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**Smart City Concept Business Model: A Case Study of Peniche City**

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Master in Hospitality and Tourism Management

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ISCTE Business School

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**ABSTARCT**

The current literatures are underlining a gap concerning a business model for smart city. With the development of new technology and of the structure of the city is important for businesses to re-define their business model in order to be competitive in the market and to keep up with the evolution. The main objective of this research is to analyze if the true concept of smart turism is well known, to revise the conception of smart city and its level of maturity in the literature and collect directions for a business model proposal for smart cities using Peniche City as a case. In order to accomplish these objectives, information from the literature review are taking in consideration and an in-depth interview was conducted with 16 participants related to Peniche as tourists or entrepreneurs. The interview's goal aims to gather ideas for the nine blocks of the Business Model Canvas in order to propose a model for the city of Peniche. Overall, the results showed that the topic is not well known from the participants and that the model obtain with their information can be a starting point for further study to implement the business model for smart city in Peniche.

## RESUMO

As literaturas atuais destacam uma lacuna em relação a um *Business Model* para *Smart City*. Com o desenvolvimento de novas tecnologias e da estrutura da cidade é importante que as empresas redefinam o seu *Business Model* para serem competitivas no mercado e acompanhar a evolução. O principal objetivo desta dissertação é analisar se o verdadeiro conceito de *Smart Tourism* é bem conhecido, rever o significado de *Smart City* e o nível de maturidade na literatura e recolher direções para uma proposta de *Business Model* para *Smart City* utilizando a cidade de Peniche como caso. Para atingir estes objetivos, foram tidas em consideração informações provenientes da revisão da literatura e foi realizada uma entrevista em profundidade a 16 participantes relacionados com Peniche como turistas ou empresários. O objetivo da entrevista visa reunir ideias para os nove blocos do *Business Model Canvas* de forma a propor um modelo para a cidade de Peniche. Globalmente, os resultados mostraram que o tema é pouco conhecido pelos participantes e que o modelo obtido com a sua informação pode ser um ponto de partida para um estudo mais aprofundado para implementar o *Business Model Canvas* para *Smart City* em Peniche.

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**List of Acronyms**

| BM | Business Model |
| --- | --- |
| BMC | Business Model Canvas |
| SC-BMC | Smart City – Business Model Canvas |
| ICT | Information & Communication Technology |
| IoT | Internet of Things |

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## 1. Introduction

Smart city is the future for cities with their innovative models while improving the quality life of residents, offering enhanced experiences to tourists and making more appealing the metropolitan area. Thus, contemporary literatures are underling the gap in the development of a clear smart city investment and the design of a business model canvas that is adapting the purpose of the business (Giourka et al., 2019).

The concept of tourism has been continuously changing and evolving in the last decades and the wide diffusion of information and communication technologies had an incredible impact in the sector involving also the city and its infrastructures (Koo et al., 2016). ICTs is enhancing a more personalized experience, empowering the tourist co-creation and reaching a higher social engagement. Smart tourism is becoming more and more present in the tourism industry with a customer-centric perspective, but still there is not a clear explanation of the concept and its evolution. It is not sufficient to define that something is smart just because of the presence of ICTs (Gretzel et al., 2015b).

More than 50% of the world's population is living now in urban areas where cities are growing and continues to grow. However, the most current smart cities initiatives are relying too heavily on technology and ICT without focusing on in designing and constructing them (Govada et al., 2016). There are lots of initiative worldwide to build a great smart tourism ecosystem, but the complexity of the sector is making it very difficult. Thus, in this case the company should create a business model to understand, describe and predict the action of buying and selling goods and services in exchange of money. More specifically, this model would be helpful for smart cities development (Giourka et al., 2019).

Therefore, the current literatures are putting emphasis on the lack of a business model for smart city, any long term strategy and very few initiatives on the phenomenon. Especially in Portugal the concept of smart city is barely developed and its evolution has not been equally evolved. In addition, the previous researches are mentioning also a discrepancy in the development between cities with financial support and the one without, usually smaller cities.

The aim of this research is first of all to revise the concept of smart city and its level of maturity in the literature. Secondly to analyze if the true concept of smart tourism is well known and in particular, to collect directions for a business model proposal for smart city using Peniche city as a case. The main research question this study is exploring is *What is the proposal of a business model for a smart city?*

In this research the first section is composed of the literature review with a detail explanation of the phenomenon of smart tourism and of the influence of ICTs. Subsequently, it is described the concept of smart city and smart experiences as a starting point for the creation of a business model for this specific sector. The second section is dedicated to the methodology where the key and sub key research question are analyzed and compared to the literature review. Then the research technique is described, the data collection and the population sample. The fourth part of the research is for the data analysis with the sample characterization and the content analysis and its comments. Afterwards the discussing and the findings are shared to finish with the conclusions and the limitation for this study.

## 2. Literature Review

### 2.1. Smart Tourism

The word 'smart' is describing specific technological features that are connectivity and intelligence and can be linked to the use of information and communication technology (ICT). The concept has expanded itself in many areas and it has made his way into tourism (Koo et al., 2016).

Gretzel et al. (2015b) describe smart tourism as the new buzzword that is increasing the reliance of tourism destination on the ICT (Information & Communication Technology) that allow the big data and the exchange of information to be transformed in value proposition, promising efficiency and sustainability (Gretzel & Scarpino-Johns, 2018). With the development of technological, economic and social aspect everything becomes smart. However, it is not the individual technological advance that constitute the smartness, but rather the interconnection of different technologies. Smart tourism is one of the element of the new technology that will shape the future landscape (Ye et al., 2020).

