initiative include: public administration; transport, storage and communication; wholesale, retail trade, restaurants, and hotels; and real estate.

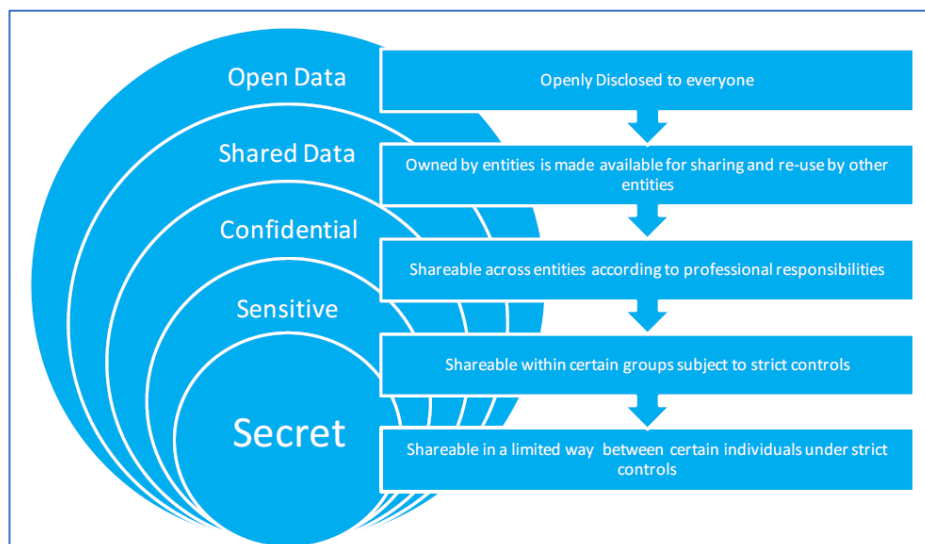


Figure 2 (Source: neXgen analysis)

<sup>7</sup> [http://www.smartdubai.ae/pdfs/DDE\\_A5\\_brochure\\_v5.pdf](http://www.smartdubai.ae/pdfs/DDE_A5_brochure_v5.pdf)

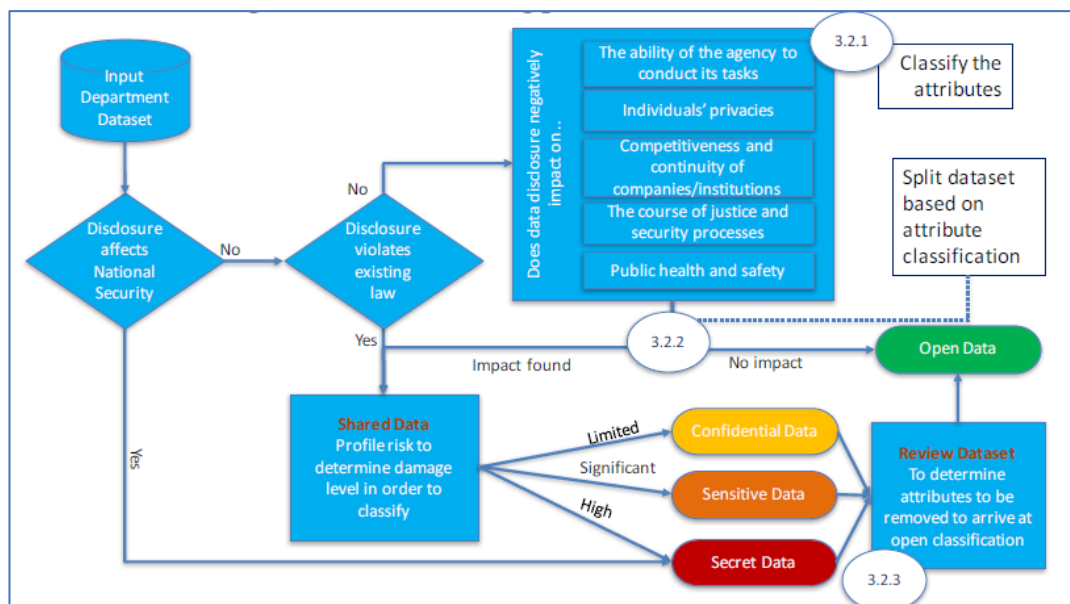


Figure 3 (Source: neXgen analysis)

## Living Lab Platform

Infrastructure and the data collected must be exploited in the best way possible. Modern spaces where a variety of companies and institutions collaborate and cooperate on the development of innovations are needed to bring it in to reality.

Even in this case, Barcelona is at the forefront. As described in the official website of Ajuntament de Barcelona: “one of the aims of the 22@Barcelona municipal company is to consolidate Barcelona’s role as an innovative city and to foster innovation in its business fabric. Barcelona Urban Lab was created under this framework as a specific line of action to foster use of the city as an urban laboratory. Through this project, the city is made available to companies with innovative projects to test their infrastructures and services for the future in a real environment. Urban Lab is a tool used to facilitate the use of public spaces in the city of Barcelona, to carry out tests and pilot programs on products and services with an urban impact, which are in the pre-market stage and in line with the Barcelona City Council’s aims, priorities and lines of action. The idea is to use the city as an urban laboratory”<sup>8</sup>.

<sup>8</sup> <http://www.22barcelona.com/content/view/698/897/lang,en/>

Another example of innovation is the Living Lab in Nieuw-West in Amsterdam. In this case citizens, academics and developers are working together in order to develop products and services able to enhance the quality of life. The city of Amsterdam has also built an iBeacon Lab of 60 iBeacons covering the 3,4 miles from central station to the former marine base. The intention of this 'Living Lab' is to provide an environment where inventors can test their products, prototypes and ideas. Amsterdam is putting great emphasis on the integration of technology on all urban levels. This is enabling a variety of innovations while simultaneously simplifying the collaboration between the various stakeholders. Topics of focus within the Living Lab are e.g. new media, co-creative designs and also tourism. (Amsterdam Smart City 2014).

Even the city of Copenhagen offers a specific test environment where both small and large companies can design and produce intelligent urban solutions that will increase the quality of life for citizens and tourists. The Copenhagen Solution Lab is a common meeting place for entrepreneurs, companies, knowledge institutions and citizens dealing with smart city and data-driven urban solutions.

Stahlbrost (2009) affirmed that "for Smart Tourism Destinations, the use of Mobile Living Lab is suggested to capture tourists' needs and preferences in real settings. Benefit of applying this approach is the main characteristic of mobile devices that could go on 24/7, which opens up the possibility for users to test the product prototype in its authentic environment and time frame precisely when they use it and give valuable feedback on how it could fit into their valid usage context. Interactive manner among different stakeholders, namely government, companies and researchers are essential in conducting this method". In addition, Buhalis and Amaranggana (2015) claimed that "by using Living Lab methodology, Smart Tourism Destinations could gain insights about customers' actual needs and preferences".

## 6 Business Model Analysis

As it has already been said previously, the aim of this thesis is to prove that a collaboration among different stakeholders can bring to important results that are not achievable by a single stakeholder. Moreover, in this section, some business models belonging to the initiatives described before will be analyzed. The principal sources of revenue and cost will be identified. To have an overall view, three different situations will be highlighted. The first one regards initiatives managed by the public sector, the second one by the private sector and last but not least initiatives managed by a public-private mix. For each of these, points of strength and weakness will be highlighted. The business models will be analyzed using the Canvas business model methodology.

### Public Initiatives

#### Find Natal

The first business model analyzed concerns the mobile application named Find Natal. This App was developed by the Natal City Council in partnership with the Metropole Digital Institute (IMD) of the Federal University of Rio Grande do Norte (UFRN).

<b>Key Partners</b>	<b>Key Activities</b>	<b>Value Proposition</b>	<b>Customer Relationships</b>	<b>Customer Segments</b>
	<b>Key Resources</b>		<b>Channels</b>	
IMD	<p>To collect, process, share, store and analyze a vast amount of data coming from multipart sensing sources in order to turn data into powerful insights</p> <p>Sensor network;</p> <p>Web &amp; mobile application</p>	Enhancing tourist experience with a free and official mobile application	<p>Self service</p> <p>Information point;</p> <p>Google store</p>	Visitors



<b>Cost Structure</b>	<b>Revenue Streams</b>
Web & mobile development cost  Sensor network costs (installation and maintenance)	Selling advertisement space

### *Strength Points*

The goal of the City council was twofold. On the one hand, the plan aimed to improve the touristic experience. On the other hand, as it is possible to understand from the case study named “Mobile tourist guide supporting a smart city initiative: a Brazilian case study”, the main goal of Natal City Council was to collect more data possible about its visitors. This because it is important to understand their flows into the city and then to improve the efficiency and safety of Natal.

In order to reach this goal, it was really important that the major number of tourists downloaded the mobile application. In fact, if more data were collected, more efficient the analysis of tourist behavior would be. The fact that the mobile application was free is surely a strength point because this encouraged its use. The gratuitousness of the mobile application for visitors was made possible thanks to the sale of advertisement spaces and thanks to the public funding.

### *Weakness Points*

Most likely, the Natal City Council didn’t implement this initiatives in order to obtain revenues. The focus was mainly to obtain data from tourists and to use them usefully. For this reason, the inability of making revenues can be considered a weakness point. This because, the shortage of finance resources affected the quality of the mobile application.

## **Bcn iPad Tour**

The utility of mobile applications without technological tools for their implementation is equal to zero. This concept is well known to the city of Barcelona. In fact, the second business model analyzed regards the service on sale on the official website of BarcelonaTurisme. The service in question allows tourists to rent iPads to be used during their visit to the city. The iPads are not owned by the public sector but they rent in turn by a partner company named Padcelona.

<b>Key Partners</b>  Padcelona  Telecommunication operator	<b>Key Activities</b>  Management of iPad contents;  Marketing	<b>Value Proposition</b>  To supply to visitors a tool utilizable to plan and to enjoy in the best way possible the visit	<b>Customer Relationships</b>  Technical support	<b>Customer Segments</b>  Visitors
	<b>Key Resources</b>  mobile applications		<b>Channels</b>  www.barcelonatourisme.com	
<b>Cost Structure</b>  Cost of iPads rent from Padcelona			<b>Revenue Streams</b>  Selling advertising space  Selling of the service to tourists (35€/day)	

### *Strength Points*

Not everyone owns a smartphone or other tool able to host a high number of mobile applications. To overcome this problem, the daily rent of a technological and fashion tool can enhance the tourist experience. This business model works without big investments by the city of Barcelona. In fact, the physic resources are rent by a third part and the mobile applications placed on iPads are those already developed for the city. In this case, the public sector, in addition to enhancing the tourist experience, is able to generate revenues from this service. However, there is no way of knowing how much the profit margin is.

### *Weakness Points*

Leasing the iPads from a third part, the price of the service becomes expensive considering that, it could be compared to a daily average rental of a car in the same city. In addition, in order to get the iPad, visitors need to be owners of a credit card and also to guarantee a deposit of about 400€.

## Dunhuang

Dunhuang, as one of the ancient world's most important intersections between East and West, is a popular city to visit on the Silk Road. The city of Dunhuang is working to convert itself into a Smart City by adopting Smart Tourism principles. As part of this project, Dunhuang has partnered with Huawei to build cloud computing centers, Big Data platforms, and IoT application systems.

<b>Key Partners</b>	<b>Key Activities</b>	<b>Value Proposition</b>	<b>Customer Relationships</b>	<b>Customer Segments</b>
Huawei	To establish a Big Data Center for culture tourism;	To provide visitors with a more convenient, comfortable and better experience.	Self service	Visitors Citizens
	To connect a wide range of tourist destinations scattered nearby on the ancient Silk Road		<b>Channels</b>  Web site;  On-site (information points)	
<b>Key Resources</b>				
Cloud computing centers;				
Big Data Platforms;				
IoT application System (Digital and seamless information display, sensors network, digital exhibition halls, etc.)				
<b>Cost Structure</b>		<b>Revenue Streams</b>		
Cost of development and installation of key resources and equipment maintenance				

### *Strength Points*

A strong point is the partnership with Huawei. In fact, Huawei helped the Dunhuang Smart Tourism Company (DSTC) to build a central cloud center, linking the service systems of government departments to provide shared information that enables a quick and efficient response to city governance issues, public security, transportation, and city management emergencies. For instance, talking about security, Huawei helped to connect tourist fingerprint libraries to the Public Security Integrated Policing Platform for real time analysis. The project involved the development of a tourist traffic model for desert areas,

through IoT, to improve city management, Silk Road tourism service quality and smart public services.

### *Weakness Points*

The return on investment is unclear. The data collected are not utilized in a commercial way. Neither the partner has access to city data. In fact, Mr. Victor Yu, President, Industry Marketing and Solution Department, Enterprise Business Group, Huawei stated: “Huawei does not monetize data. We monetize technology and services.”

## **Private Initiatives**

### **Copenhagen Travel Guide**

It is a mobile application developed by a company named eTips LTD with headquarter in San Jose, California. This company has developed about 480 travel guides, one of those is the one dedicated to the city of Copenhagen.

<b>Key Partners</b>	<b>Key Activities</b>  To maintain the mobile application updates with new information	<b>Value Proposition</b>  Copenhagen Travel Guide is designed to ensure a smarter experience for travelers	<b>Customer Relationships</b>  Self service	<b>Customer Segments</b>  Visitors
	<b>Key Resources</b>  Mobile application		<b>Channels</b>  Mobile application stores	
<b>Cost Structure</b>  Development and maintenance of the mobile application			<b>Revenue Streams</b>  Selling advertising space  Sale of aggregate data (supposition)	

### *Strength Points*

A strength point is the sale strategy. When the users download the app, they do not have to pay anything because its basic functionalities are free. Once the mobile application is downloaded, users have the opportunity to discover its good quality. At this point, users are free to switch to the upgrade version and to enjoy additional functionalities and more information. The price for the upgrade is about 4€.

As it was said before, eTips has developed 480 tourist guides. Each tourist guide has the same layout and the same organization to supply information. So, it is as if eTips had done a unique initial investment, that is the development of a mobile application framework. It can be utilized an infinite number of times going to modify the information based on the city in question.

### *Weakness Points*

There is a lot of concurrence and few possibilities to attract customers. The only visibility for the application is on the main online application stores.

Although the quality of the app results good, it is difficult to image that eTips is able to update frequently about 480 mobile tourist guides with the latest information. The need to create large volumes can be a double-edge sword.

In addition, at the time when the users buy the upgrade version, the sizable amount of data to download makes this operation difficult to be implemented without a good internet connection.

## **Mixed Initiatives**

### **Sail Amsterdam 2015**

In addition to InBeacon, a company specialized in iBeacon technology, sponsors and the SAIL organizers were involved in the creation of the app, while having different interests. The sponsors included amongst others are: Staatsloterij, Delta Loyd, KPN, Telegraaf, ING. Some of them wanted to send out push notifications with exclusive offers.