As it is underlined by Koo et al. (2016), smart tourism is providing unique and personalized experiences from real-time data with the combination of ICT and the existing environment allowing each visitor to get heterogeneous experiences in the same place. The collection of data is helping the business to innovate (Gretzel et al., 2015b) and to have an estimation of tourism demand (Ye et al., 2020). The tourists also have a more active role being part of the co-creation of the experience, interacting with the technology and the ecosystem. The success of smart tourism is based mainly on the end-users' satisfaction and it is achieving with the fulfillment and meeting expectations (Ye et al., 2020).

Nowadays, there is a big rise in the number of articles regarding smart tourism. Since 2015 there were 30 articles published in 2017, 26 in 2019 and in 2020 just until the end of February already 18 articles (Ye et al., 2020). In addition, there is also an increasing popularity in Google Scholar with 2,470 results for the keyword "smart tourism" and a worldwide increase of searches in Google Trends. Slowly is taking an important place in the minds of the destination managers, tourism providers, IT developers, statisticians and researchers around the globe (Gretzel, 2018).

Gretzel et al. (2015b) has divided smart tourism in three different layers. First of all, the smart tourism destination. Innovative tourism destination that increases the quality of destination's experience and improves residents' quality life. Then the smart experience that is the engagement with personalization, content-awareness and real-time monitoring. And the third component smart

business that it is referring to the complex business ecosystem that is supporting the exchange of touristic resources and the co-creation of tourism experience.

In the Western countries it is rare that smart tourism is seen as a strategy for the tourism development and it is hard for hospitality firms to apply smart technologies in their strategies (Li et al., 2017). However, nowadays firms are becoming more and more interested in narrowing the gap between smart technologies and the fundamental theories of smart tourism (Ye et al., 2020).

On the other hand, the Chinese government sees smart tourism as the core of its tourism development. Smart tourism is showing itself in many forms and the key is to connect all the sensors application, the techniques and the social technology applications in the tourism Internet of Things. However, the Chinese consideration of smart tourism is emphasizing more the technological aspect rather than the tourism and experience one (Li et al., 2017).

Smart tourism will have a remarkable development in the next decades and is certainly a huge step in this new level of artificial intelligence (Gretzel et al, 2015a), also if the key elements involved in its development are still to be well defined because it seems that suddenly everything is smart (Li et al., 2017). It is a hot topic gaining more and more attention day by day. The only existing models that were analyzing smart tourism and tourists' behavior until now were the theory of Planned Behavior, the Technology Readiness and Acceptance Model and the Technology Acceptance Model. This is underlining that there is still not a definition of smart tourism that is granted (Ye et al., 2020).

The tasks for the company already argued by Stamboulis and Skavannis (2003) are to improve the innovation process in order to create new experiences, because as underlined by Gretzel et al., (2015a) the shared purpose of all actors in a smart tourism ecosystem is to enhance and enrich the tourism experience with intangible memories. Therefore, it is not the technological development itself the main point, but the integration of it into the experience (Neuhofer et al., 2013).

Therefore, as underlined by Gretzel and Koo (2021), smart tourism is a phenomenon grounded in technology, more precisely in smart technology: ubiquitous Wi-Fi, smart phones, data mining algorithms and sophisticated data warehouses. They provide a real-time awareness of the real world, because of the interconnection, synchronization of the different technologies. In addition, with the use of cutting-edge technologies smart tourism business have fully access to an abundance of free data and unlimited platform that are transformed in value proposition and more precisely value in use because the value creation is created by data, technology and infrastructure (Gretzel et al., 2015b).

Consequently, smart tourism is a promising progress that will lead to a safer, excited space for both the residents and tourists. More personalized services that guarantee a tourism experiences and

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great new opportunities for new services, business models and markets (Gretzel et al., 2015b). As the technological infrastructure is fundamental for the smart tourism development also the physical environment, the interaction with tourists and the discover of what they would like to foster with the experiences has its importance (Gretzel & Scarpino-Johns, 2018).

## 2.2. Smart Technology: ICTs & IoT

According to Boe et al. (2016), there are two key components to smart tourism. The first is the inclusion of leadership, innovation and social capital supported by human capital and the second one is including ICTs and technology.

The conception of tourism along the years has changed and the principal element for this innovation is the exploitation of information and communication technologies. Tourists have easier access to large amounts of information: developments of customer data-bases and matching information for the delivery of personalized services. Already in 2003 Stamboulis and Skayannis were seeing ICTs as a very promising tool for the creation of customer-focused content. Also Gretzel & Scarpino-Johns (2018) are underlining how the technology integration in tourism is accelerating the speed of the availability of data and of course how these data are transformed into knowledge.

ICTs include hardware, software, groupware, net ware and human ware. It is enabling to manage the information as well as it has changed how the individuals are communicating with each other. (Neuhofer et al., 2013). The prevalence of IoT, local-based services and mobile applications are offering immense opportunities for restoring big data for tourist's experience enchantment, personalized interaction, destination competitiveness and sustainability improvement (Ye et al. 2020) and are the bridge between the physical and the digital (Gretzel & Scarpino-Johns, 2018). IoT has a fundamental role on tourism development, because travelling means moving through time and space and this new smart environment will be able to meet travelers' needs in a pervasive way (Gretzel et al., 2015b). Thus, as underlined by Koo et al. (2016) the integration of web infrastructure with physical infrastructure is a main characteristic for smart tourism.