<b>Key Partners</b>	<b>Key Activities</b>	<b>Value Proposition</b>	<b>Customer Relationships</b>	<b>Customer Segments</b>
InBeacon	Mobile application management; Targeted marketing	The official mobile application of the sail that supplies information and special promotions to visitors in base of their location during the event	Self service	Visitors
			<b>Channels</b>	

	<b>Key Resources</b>  Five public and private beacon networks (232 beacons in total);  Mobile application		Mobile application stores;  Official web site of the sail	
<b>Cost Structure</b>  Development of the mobile application;  Cost of installation (beacon networks), equipment maintenance, and digital advertising operations		<b>Revenue Streams</b>  Funds by Staatsloterij, Delta Loyd, KPN, Telegraaf, ING.		

### *Strength Points*

To the visitors was not asked disbursement of money in order to benefit from a mobile application, that enriched the event and supplied visitors with real time information based on their location.

All costs were covered by sponsors in change of visibility during the event and also they had the opportunity to send advertisement to app users. This thanks to a private network of beacons.

### *Weakness Points*

Despite sponsor financing the project, there were no direct source of revenues linked to the initiative. The data collected during the event were not used for commercial goals but just to study the flow and behavior of visitors.

A lot of visitors didn't fully enjoy the mobile application because they were ignorant about the correct use of iBeacon. This because they didn't know that notifications could be received only by turning on the Bluetooth. Beacons can only be used in combination with a system such as a Bluetooth. In fact, whereas many people installed the SAIL app, not everyone used it properly because they didn't use the Bluetooth function. Likely, in that case, the digital channel was not enough to ensure a properly use of the app.

## VisitLondon

London & Partners created the mobile application in partnership with Mastercard. London & Partners is the Mayor of London's official promotional agency. It is a not-for-profit public-private partnership, funded by the Mayor of London and a network of commercial partners.

<b>Key Partners</b>  Mastercard	<b>Key Activities</b>  To create contents for the mobile application and to update the information	<b>Value Proposition</b>  The visit London app is a free app that’s designed to help visitors make the most of their time in London while on the move	<b>Customer Relationships</b>  Self service	<b>Customer Segments</b>  Visitors
	<b>Key Resources</b>  Mobile application		<b>Channels</b>  Web site Apps store	
	<b>Cost Structure</b>  Mobile application development		<b>Revenue Streams</b>  Funds by Mastercard	

### *Strength Points*

The mobile application is fully free for visitors because it is financed by the Mayor of London's office and it receives funding from the main partner Mastercard and from other sponsors. The overall quality of the mobile application is excellent.

### *Weakness Points*

Even in this case, the return on investment remains unclear. Sponsors cover the cost of implementation but there is not a clear source of revenue.

There is also a strict dependence on the main partner Mastercard. In fact, some services are enjoyed only by the owners of a Mastercard.

## LinkNYC6

The city has formed an innovative partnership model to finance and fund the project. LinkNYC is being provided by CityBridge in accordance with the terms of a franchise agreement granted by the City of New York. CityBridge is a group of companies comprising experts in technology, user experience, connectivity and advertising that include the following members: Qualcomm, Civiq and Intersection.

<b>Key Partners</b>  CityBridge  Telecommunication operator	<b>Key Activities</b>  Management of advertising spaces  Management of the installation of new kiosk	<b>Value Proposition</b>  LinkNY is a new communication network. Each link is equipped with free services like high-speed Wi-Fi, phone calls, a tablet for maps and city services, and device charging for anyone living in or visiting New York City to enjoy	<b>Customer Relationships</b>	<b>Customer Segments</b>  Visitors  Citizens
	<b>Key Resources</b>  1268 kiosks		<b>Channels</b>	
	<b>Cost Structure</b>  Cost of installation, equipment maintenance, and digital advertising operations		<b>Revenue Streams</b>  Selling advertising spaces	

### *Strength Points*

Under this model, the city provides concessions to allow the consortium to install the kiosks (at no cost to taxpayers or users) and collect advertising revenue, which is shared with the city at an agreed-upon rate. The revenue would be used to cover the costs of installation, equipment maintenance, and digital advertising operations.

According to a report by Deloitte, LinkNYC will generate more than half of a billion dollars in revenue for the City of New York. The project is also expected to create 100 to 150 new full-time jobs in manufacturing, technology and advertising<sup>9</sup>.

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<sup>9</sup> <https://www.link.nyc/faq.html>



Such funding models bring existing physical assets back up, bring in private-sector capital and expertise, and ultimately create new sources of revenue through data collection and citizen and tourists engagement.

As a one-to-many advertising platform, advertisers are able to target audiences using anonymous and aggregated information, such as number of users connected to a specific Link at a specific time, but nothing identifiable about users' devices.

### *Weakness Points*

There is little clarity about the data collected. Despite the sizable amount of data collected by the Links, the management affirms that these data will not be used for commercial goals. On the contrary, reading the privacy document, it is possible to understand that these data could be utilized for commercial scope under consensus of the users.

## **Consideration**

Smart Tourism initiatives are not all the same, from the analysis presented in this chapter it is possible to define two macro categories: basic initiatives and more complex initiatives.

Basic initiatives are these that don't go any further than to develop a mobile application. Their function is to digitalize and to make easily available information. They are developed both from the public sector and from private companies with different aims.

The public sector develops these mobile applications because the visitors' needs have changed. From the point of view of a tourist, not having a mobile application for the public transport or an app to obtain useful information about a point of interest could be an element of trouble. From the point of view of public sector, the benefit resulting from these apps is to increase the tourist experience and consequently to increase the competitiveness of the city and to be recognized as a Smart Tourism Destination. The city can also create tourist profiles to improve urban planning and better balance visitor crowds. The mobile applications developed from public sector are often free and they are financed from the same public sector and through the sale of advertisement spaces. The costs are those related to the development and maintenance of the app. Partnerships with university departments are frequent.

Private companies develop smart tourist guides with the aim of generating revenues. The revenues come from the sale of advertisement spaces and from the sale of the mobile

application to tourists. There is another possible form of revenue even though it is not easy to identify. In fact, it is possible to deduce that the data collected from the app are aggregated and sold to third parts. An example to explain the concept will follow. Let's assume that tourists use the app of Copenhagen to obtain information about bus tours. It is not a case that from then on, surfing on the web, they will obtain targeted advertising about offers for bus tours in the city of Copenhagen.

The initiatives considered to be more complex are those requiring the presence of specific infrastructures and the presence of more stakeholders joint in a platform. The infrastructures can be installed in permanent way as in the case of New York or in temporary way as in the case of the beacon networks in Amsterdam. The implementation of this infrastructures often surpasses the municipal capacity to fund them. This forces city governments to carefully consider the cost benefit of pursuing a particular project, as well as new models for funding and financing infrastructure programs. In fact, the costs of infrastructures are often covered by sponsors or through new performance-based approaches for revenue sharing. The public procurer of services and the private-sector investors share in the value of efficiency gains in service delivery, advertising-generated income, and revenue from value-added analytic services.

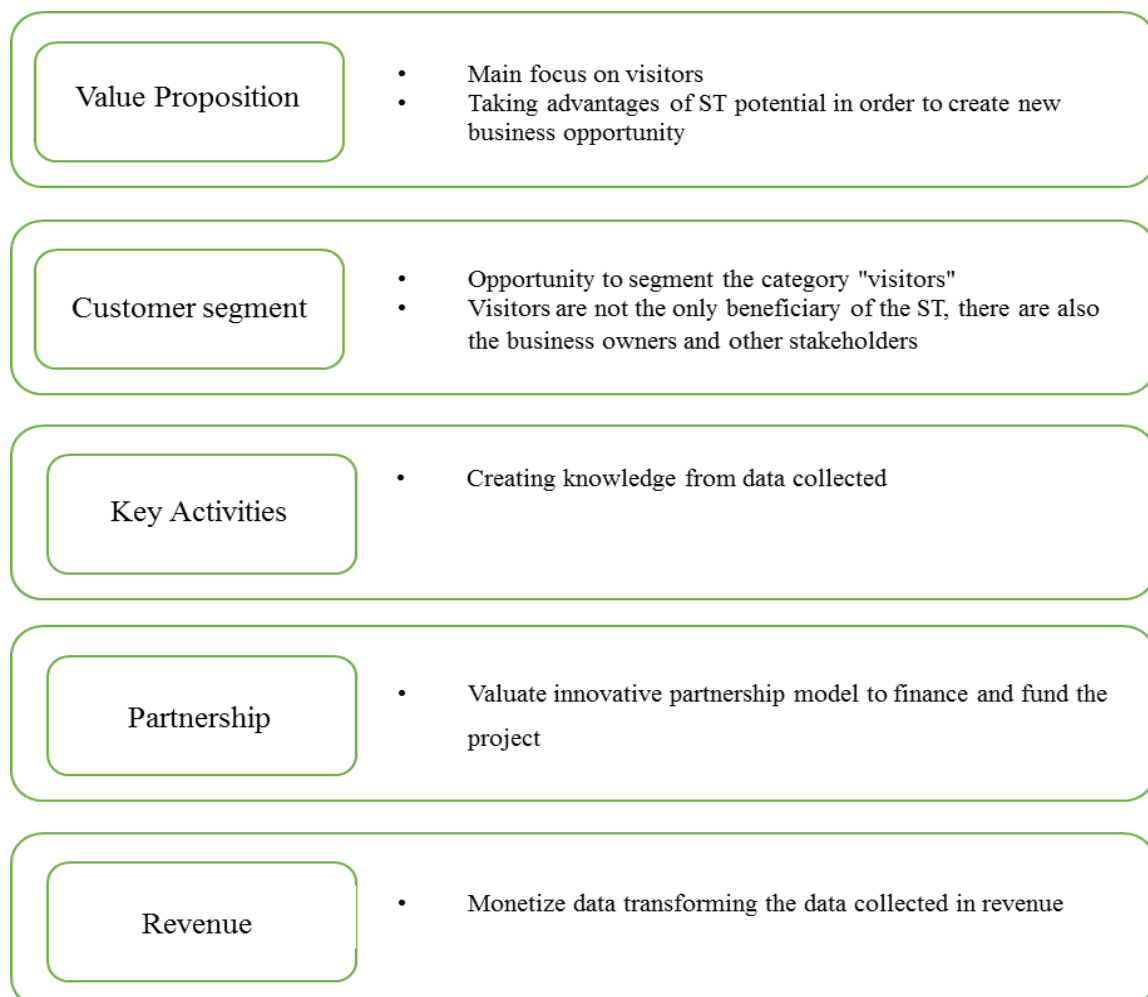
As said in the second chapter, a city is considered a Smart Tourism Destination only when that city is able to apply the Smart Tourism concept in an organized and widespread way. That happened significantly with complex initiatives. For that reason, for the rest of the work, the thesis will focus its attention on that kind of initiatives.

# 7 Business Model Recipe

Smart Tourism initiatives are not all the same. However, in this chapter, the thesis will identify the similarities between the case studies previously seen. In particular, the aim of the work is to understand if these similitudes occurred because the best practice was followed or because each new initiative copied the previous initiatives and actually the best practice is the “unique practice”.

In fact, analyzing individually some dowels of the business models, it is possible to notice that they show similar features. The thesis will analyze these features and when it is possible, it will propose new scenarios. The aim of this section is also to fix key points, in order to create a kind of recipe for successful Smart Tourism initiatives.

## Recipe for successful Smart Tourism Destination



## **Value proposition**

The value proposition always converges to provide tools to visitors that enhance their tourist experience. This is surely a key point into Smart Tourism business models. In fact, the aim of the Smart Tourism is to enhance the tourist experience and as a consequence it is important not to lose the focus on tourists.

On the other hand, thinking of the Smart Tourism with the only aim of increasing the tourist experience could mean to underrate the potential of Smart Tourism.

It is important to use the available technology to enhance the tourism and also to create value through new business opportunities. For example, there are several business owners that could benefit from the application of technology to the tourism market. Moreover, a good value proposition could be useful in order to offer services that allow these stakeholders to be more competitive and efficient on the market. So far, the only service offered to business owners was the offer of advertisement space.

## **Customer Segment**

The aim of Smart Tourism is to enhance the tourist experience. Therefore, as it is highlighted in the block named customer segment, it is normal that all the business models focused on the category named “visitors”.

This category is actually composed by several shades. Surprisingly, no initiative has tried to segment it. The segmentation topic will be deeper treated during the following chapter when the thesis will introduce its idea of business model. In the meanwhile, in order to clarify the concept, an example will follow.

Let's imagine three cases. In the first one, a multinational company sends one of its white-collar worker to a business meeting located in a foreign city. In the second case, the same city is visited by a young couple. In the latter case, a student has just moved to the same city in order to attend an Erasmus project.

In each of the three cases, there are people that belong to the same category called visitors. However, as it is easy to imagine, despite they belong to the same category, they will have different needs and expectations during their stay in the city. Why not create mobile applications or targeted projects to satisfy distinct segment of visitors? An idea could be to

create mobile applications able to recognize the characteristic of the users and as a consequence to supply targeted contents.

In the case that, the business model provides a value proposition that includes the offer of services to the business owners that have stake in the tourism market, these latter will be included among the customers.

## **Key activities**

None of the business models analyzed provided the elaboration of the data collected with the aim of utilizing them for commercial purposes. These activities of collection, elaboration and creation of value are necessary to create new and concrete opportunity of business through the application of Smart Tourism concept.

## **Channels**

The channels utilized belong mainly to the digital category. Almost all the initiatives include the use of mobile applications and as a consequence the channels used are the mobile application stores.

Advertisement on websites are a common method to invite the visitors to download the mobile applications, for example it is common that the public sector uses its own website to publish the developed apps.

It is also common to find, in the streets of the city or in museums, advertisements that encourage visitors to scan special QR-codes with their technology devices. These QR-codes allow visitors to a direct download of apps. In addition, the direct contact with visitors is needed when the business model includes new technologies. This because the visitors could be ignorant about the use of these new technologies and not use them properly.

## **Revenue stream**

A common feature observed, is the inability to generate revenue. In fact, the majority of the initiatives are focused on “visitors perspective”, there is a lack of “commercial perspective”.

There is a lack of capabilities to exploit all the potentiality that a big change like the Smart Tourism can bring. Without a commercial perspective, the initiatives become pure costs and the development of a Smart Tourism project risks to be heavily subsidized by taxpayers.

A crystallize behavior is that to cover the implementation and management costs with the selling of advertisement spaces to third parts and to gain money from visualizations on the mobile applications. This is for sure the easier way to make revenues with the Smart Tourism but thinking that this is the only source of revenue is a limit. This form of revenue makes the business model sustainable only when the advertisement activity is done on big scale, for example as in the case of New York with the 1268 digital kiosks spread all around The Big Apple.