Technologies are elevating tourist experiences, but at the same time is fundamental to blur some boundaries between technology and touristic experience to not have a disrupt reality and disappointment (Stankov & Gretzel 2020). As argued by Greztel et al. (2015b) smart destinations, smart business ecosystem and smart experiences are the basic components of the data creation. There are lots of initiative worldwide to build a great smart tourism ecosystem, but the complexity of the sector is making it very difficult.

It is important anyway to keep in mind that ICT does not necessary define "smart". It is just one of the most important components and the successful implementation of the smart tourism concept. Is it therefore not surprising that the early conceptualization of smart tourism has seen ICTs as the key of the development of smart tourism. (Gretzel et al., 2015b).

As also claimed by Baggio et al. (2020), the technology alone is not the only reason for a destination to be considered smart. Making a destination more dependent to technology seems counterproductive, but at the same time focusing solely on technology would also have its own limits (Gretzel & Scarpino-Johns, 2018).

Hence, it is crucial to deliver attention also to the physical components in order to achieve innovation, co-creation and knowledge sharing. To this end, the ICT approach should not be just based on complex technological platforms, but rather on tailoring them into the local needs (Buhalis & Amaranggana, 2014). Smart tourism therefore is a bridge that connects the digital with the physical to create meaningful experiences for tourists (Gretzel et al., 2015a).


## 2.3. Smart city

Smart tourism is directly related to the smart city concept with smart destinations representing special case of smart cities and improving the quality of life of residents and offering enhanced experiences to tourists (Buhalis & Amaranggana, 2014). Regarding Khan et al. (2017), the term "smart city" is to indicate the orientation of the city using a model based on innovative systems like an efficient information technology and good engagement of data generated though the interfaces.

The essential pillars of smart cities as identified by Boyd Cohen in his Smart city Wheel (2012) are: Smart City, Smart Economy, Smart Environment, Smart Governance, Smart Living and Smart Mobility and how important it is the combinations of the six elements for the success of Smart Cities with everything connected to the various sectors (Govada et al., 2016). Sustainability is the center of the growth and it should be prioritized as strategic in the tourism planning process. Therefore, what is basically making the difference also in this case is the ICT that keeps improving the tourist experiences and the well-being of tourist and those around them (Gretzel & Stankov, 2021).

Making a city smart is not always involving the fact of creating new infrastructure, but to enhance the technology already installed in support of the smart city. The success of its depends also on the active role of citizens regarding the incentive of the behavior change and the adoption of the new technology. Citizens and residents are the focal point for the design of the smart city solution (Giourka

et al., 2019). Efficient smart cities are able to maintain the spontaneity of urban life, the unexpected serendipity and the social opportunities. This is achieved by the focus of smart cities in the experiences (Gretzel & Koo, 2021).

Electronic payments, utility e-billing, public Wi-Fi hotspots, interactive maps, transit apps, smart parking apps, interactive government services and online shopping are already commonplace in smart cities. According to Gretzel et al. (2016) Google Maps, mobility-enabled technologies (such as Uber, electric scooter applications, and smart bike-sharing) and sharing economy platforms (such as Airbnb or co-working apps) all play crucial roles in improving accessibility to cities.

One of the challenges cities are confronted to is to provide high-quality services with the process of big data through the network of Internet of Things and ICT (Habeeb & Weli, 2020) and one of the example more recent is the city of Dubai that with the Dubai's Smart city initiative has built the city of the future (Khan et al., 2017). In addition, cities are facing the challenge of facilitating the increase of economic opportunity while improving the quality of life. Costs and benefits are emerging with uncertainties therefore city leaders must develop a clear smart city investment and creatively design a business model canvas that is adapting the purpose of the business. But also to implement smart solution to become more resilient in the economic, environment and social aspect (Giourka et al., 2019).

In Europe, smart tourism initiative is getting very popular and one of the main example is European Capital of Smart Tourism, an initiative to reward innovative and smart tourism practices in European cities. The aim of the project is to promote smart tourism in EU and to promote innovation to strengthen smart destinations in Europe, to enhance and offer unique visitor experiences (An EU Initiative to Reward Innovative and Smart Tourism in European Cities!, n.d.).

Examples of Smart City in Europe underlined by Gretzel and Koo (2021) is in London with the "integrated API" that provides information. API is offering a variety of data on traffic, air quality, public bicycle rental locations, and Wi-Fi access points, giving visitors the knowledge they need to improve their visit while also assisting locals in managing daily life. Another example is Tokyo that has created an app that translates announcements made in Japanese at tourist destinations and other institutions into six other languages. Or Berlin where at Potsdam Square, a sizable QR code is shown. By scanning the QR code, visitors to the square can view earlier pictures of Potsdam Square. At more than 50 spots throughout the city, Berlin provides tour services that use QR codes to connect actual locations with virtual material.

Smart cities are allowing citizens to raise their living standard, their quality life and making the metropolitan area more appealing. This is an example of how the adaptation of smart technology is allowing cities to achieve their goals and increasing not only tourists' but also residents' happiness and satisfaction (Boes et al., 2016). On one side smart tourism is encouraging residents to search for unusual in their home cities and on the other is pushing tourists for authentic experiences living like local (Gretzel & Koo, 2021). Concerning Gretzel (2020, p. 394) it is because of smartification that it is blurs the distinction between visitors and locals. A city defined by hyper-connectivity of infrastructure, hyper-mobility of individuals and hyper-personalization of tourist value propositions is when cities are characterized by smartification.

What Baggio et al. (2020) discovered is that physical and digital are two components that in the smart tourism coupled and co-evolve as a single entity. The digital component itself is not a sufficient reason to render a destination smart and the digital injection can support this transformation only when the physical component of the tourism destination is also evolved. In other words, an injecting technologies without assuring an effective networking will automatically create over expectations and dissatisfaction. The reinforcement of physical and digital components would help to achieve a higher degree of destination efficiency and competitiveness.