This work has highlighted several times as the introduction of technology in the tourism sector allows the collection of big quantity of data. This byproduct is considered as a truly gold mine. Despite all premises did so far, no initiatives have included the elaboration of the collected data and the selling of aggregated data to stakeholders. If these data have a value, why aren't they transformed into revenues? Maybe because the collected data are still few or because who owns the data is not able to elaborate them in order to make them attractive to stakeholders or again because who owns the data does not have the tools to elaborate and to sell them.

Another form of revenue could be the creation of a Smart Tourism platform that can be adapted in different territories or cities. In doing so, it is necessary to create a business model that can be proposed, re-adapted and sold to other cities. This happened in the case of the project named LinkNYC. In fact, in the past years, the telecommunication company BT has re-adapted this project to the city of London. To implement this new initiative, BT has relied on the IT company who implemented the same project in New York. The BT installed the first digital kiosk in the district of Camden in the 2016. In addition, in 2017, the same platform was adopted by Philadelphia, the 6th largest city in the U.S.A

## **Partnerships**

Cities forge relationships with private partners that have a stake in the game in order to tackle the tough question of sustainability of the business model. Private-public partnerships are a good way to retool the funding mechanism. A key point is to find a win-win solution.

The main key partners are easily identifiable and it is possible to split them in categories. The categories are: IT companies, Telecommunication companies, Tour Operators, Financial service companies and the Universities.

The partnerships with the IT companies have emerged for their strategic importance. It is interesting to understand the reason why these companies were chosen as partners and not as simple resources to entrust some tasks of the project.

The solution of including the IT companies as partners can be considered as the best practice when the public sector does not own the necessary funds to deal with the initial costs. This because it is possible to implement new business models in which these IT companies bear the implementation costs in exchange for a share of future revenues. A point of strength of a partnership is that this relationship can bring to a strong commitment between the partners and often to better results. The weakness point is that these companies will take the intellectual property of the final result and they will sell it to other cities.

On the other hand, let's suppose that the public sector owns the financial resources needed to fund themselves. The same public sector could create a company and establish a partnership with local universities. In that case, this company could develop a platform taking advantages of the cutting edge know how of the universities and especially to maintain the total ownership of the final result. The public sector could maintain the full autonomy and the full control on the project. This is crucial in order to sell that project to other cities. In addition to paying back the costs of the project, the public sector could have the opportunity to make revenues.

What are other possible partnerships? It could be interesting to think of a new kind of partnership with telecommunication companies. Partnerships that go further to a simple accordance to providing internet connection. In fact, some telecommunication companies have developed services that use fully anonymous and aggregated mobile network data to measure and compare the number of people visiting an area at any time. These services create a 'heat map' or the digital equivalent of the people who stand in shop doorways and count the number of visitors entering the store on a clicker. This can help retailers count and understand footfall outside their stores, in other parts of the town center. It can help retailers tailor product promotions in existing stores and determine the best locations and formats for new stores. And it is not just retailers who could benefit from these services. These services could be a useful tool for local councils to make their cities more efficient. It will help them

see the increased number of people who visit the town center if they introduce tourist initiatives, for instance: free car parking, late night shopping or free public transport.

The city of Dubai, for instance, has started a business partnership with a local telecom operator named DU. The city is very interested in the data that DU has about the movement of people, which will help in urban planning. For example, the public sector wanted to know what's the area where tourists were circulating because they would like to open new shops around the city. The profit that comes out of the use of the data can be a revenue share between the operator and the city.



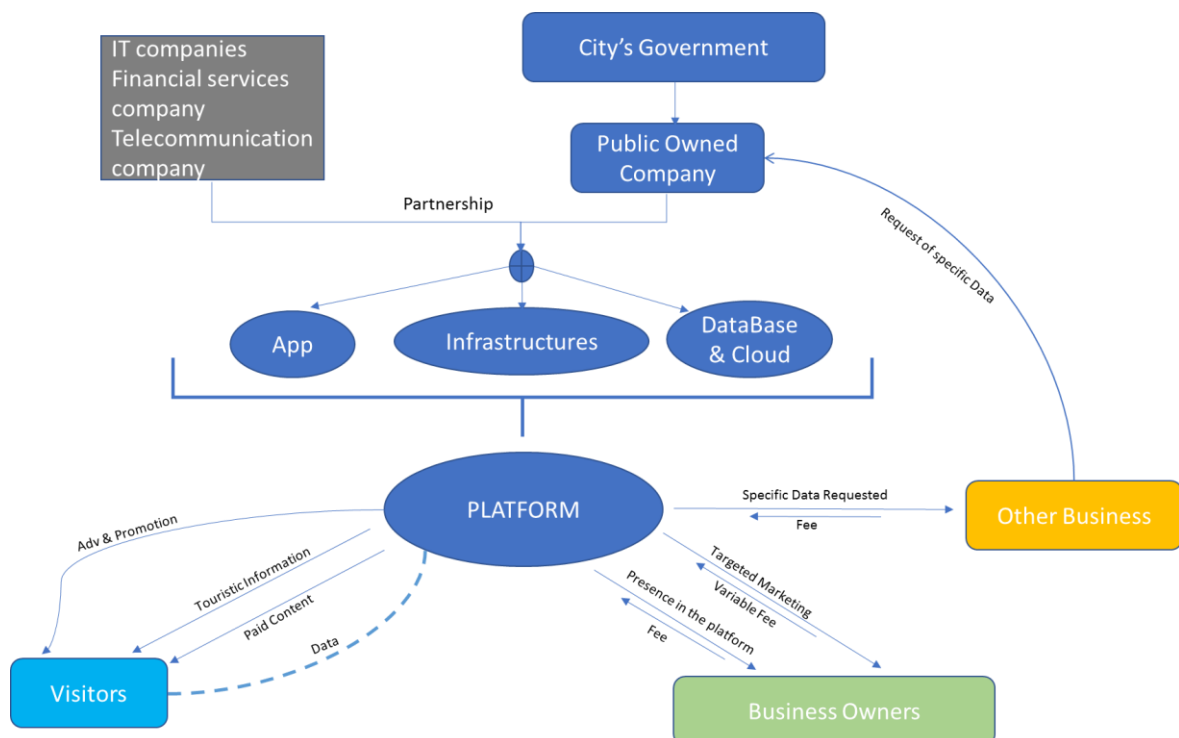
## 8 New Business Model

Taking inspiration from the initiatives of Smart Tourism illustrated during this work, the thesis proposes a new business model. More precisely, the work will attempt to include the key points illustrated in the previous chapter and also it will take into consideration the main points of strength and weakness seen in the chapter 6. In addition, the thesis will try to give an added value in order to create an innovative business model.

This business model is based on the presence of a platform. This platform can be considered as a multi-sided platform (MSP). On one side, there are the visitors and on the other side there are the stakeholders of tourism market.

Hagiu and Wright (2011) define a MSP as an organization that creates value primarily by enabling direct interactions between two (or more) distinct types of affiliated customers. Armstrong (2006) defines two-sided markets as markets involving "two groups of agents who interact via 'platforms,' where one group's benefit from joining a platform depends on the size of the other group that joins the platform."

In the figure below, the platform regarding this business model is represented. Moreover, in the following sections, each point will be clarified.



## **Who is responsible for the platform's management?**

The city's Government will manage the platform. Or better yet, this role should be covered by a public owned company appositely created. The creation of an owned public company calls to mind the case of Barcelona. In that case, Barcelona created the 22@Barcelona municipal company with the aim of managing the 22@district project.

To achieve this business model, the installation of specific technological infrastructures into the city will be necessary. For that reason, the presence of public sector is indispensable because the urban hard infrastructures will be modified.