In conclusion, the innovation process of smart city is requiring strategies, ecosystem, reformulation of the urban structure and a call for a new business model. For its development the focus should be on the people while improving their quality life, on the provision of economic competiveness and environmental and social consciousness focusing on sustainability (Giourka et al., 2019). After that the city may establish a reputation for being cutting edge and forward-thinking. But also responsible to the implement the infrastructure, the resource and the spaces shared during the daily life and touristic one (Gretzel & Koo, 2021).

## 2.4. Business Model

The appearance of the term business model is relatively young and the first time it appeared was in 1960 in the title of a paper in the Accounting Review. However, the term was mainly used in relationship with e-commerce, start-up and high tech companies and people never really had a clear idea of what it means. The term starts to became significant with the development of World Wide Web in the mid-1990s and along the years the term was attributed with different definition and this was leading to a confusion in the technology (Osterwalder, 2004). During this period firms were using

the business model, but they were operating following the same logic of delivery and revenue (Massa & Tucci, 2013).

Despite the general surge on the literature for business model, it was still hard for researchers to agree on what business model is. It was often studied without an explicit definition of the concept and the models were generally adopting a holistic perspective without focusing on the function of the business model and on what the businesses do produce and its services do (Zott et al., 2011).

Both business and model have a specific meaning. Based on WordNet 2.0 the combination of the two words mean: 'a simplify description and representation of a complex entity and process' (Osterwalder et al., 2005). Concerning Osterwalder (2004) a business model shall help to understand, describe and predict the action of buying and selling goods, services and the outcome of those actions. Its process should go from design to implementation and it can function as a link between strategy, business and ICT.

Zott et al. (2011) showed that at the beginning the business model has been addressed different research questions in different areas and contexts and that started to receive attention regarding the explanation of firms' value creation, performance and competitive advantage. The term business model is not one, but many concepts and in order to not create confusion it is require a more precise terminology.

Nowadays, Massa et al. (2017) are arguing that a business model is an explanation of an enterprise and of how it works in order to achieve its goals. Over the last two decades, the business model has become an increasingly concept in different fields like technology, innovation management and environmental sustainability. In addition, business models are important for competitiveness, constitute a strategic priority for business managers and have a profound impact in the society.

In conclusion, the role of the business model is to represent and comprehend the business logic while being functional, operationally meaningful, logical, measurable and reasonably simple. And it is helping to capture, visualize, communicate and share a specific business model (Osterwalder et al., 2005). As Massa et al. (2017) affirm there are several business model with different possibility to represent it and this research is focusing especially in the canvas one.

### 2.5. Business Model Canvas

Any enterprise has to deal with the unknown and uncertainties. In order to survive they have to find new input to innovate. One of the way to innovate is to conduct a business model innovation and the

Business Model Canvas is important to define it before starting any new innovation (Qastharin A. R., 2015).

Osterwalder and Pigneur (2010) differentiate themselves from others as they provide not only a business model definition and components, but also the business model visualization and a way the company does business in order to reduce complexity. Business Model Canvas is allowing the business model to be simple, relevant and intuitive and at the same time is not simplifying the complexity of how enterprises is working (Qastharin A. R., 2015). Moreover, it is presenting a very clear description of the elements comprising a business model (Díaz-Díaz et al., 2017).

There are nine building blocks of the Business Model Canvas (BMC): The three blocks on the canvas' left side (key resources, key activities, and key partnerships) that are related to internal procedures and efficiency. Customers and values are represented by the three blocks on the right side of the canvas: customer segments, channel and customer relationship. The value proposition is in the center of the BMC and the cost and revenue structures are shown at the bottom (Ojasalo & Ojasalo, 2018).

1. Customer Segments: The different groups of people that a business hopes to reach and serve.
2. Value Proposition: Goods and services that are adding value for a certain customer segment. It can be quantitative or qualitative.
3. Channels: How a business interacts with and reaches out to its customer segment in order to create a value proposition. They can be owned or partner channel.
4. Customer Relationship: The kinds of connections a business makes with particular Customer Segments.
5. Revenue Streams: The money that a business makes from each customer segment.
6. Key Resources: The most crucial resources needed to implement the business model. An organization can use these resources to develop and present a Value Proposition, access markets, keep in touch with customer segments, and generate income. Important resources may be material, monetary, intellectual, or personal. They may be purchased from important partners or owned or leased by the company.
7. Key Activities: the most crucial actions a business must do to ensure that the business model is working. These are the steps necessary to develop and provide a Value Proposition, reach markets, uphold customer relationships and generate profits.
8. Key Partners: the network of partners and suppliers who support the business strategy.
9. Cost Structure: the total expenses incurred to run a business model.

Concerning (Osterwalder & Pigneur, 2010) the concept of the business model must be simple, relevant and intuitive while not oversimplifying the functions of the business. At the same time is not a guarantee for the success because the model has to be implemented and managed. The business model canvas is linked with design, strategy and innovation that are helping the business domain to increase the potential and take advantage from opportunities as they arise (Carter & Carter, 2020b) and its focus has shifted from giving definition of what the business model is to how it is assisting organization in implementing and innovating their business (Massa & Tucci, 2013).