This is not the only reason which has brought the thesis to identify the public sector as main actor to manage the platform. In fact, this business model is definitely data dependent. Considering the set of problems linked to the privacy and the safety of these data, the presence of a public entity as guarantor is needed. The public sector will define and regulate the use of data collected by the platform. Exactly as in the case of Dubai. In that case the city of Dubai created the Dubai Data Establishment, with the aim to manage and to categorize the big data.

## **Platform Elements**

The platform is composed of three main elements. First of all, there is a need of specific technological infrastructure that allow the collection and the tracking of visitors' data. Beacons and sensors networks could be the right solution to reach this aim. In addition, a network of digital kiosks into the city could give to visitors several services and Wi-Fi access. Moreover, these kiosks could collect data and they could function as new advertising terrain for the city.

It is also necessary to adopt a cloud computing service in order to memorize and to have access to the big amount of data. Cloud computing is also necessary to guarantee scalability of the service.

Last but not least, a mobile application characterized by high quality is needed. The app will be the tool that allows visitors to interact with the platform. Something very similar to the app developed in the case of London will be the optimal solution.

## **Partnerships**

Let's suppose that the public sector does not own the fund and the capabilities to develop alone all the elements of the platform. In that case, partnerships with IT companies are vital to develop the platform. The costs arising from the implementation will be high, for that reason the best solution could be similar to the partnership model adopted by the city of New York with a consortium of IT companies in the project named LinkNYC6.

It is also important that all visitors will have the opportunity to connect their technological devices to the internet in order to fully enjoy the mobile application, for that reason a partnership with a Telecommunication company will be necessary. Even in that case a revenue-sharing agreement could be the best solution. For example, the internet provider offers a basic level of service for free. If users need more bandwidth, they will have to upgrade to a higher level of service. Doing that, the city offers a good service to visitors and in the meanwhile it also allows the telecommunication operator to recoup some of the cost of the investment to be put in the infrastructure.

Another partnership could be with a financial services company. In fact, the app will allow the users to make online purchases such as tickets for museums or for the public transport. Then, a partnership could be very useful to manage and to guarantee safety during users' purchases. For example, the official mobile application of London has chosen Mastercard as partner.

## **First Side: Visitors**

The category of visitors includes each person who does not live permanently in the city but spend time in the city for different motivations. Some examples are: tourists, students living away from home and posted workers.

## **Second Side: Business Owners**

The business owners are those who have direct and indirect interests linked to the tourism market. Among those, there are: museums, restaurants, hotels, shops, banks, traditional

transport services (public transport, taxis), car and bike sharing services, tour operators, startups, etc.

## **Government Benefits**

The public sector can benefit from this business model in several ways. First of all, managing the platform, the public sector maintains the total control over the tourism sector. In fact, thanks to this business model, the government can collect and manage data that previously were impossible to collect. In fact, in this case, the data are collected by different actors and different sources.

These big data make the analysis of tourist flows in the city possible and to understand the tourists' behavior. For example, to understand what are the most loved and most visited parts of the city or which are the less visited. In the first case, the public sector can improve the logistic management of tourists. In the second case, the city's government can discover the reason why tourists don't visit some parts of the city and as a consequence to carry out strategies in order to requalify them.

The public sector will have the opportunity to influence the tourists' visit, it can incite them to follow determinate paths. For example, the mobile application could supply contents that can be enjoyed only following a determinate path.

The public sector has the opportunity to use the mobile application as a communication tool with the users during the management of emergency situations such as a terrorist attack or a natural catastrophe.

This business model is sustainable and the public sector can enjoy revenue. The first source of revenue came from the selling of advertising spaces and others source of revenue will come from both tourist and business owners. This topic will be treated later in chapter.

Moreover, adopting this business model, a smart city can switch to be recognized as a Smart Tourism Destination.

## **Visitors Benefits**

The visitors, downloading the official app, will have in a unique mobile application all the necessary information to enhance their permanence in the city. The mobile application will supply live information, for example some news about crowded streets or the waiting time to enter a museum.

The tourists, in addition to benefit from the digitalization of information, will have the opportunity to use a planning tool that will help them to organize their journey based on the time available.

Moreover, the mobile application supply special contents such as augmented reality and audio guides. The mobile application will be also utilized as digital wallet. For example, using the app, tourists can buy tickets for a museum. They can save them on the app and then they will show the digital tickets at the museum. In addition to avoid wasting of paper, this solution will avoid boring queues.

The app's users will benefit from special promotions offered by the stakeholders who participate to the platform. In addition, in order to incentive the download of the app, the tourists will get discounts on public museums' tickets.

## **Business Owners Benefits**

First of all, to be present on the platform is surely a good source of visibility for the business owners. This allows them to attract potential customers and also to increase the awareness of their brands.

Moreover, the business owners will have the opportunity to ask to the platform specific set of data. They can ask to the platform aggregated data regarding potential customers and understanding their attitude. This is an important service in order to understand the behavior of target segments of customers. In fact, analyzing these data, the business owners can introduce apposite selling strategies to reach their targeted customers.

In addition, the business owners can enjoy a service named instant targeted marketing. The platform tracks the position and the main actions of the users' app and it will send them targeted notifications and advertisements. In the next section this service will be examined extensively.

There could be some stakeholders which are not interested in appearing on the platform. Moreover, they could have interests in obtaining specific data from the platform. They will have the opportunity to request these data to the platform and the latter will verify if it is possible to share the data requested with them.

Why the stakeholders should share the data collected with the platform? Because getting into the platform, they can enjoy the network externalities. The more stakeholders will join the platform more data collected will be completed and they will assume value. In fact, for a single stakeholder will be difficult to collect enough data to realize selling strategies or to analyze its customers in a concrete way. In addition, it is likely that a stakeholder collects data that are not useful for itself but these data could be useful for other stakeholders and vice versa. For that reason, it is convenient to share data.

## **The instant targeted marketing**

The visitors are not all the same, they have different features and needs, for that reason it is possible to split the market in segments. There are several variables that can be used to segment this market. The main are: nation of origin, age and the travel reason. It is also important to highlight that each segment of consumers has a different propensity to consume.

Kotler and Armstrong (2009) define market segmentation as dividing a market into distinct groups of buyers who have distinct needs, characteristics, or behaviors and who might require separate products or marketing mixes. The segmentation allows an improving of the satisfaction degree of the demand creating new possible competitive advantages.

For that reason, it is important that the business owners have the opportunity to be advertised for the subcategory of visitors which closest match their offer of product or service.

Obviously, the segmentation will strongly depend on the territory or on the city where the business model is implemented. Moreover, as a first step, the organization that implements the platform will analyze the historical data available and it will decide the criteria for the segmentation. At this point, each business owner interested in this service will identify the more interesting segments. For each of those, they will periodically supply to the platform, the advertisements that they want to be sent through the app. The platform will be able to

show and send advertising messages based on the behavior observed, features and current position of the app's user.

The instant targeted marketing will be very useful for stakeholders who want to focus on more than one segment. They will have the opportunity to dedicate at each of them a focused strategy of selling. In other words, this service can allow the platform to create the right relationships with the right customers.

Let's suppose that, in addition to the usual inscription form, the first access to the app could be possible with a simple scan of the identification code contained in the plane or train ticket used by the visitors to reach the city. From the information contained in this code, the app will be able to collect data and this information will help the platform to associate the visitor to a specific segment.

For example, the visitors who reach a city with a low-cost flight, will be associated to a category regarding customers with a lower propensity to consume. These visitors, during their permanence in the city, will not receive advertise about luxury restaurants or other expensive services. On the contrary, they will receive and visualize advertising about fast food or other restaurants that most match with the propensity to consume of that segment of consumers.

There are several ways to obtain data from tourists without annoying them with a lot of questions. For example, the Dubai Government has implemented a project called "Emirates Smart Wallet". This initiative allows travelers to use their smart phones as a passport for immigration. "Emirates Smart Wallet" wanted to make it easier for the tourists at the airports and also to collect data of tourists that arrive in Dubai. In fact, thanks to this initiative, the city of Dubai can collect personal data of travelers including passport information.

Another example regarding the instant marketing service will follow. Let's suppose that, a group of tourists download the mobile application and then they visit a luxury shop and potentially make purchases there. The platform receives these information, for instance thanks to the beacons network or thanks to the NFC technology. As a consequence, the platform will send to them advertisement about luxury restaurants or five stars hotels where to spend the night.

## **Pricing: side Visitors**

The visitors will not pay anything to use the base version of the app. The base version includes all the information and the functionalities needed to improve the tourists' experience in the city.

In addition, the tourist can buy additional contents. An example is the purchase of audio guides. Utilizing the app, the tourists will have the possibility to buy audio guides that supply interesting information about points of interests. Once that the tourists buy a set of audio guides, they will go where the points of interest are located. At this point, they will use their smartphones or other tools to scan the QR-code present on the ground and to enjoy the audio guide.

Another functionality accessible through payment could be the augmented reality experience. The modality of distribution will be similar to that of the audio guides.

## **Pricing: side Business Owners**

Each business owners will periodically pay a fee to join the platform and as a consequence to enjoy the visibility caused from their presence on the mobile application. Each stakeholder pays a different fee, this fee could be calculated on several variables. For example: type of activity, size of the shops or average of visitors affluence etc. The idea is that the more data are collected from a stakeholder and the less the fee will be. How can stakeholders collect the data? For example, in each museum, shop and other business beacons could be installed to recognize the passage, the visit and the stay of tourists.

To enjoy of the instant targeted marketing service, the stakeholders will pay a variable fee. The more they want to appear through advertisements and the more they will pay. This is aimed to restrict the exaggerated sent mailing of notifications and advertisings that could be element of disturb for app's users.

## **Privacy**

In an initiative like this one, the privacy could be an element of weakness, if not well managed. A great customer experience of an app can only be created if there is trust. To



build trust between the user and the application provider is one of the most important conditions for an enhanced experience. In fact, the fear of privacy loss is one of the main obstacles for further development of this business model. Any use of public data must be balanced with careful consideration as to the nature of the protection of user privacy and potential cyber security risks. People don't know what happens to their data and that scares. On the other hand, when there is an added value, the customer is mostly willing to share some information in return of benefits. In this case, visitors will not be concerned about privacy issues because they will perceive the rewards of using the mobile application.

## Business Model Canvas

The representation of the business model utilizing the canvas methodology will follow. Its points of strength and weakness are also listed.

<b>Key Partners</b>	<b>Key Activities</b>	<b>Value Proposition</b>	<b>Customer Relationships</b>	<b>Customer Segments</b>
IT companies Financial services company Telecommunication company	Platform Management  Generate knowledge from data (collect data, elaborate data, create value from data)	The official city's App that improves the quality of tourist experiences. #visitors  Promote in an innovative way different kind of businesses. Sending notifications and promotions to targeted potential customer. #businessOwners  To supply specific set of data. #businessOwners	Self Service #visitors  Personal Assistance #businessOwners  <b>Channels</b>  Information point #visitors  Advertisement in key points of the city #visitors  App stores #visitors	Visitors (tourists, students living away from home and posted workers)  Business Owners
<b>Cost Structure</b>		<b>Revenue Streams</b>		
Development and management of the public company  Development of the mobile application  Cost of installation (beacon networks), equipment maintenance, and digital advertising operations  Revenue sharing		Subscription to the platform (fee) #businessOwners  Subscription to the instant targeted marketing service (variable fee) #businessOwners  Data monetization #businessOwners  Sale of audio guides and other contents to app's users #visitors		

### Strong points

- Business model allows to generate revenue
- Business model is self-funding
- Business model adaptable in different cities
- Business model allows to join different stakeholders in a unique platform

### Weak points

- Privacy of data
- Strong dependence on some key partners

- Difficulties in educating the business owner managers and their marketing teams about the potential and effective use of shared data

In addition, advantages of public sector and private sector due to the implementation of this business model are highlighted in the following table.

<i>Public sector</i>	<i>Private sector</i>
<ul style="list-style-type: none"> <li>• To increase the tourist experience</li> <li>• To increase the competitiveness of the city</li> <li>• To introduce the IoT in the city</li> <li>• To be recognized as Smart Tourism Destination</li> <li>• To share investments with other stakeholders</li> <li>• To obtain data needed to increase efficiency and safety of the city</li> <li>• To monetize the data by charging access fees for any third-party</li> <li>• To take advantage of the partners' know how</li> <li>• To create employment and to create new professions</li> </ul>	<ul style="list-style-type: none"> <li>• To take advantages on network externalities arising from the platform</li> <li>• To obtain structured and organized data</li> <li>• To understand the behavior of potential customers, to segment the market</li> <li>• To increase the awareness of their brand</li> </ul>

## 9 Conclusion

In this last chapter, the thesis will fix the keystones that emerged during the development of this work in order to draw a conclusion. As said previously, the Smart Tourism is a new topic that step by step is becoming more and more popular, this thanks mostly to the unstoppable wave of smart cities. Several academics of tourism have tried to give their support in order to clarify this new topic. Despite that, a lack of clear definitions is still evident. In particular, the existing academic literature gives a unique definition for Smart Tourism and Smart Tourism Destination. For that reason, the first chapters are focused on defining properly the principal elements of Smart Tourism. Moreover, two new and distinct definitions of Smart Tourism and Smart Tourism Destination were proposed.

Once clarified the Smart Tourism world, the thesis defined the state of art of this topic. Then, after an operation of gathering of case studies, a classification method for Smart Tourism initiatives was proposed. The thesis can affirm that Smart Tourism initiatives have quite often distinctive characteristics. A conclusion is that these characteristics are very dependent on the actors involved in the management activities. In particular, the thesis reached the conclusion that Smart Tourism initiatives can be splitted in two macro categories named: basic and complex. The initiatives defined basic are those regarding the digitalization of tourism information and that by now, they represent a first stage of Smart Tourism; these initiatives are well consolidated and there are not interesting elements to highlight. On the other hand, the initiatives considered complex, are those that have been able to introduce new technologies, to embrace more stakeholders and to increase the tourist experience in an innovative way. This kind of initiative, in most of the case, were born and managed by public-private partnership. These public-private alliances showed a situation of win-win for both the parties. It is very important to highlight that in presence of these partnerships, the key enabling technologies used, were at the cutting edge. In fact, the private sector is very interested in the penetration of new technologies on the market but is less interested in the data collected than the public sector. On the other hand, when the public sector decides to develop a Smart Tourism initiative alone, it often uses dated technologies but by the time well established.

Talking always about complex initiatives, the thesis discovered that there is not the presence of best practices in this field. However, some evidences lead the work thinking that it is only question of time. For example, the case of New York, in which the old phone boxes were replaced with digital totem, has spotted a good success and the same project will be implemented in different other cities. This is not surprising, in fact, this is the case that closest match the definition of Smart Tourism Destination given by this thesis. It was created by a public-private partnership, the introduction of new technologies in the city allowed to link different point of interests, it embraced more stakeholders in a sustainable business model. Only in the next years, we will know if this business model will be considered as a best practice and adopted by all the metropolis in the world.