## 2.6. Business Model for Smart City

It is actually very difficult to find a tourism destination that it is completely considered smart. Most of the previous studies are suggesting implicitly that the use of technology alone make a destination smart, but injecting technology it is not a sufficient condition (Baggio et al., 2020). This is also argued by Morrison and Andres Coca-Stefaniak (2020) underlining that seems that smart tourism is only related to technology and that the only driver of innovation goals is coming from IT. However, it should be also related to tourism industry development and governance, to management mindset and to a strategic orientation of the destination (Greztel et al., 2015a).

Concerning Gretzel et al. (2015b) the tourism sector has to redefine the business model in order to propose customer value that meet the needs of the travelers. The smart environment is affecting all nine elements of the business model from the customer segmentation to the cost structure and the smart tourism business model is still to be determinate.

Also Schmidt-Rauch and Schwabe (2013) are arguing that firms have to re-define their business model in order to be competitive and take advantage of opportunities, challenges and affordances of smart tourism. In addition, they have also to collaborate with stakeholder that are beyond their organization in order to have an exchange of resources to reach the value co-creation. According to Gretzel et al. (2015c), in a smart tourism ecosystem any stakeholder can become producer, consumer and intermediary, there are no defined roles. Therefore, if the stakeholder can adopt different roles also smart cities has to raise new business models (Díaz-Díaz et al., 2017).

As underlined by Giourka et al. (2019) there is a lack of business mode for smart city to determine a clear path for their evolution. Especially in the case of smart city the solution for its development has different conditions depending on the context. Firms must adapt their business model referring to local circumstances and cities and addressing their needs to the specific end users. The Smart City

Business Model Canvas aims to co-create, capture and deliver the value of smart city services that are socially inclusive, environmentally sustainable and economically feasible.

Unfortunately, concerning Gretel & Koo (2021) tourism is rarely regarded as a key component in smart city development plans, although being occasionally cited as one of many services that could be improved utilizing smart city concepts. Smart city projects are frequently lacking from tourism development plans and have also been disregarded by tourism professionals.

Giourka et al. (2019) are affirming that the BMC is allowing the business to innovate by using the nine blocks to uncover new opportunities and turn the customers' need in a profitable resource. And in particular SC-BMC is supporting a creative development of a sustainable city with an innovated business model based on a network-centric value proposition that is including all the actors in the ecosystem as value co-creators (Table 1).

Consequently, businesses in order to manage their smart tourism ecosystem dynamically and facilitate 'plugging and playing' stakeholders have to adopt a business model. A functioning ecosystem is an important prerequisite to enable customer experience. There is a lot of work in order to understand how firms can manage these ecosystems in a dynamic way with mixing, matching and exchanging resources while taking in consideration the consumption situation (Gretzel et al., 2015b). Plus, business models have been developed in different markets and depending on the context the same solutions that for one city does not specifically implies that produce the same result in other cities (Giourka et al., 2019).

Therefore, the evolution of smart city and their implementation have not been seen uniformly across the countries. Specifically focusing in the case of Portugal the search of "Smart City" and "Portugal" returned only 84 results. The literature just gives information about specific projects in specific cities, but the smaller cities are mostly not taken in consideration. The research conducted by Correia et al. (2021) is showing that in Portugal there is a huge heterogeneity of smart cities, a lack of funding and knowledge regarding it and any kind of strategy for its improvement.

**Table 1 –** General business model canvas for smart city.

| Key Partners | Key Activities | Value Proposition | Customer Relationship | Customer Segments |
|---|---|---|---|---|
| -Solution providers for public transportation<br><br>-Providers for internet connection | -Transportation<br>-Connection | -Price/cost reduction<br>-Accessibility<br>-Novelty Convenience/ Usability | -Facilitating the co-creation<br>-End users evaluate or participate in the value co-creation | -Community<br>-Business<br>-Nonprofits |
| | **Key Resources**<br><br>-Physical assets: buildings, public transports, energy grid<br>-Financial access to capitals | | **Channels**<br><br>-Advertisement<br>-Smart city applications | |
| **Cost Structure**<br><br>-Salaries<br>-Process of IoT sensors installation<br>-Technology installation | | | **Revenue Streams**<br><br>-Social value creation<br>-Usage fees | |

Source: https://doi.org/10.3390/en12244798

# 3. Methodology

In this chapter is presented the methodology of the research starting from analyzing the key and sub key research questions and compering them with the research objectives and the literature review. Subsequently, the research technique is explained and showed the gap coming from pre-existing literatures. The other subchapters are describing the collection of data and at the population sample.

## 3.1. Key and sub key research questions VS literature review

What this research is aiming to is to discover what is the proposal of a business model for a smart city. In particular, to know how can a business model be defined for smart city in terms of product's value proposition, infrastructure, customers and finances. As sub research question part of the investigation is to find out if the concept of smart city is normalized and fixed in the literature and if the information is enough to complete a business model. In addition, another important point is to understand what smart tourism means for people and what services are they looking for in a city and how the life of citizens and tourists can be improved in Peniche with smart tourism.

What the previous literatures are underlining is a gap in the business model of smart cities to determine a clear path for their specific characterization (Gretzel et al., 2015b) in order to be competitive and take advantage of opportunities, challenges and affordances of smart tourism (Shmidt-Rauch and Schwabe, 2013). And as the main aim of this research is to discover a model for them the BM Canvas was chosen because of its strong academic foundation, ease regarding practical application and presentation of complex components and broad recognition (Giourka et al., 2019). The decision to take in consideration the city of Peniche comes from a lack of knowledge of the topic in Portugal and especially in smaller city where smart-city initiatives are very rare (Correia et al., 2021).

Succeeding, the research is analyzing if the true concept of smart tourism is well known and as underlined by Ye et al. (2020) there is still not a definition of smart tourism that is granted. Li et al. (2017) also confirm that the key elements involved in its development are still to be well defined because it seems that suddenly everything connected with ICT is smart. As also claimed by Baggio et al. (2020), the technology alone is not the only reason for a destination to be considered smart.

Focusing especially on the re-visitation of concept of smart city and the level of maturity in the literature there are many different definitions of "Smart City" from solely focusing on technology to enhancing quality of life, transparency of data, governance and from the literatures smart city are too heavily focusing on ICT (Govada et al., 2016). In addition, it has been asked if the information in the

literature is sufficient in order to build a business model and concerning Giourka et al. (2019), models have been developed in different markets and depending on the context the same solutions that for one city does not specifically implies that produce the same result in other cities.

**Table 2 –** Key and sub research questions vs literature review authors.

| Research objectives | Research Questions | Literature Review Authors |
|---|---|---|
| Collect directions for a business model proposal for Smart Cities using Peniche City as a case | -What is the proposal of business model for a smart city? -How can be defined a business model for smart city in terms of product's value proposition, infrastructure, customers and finances? - How the life of citizens and tourists can be improved in Peniche with smart tourism? | -Giourka et al. (2019) -Gretzel et al. (2015b) -Schmidt-Rauch and Schwabe (2013) - Correia et al. (2021) |
| Analyze if the true concept of smart tourism is well know | -What does smart tourism mean for people and what services are they looking for in a city? | -Li et al. (2017) -Ye et al. (2020) - Baggio et al. (2020) |
| Revise the concept of Smart City and the level of maturity in the literature | -Is the information in the literature enough to complete a business model? -Is the concept of smart city normalized and fixed in the literature? | - Govada et al. (2016) -Giourka et al. (2019) |

Source: elaborated by the author

## 3.2. The research technique

The literature provides the research with very useful starting points for the investigation as secondary data. The first step was to scan the literature on smart tourism, ICT, smart city and business model canvas topics in the main scientific databases like Scopus, Google Scholar, academia.edu, etc. First,

it was performed a generic research with keywords like "Smart Tourism" and "Information and Communication Technology" and "Smart City" and "Business Model for Smart Cities". The most pertinent papers were selected according to their title and their abstract, filtered and summarized as they were matching with the purpose of the study. The gap on the business model for smart city was founded and the ambiguity of the concept of smart tourism and smart city was discovered and used as secondary data for the research.

However, further researches based on primary data were conducted. The research can be defined exploratory because *"What is the proposal of business model for a smart city?"* implies the discovery of ideas and insight as an objective. Since the main goal of the research is to collect primary data from human experiences and ideas the qualitative method is the most efficient approach. Human experiences are a difficult area to analyze. Qualitative methods are specifically made in order to take in consideration of those aspects, especially the language data that are not single words, but words combined into sentences and sentences combined into discourses (Polkinghorne, 2005).

The method suggested is in-depth interviews. Interviews are an important qualitative research method where the researcher is collecting data directly from the participants. The goal is to collect opinions, experiences and other aspects of the population that is studied (Parveen & Showkat, 2017). In this research, it was important to have more detailed information in order to have a proposal for a business model for smart city. That is why it was chosen to have one-on-one interviews and face-to-face with the participants.

The interview is conducting with an informal conversation and with an open-end conclusion since the benefit of them is that the researcher is able to collect more in-depth information rather than with surveys. The interview script is divided in two parts with open answers as it is presented in the Appendix A. The first part is to give an overview of the concept to the participants and to understand what is the knowledge of the concept of smart tourism and smart city. The second part is characterized by specific questions regarding the nine blocks of the business model canvas (Osterwalder & Pigneur, 2010). The participants are helped by showing a business model of a smart city scenario elaborated based on the literature and re-elaborated by the author by collecting their ideas and experiences build a proposal for a business model canvas in Peniche (Table 1).

Therefore, during the face-to-face interviews, the researcher will make the participants feeling at ease and confident to share their opinion. Especially by paying attention when talking and putting value in their answers. The qualitative approach will help to take in account particular characteristics of the participant's point of view and to facilitate the investigation of the current gap in the study.

## 3.3. The data collection and the population sample

The purpose of the data gathering is to provide evidence regarding the gap the research is investigate. The specific location of Peniche was choose from the researcher based on the lack of information regarding a possible innovation for the city. All the interviewees are referring to known people by the researcher having a business in Peniche and spending their holiday in the hotel where the researcher is working. Mostly all the businesses are related to surf, since it is the main tourism activity in the city. Regarding the tourists, their sample is referring to surfers, but coming from different country. This is helping to have a brighter vision about what Portuguese point of view and foreigners one. The interview was conducted in person with a duration of 20-25 minutes and afterwards all the data ware gathers to be analyzed by the software KH coder.

In order to build a proposal for a business model of a smart city in Peniche, the sample characterization is based on two different points of view, each category made of 8 participants with businesses connected to the city of Peniche and 8 tourists, especially surfers coming to the city on holiday with a total of 16 people.

One of the aspect of the qualitative research is to conducted the research in the field and in this case precisely in the city of Peniche. The design used is the cross-sectional one that involves the collection of information from the given sample population elements only once.

The participants of this research are surf school owners (2), owner of a surf house (2), owner of a surf house (1), owner of a restaurant (1), hotel manager (1), owner of a Coffee Shop (1) and owner of a night club (1) regarding people with a business connected to the city of Peniche. Concerning the other participants, they are tourist especially surfers coming from Germany (3), from Portugal (2), from Italy (2) and from Canada (1). The name of the interviewees and of their related businesses will not be shared to keep them anonymous and to preserve their identity. Their role related to tourism is presented in Appendix B.