The third step is focused on the analysis of business models of the initiatives already implemented. One important conclusion regards the lack of business perspectives. In the other words, at the moment, the Smart Tourism is focusing its efforts only on enhancing the tourist experience. The Smart Tourism is seen only as a tool able to attract the visitors in a city or to increase the tourists' experience. With this mentality, to build sustainable projects becomes difficult. The projects should be implemented in order to introduce and to take advantages of new business opportunities made possible by new technologies.

The future business linked to the Smart Tourism will be founded on the use of big data. For that reason, an engagement of more stakeholders is needed in order to obtain the data needed to create value. The more stakeholders are involved and the more value will be created. Obviously, the inertia of the business owners to share data will be a difficult obstacle to bypass. In order to solve this problem, it would be necessary to make the stakeholders aware that a sharing of data is not a threat but it can be an important element to improve their business. In fact, a stakeholder could collect data that are not interesting for him but the same data could be indispensable for others stakeholders and vice versa.

An important outcome emerged analyzing the business models. Several initiatives used new technologies to collect data but these latter were not utilized to create value. Doing that, the Smart Tourism is an end in itself, to collect data is not enough. Hypothesis to explain this behavior could be the lack of infrastructures, competencies or regulation. Moreover, what is sure is that the technology allows the collection of a big amount of data, what is missing today is the second step. The second step consists on the passage of data from who collect them to who is able to elaborate and interpret them in order to develop new business models.

Finally, starting from the previous analysis, it has been possible to define a recipe for Smart Tourism initiatives. This recipe was created with the aim of fixing the key points for a business models linked to Smart Tourism. This recipe highlights the key points that can transform a Smart Tourism initiative in a successful Smart Tourism initiative. Following this recipe and considering the entire work, an innovative business model was proposed. This could be implemented to transform a city from a smart city to a Smart Tourism Destination.

## **Further developments**

The Smart Tourism is a field that have a promising future but unforeseeable in some ways. A future strictly linked to the innovation technology. In fact, each new technology could revolutionize everything that has been done up a certain moment. Very important will be to introduce new technologies into the previous business models or even to start from zero to develop a new one. It will be also crucial to be able to take advantages of these new technologies in order to make the project sustainable without to lose the focus on the main goal of this field, that is to enhance the tourist experience.

However, the thesis reserves the right to make a prediction for the future. Considering this work, it is possible to forecast strict collaboration between the public and private sector. The role of private sector will be to develop Smart Tourism platforms. These platforms will be characterized by innovative technologies and they will be proposed to cities. The public sector will choose the platform to use thinking to the features of the city and the business models implementable. A strict partnership will be needed because each city is different and the platform will need a customatization. The role of public sector will be to engage the stakeholders of the Smart Tourism in order to use the platform both to enanche the tourism and to create value.

# References

- Amelie Nabben, Elena Wetzel, Elisa Oldani, Julia Huyeng, Michelle van de Boeln and Zada Fan. “Smart Technologies in Tourism: Case study on the influence of iBeacons on customer experience during the 2015 SAIL Amsterdam event”. Research paper prepared for the International Tourism Student Conference 2016.
- Andréa Cacho Luiz Mendes-Filho Daniela Estaregue Brunna Moura Nélío Cacho Frederico Lopes Cristiano Alves. "Mobile tourist guide supporting a smart city initiative: a Brazilian case study". *International Journal of Tourism Cities*, Vol. 2, 2016 (pp. 164 – 183). Emerald Insight.
- Capdevila, I. and Zarlenga M.I. “Smart City or smart citizens? The Barcelona case”. *Journal Of Strategy And Management* 8(3), 2015 (pp: 266-282).
- Dimitrios Buhalis and Aditya Amaranggana. “Smart Tourism Destinations Enhancing Tourism Experience Through Personalisation of Services”. *Information and Communication Technologies in Tourism*, 2015 (pp: 377-389). Springer International Publishing.
- Dimitrios Buhalis and Aditya Amaranggana. “Smart Tourism Destinations”. *Information and Communication Technologies in Tourism*, 2014 (pp: 553-564). Springer International Publishing.
- Dimitrios Buhalis and Kim Boes. “Conceptualising Smart Tourism Destination Dimensions”. *Information and Communication Technologies in Tourism*, 2015 (pp: 391-403). Springer International Publishing.
- Gianpaolo D'Amico, Simone Ercoli, and Alberto Del Bimbo. “A framework for Itinerary Personalization in Cultural Tourism of Smart Cities”, 2013. *AI\* HCI@ AI\* IA*.
- Perboli G., De Marco A., Perfetti F., Marone M. .A New Taxonomy of Smart City Projects. *Transportation Research Procedia*, vol. 3, 2014 (pp. 470-478). Elsevier.

- Haiyan Song and Han Liu. “Predicting Tourist Demand Using Big Data”. Analytics in Smart Tourism Design, Tourism on the Verge, 2017 (pp: 13-29). Springer International Publishing.
- Hamideh Afsarmanesh and Luis M. Camarinha-Matos. “Future Smart-Organizations: A Virtual Tourism Enterprise”. Proceedings of the First International Conference on Web Information Systems Engineering, Hong Kong, vol 1, 2000 (pag: 456 – 461). IEEE Explore.
- ITU’s Telecommunication Standardization Sector (ITU-T). “Smart Cities – Seoul: a case study”, 2013. ITU-T Technology Watch Report.
- Javier de Esteban Curiel, María Luisa Delgado Jalón, Beatriz Rodríguez Herráez and Arta Antonovica. “Smart Tourism Destination In Madrid”. Sustainable Smart Cities, Innovation, Technology and Knowledge Management, 2017 (pp: 101-114). Springer International Publishing.
- Karandeep Kaur, Rajdeep Kaur. “Internet of Things to promote Tourism: An insight into Smart Tourism”. International Journal of Recent Trends in Engineering & Research, 2016 (pp: 367-361). IJRTER.
- M. Sajid Khan, MinaWoo, Kichan Nam and Prakash K. Chathoth. “Smart City and Smart Tourism: A Case of Dubai”. Sustainability, 2017. MDPI.
- Oliva, A. “The 22@bcn Activities District. Barcelona Model”. Management Booklets, 15, 2004.
- Richard Smith. “Smart Tourism Tools. Linking Technology with the Touristic Resources of City Destinations”, 2015.
- Roland Atembe. “The Use of Smart Technology in Tourism: Evidence From Wearable Devices”. Journal of Tourism and Hospitality Management, Vol. 3, 2015 (pag:224-234). David Publishing.
- Steve Hamilton and Ximon Zhu. “Funding and financing smart cities”. Deloitte Center for Government Insights, 2017.
- Ulrike Gretzel, Marianna Sigala, Zheng Xiang and Chulmo Koo. “Smart Tourism: Foundations and Developments”. Electron Markets, 2015 (pp: 179–188). Springer International Publishing.



- World Tourism Organization. “UNWTO World Tourism Barometer (English version)”, January 2018.
- Ignasi Capdevila and Matias Zarlenga. “Smart (3), City or smart citizens? The Barcelona case”. Journal of Strategy and Management8, 2015 (pp: 266-282).
- Nikolay Teslya, Andrew Ponomarev. “Smart Tourism Destination Support Scenario Based on Human-Computer Cloud”. Proceeding of the 19<sup>th</sup> conference of fruct association (pp: 242-247).