## 4.Data Analysis

### 4.1. The sample characterization

The following chapter will present and analyze the results of the information from the in-depth interviews by the 16 participants choose for the study. All of them are linked to tourism in Peniche as entrepreneurs or as a tourist and can provide a clear idea of what are the improvements the city can achieve and give an opinion regarding services and facilities. The main objective is to collect information regarding a possible smart scenario in Peniche and build a proposal for a Business Model Canvas.

The analysis is divided in two parallel sections. One taking in consideration the business point of view and the other the tourists one. The first part is based on introductory questions regarding the knowledge of the topic and the connection of the interviewee with the research. This approach is helping the participants to have an overview of the analysis and to establish as a starting point a smooth conversation. Instead, the second part is composed about question related to the nine blocks of the Business Model Canvas by Osterwalder and Pigneur (2010).

Once all the questions are answered, every single question will be analyzed 16 times and will match with the correspondent one in order to gather them based on the topic. This analysis is typical for the use of KH Coder, Japanese text analysis tool for free text. Two keyword extraction will be taken into the study: the keyword frequency and the correspondence analysis (Kino et al., 2017). Afterwards, the results will be compared with the previous literature review aiming to understand if the data are congruent with the research and if they are fulfilling the gaps. Eventually the results obtained will contribute to the current literature and could help for further researches in the field.

### 4.2. The content analysis and comments

The first question for both of the groups was: *What does smart tourism and smart city mean for you?* and according to the Graph 1 and 2, the majority entrepreneurs are linking the concept to technology (3), to be connected (2), to service (2) and the tourists to information (2) and to advertisement (1). Those graphs are showing that there is not a really strong relation with a specific word showing a lack of knowledge regarding this specific sector. From this first initial answers appears that there are some ideas regarding the topic, but still confused and not fixed.

| | | | |
|---|---|---|---|
| 1 | tourism | Noun | 9 |
| 2 | Smart | ProperNoun | 7 |
| 3 | mean | Verb | 6 |
| 4 | relate | Verb | 3 |
| 5 | technology | Noun | 3 |
| 6 | connected | Adj | 2 |
| 7 | service | Noun | 2 |
| 8 | better | Adv | 1 |
| 9 | city | Noun | 1 |
| 10 | clean | Adj | 1 |
| 11 | connection | Noun | 1 |

| | | | |
|---|---|---|---|
| 1 | tourism | Noun | 8 |
| 2 | city | Noun | 4 |
| 3 | mean | Verb | 3 |
| 4 | smart | Adj | 3 |
| 5 | Smart | ProperNoun | 3 |
| 6 | different | Adj | 2 |
| 7 | information | Noun | 2 |
| 8 | relate | Verb | 2 |
| 9 | adapt | Verb | 1 |
| 10 | advertisement | Noun | 1 |
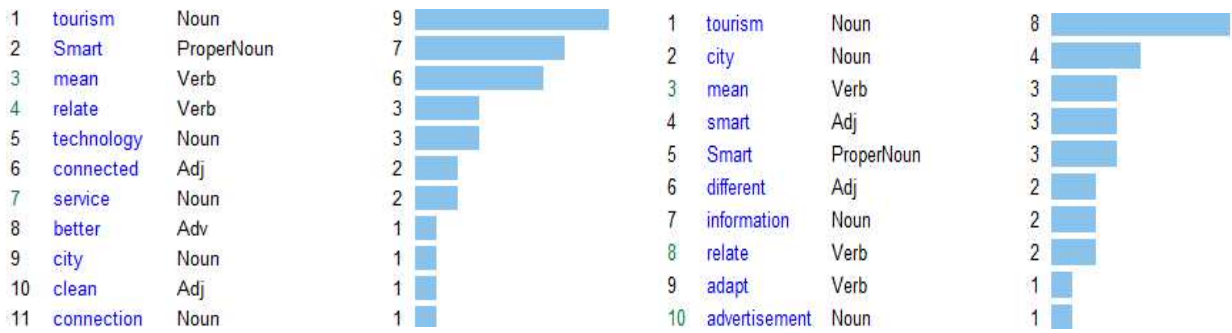
**Graph 1 & 2** - Keywords frequency of the meaning of smart city and tourism (Source: Elaborated by KH Coder)

From the second question *What link do you see with Peniche and smart city?* asked to the business people it emerges from the Graph 3 that there is no relation since there are no words that can link the city of Peniche with smart tourism.
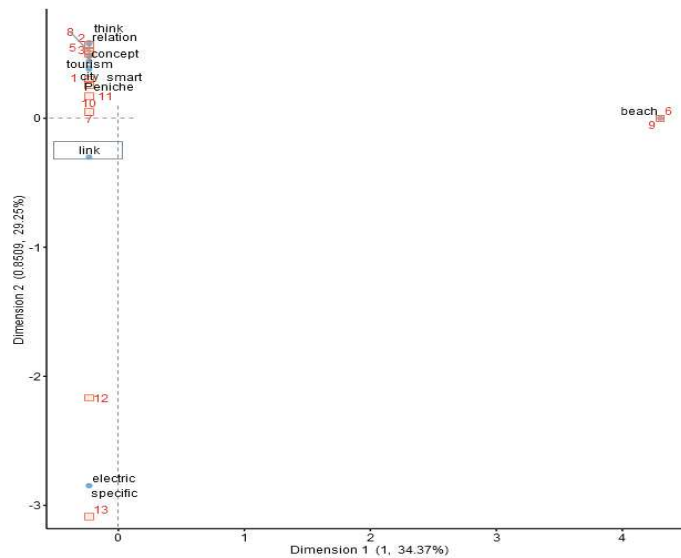


**Graph 3 -** Correspondence analysis of the link of Peniche with smart city (Source: Elaborated by KH Coder)

Instead to the tourists the question asked is *What is your opinion about the service that the city is offering you and at your arrival?* From the Graph 4 it emerges that the services need to be improved and what concern the most is the arrival at the bus stop and that basic services like hospitals need to be improved.

19
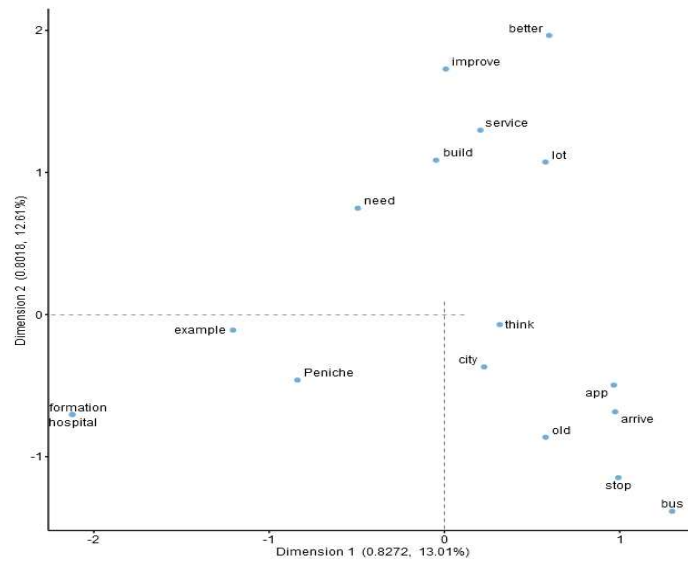
**Graph 4 -** Correspondence analysis of the services Peniche is offering (Source: Elaborated by KH Coder)

The third question asked to the entrepreneurs is *Do you think that smart tourism has any relation to your business and contribute to it?* and it appears from the Graph 5 that the elements that emerge with the most frequency are the website (4), the Wi-Fi (3) and Instagram (2). This shows that the level of smart tourism in Peniche is linked to the main common ICT.



**Graph 5 –** Keywords frequency of the relations with the business and the smart tourism (Source: Elaborated by KH Coder

Instead the question asked to the tourists is *What changes do you think the city need to take in order to have all the facilities connected?* The Graph 6 is underlining the words like busses and shuttle, app and improve the public services are identifying the changes that the tourists are visualizing for a better connectivity of the city of Peniche.
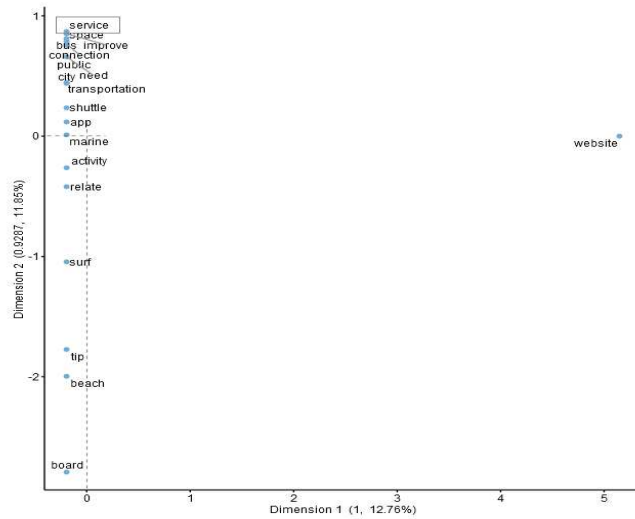
**Graph 6 -** Correspondence analysis of the facilities Peniche needs to have to be connected (Source: Elaborated by KH Coder)

The last introductory question to the entrepreneurs is the following *Which services should be improved to have benefits in your business as well?* From the Graph 7 it appears with improvements in the that city (8), in the surf activities (4), in the transportation (4) and in the events. With good public transportation it would be easier for every business to be reached and offer more comfort to tourists.



| 1 | city | Noun | 8 |
| 2 | people | Noun | 6 |
| 3 | good | Adj | 5 |
| 4 | surf | Noun | 4 |
| 5 | transportation | Noun | 4 |
| 6 | event | Noun | 3 |
| 7 | public | Adj | 3 |
| 8 | attract | Verb | 2 |
| 9 | bring | Verb | 2 |
| 10 | business | Noun | 2 |
| 11 | connect | Verb | 2 |
| 12 | invest | Verb | 2 |
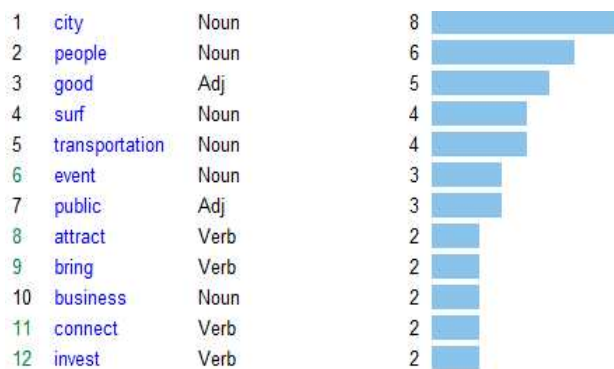
**Graph 7 –** Keywords frequency of the benefits for the business (Source: Elaborated by KH Coder)

And regarding the tourists the last general question asked is *How would you think your holiday could be improved by smart tourism?* the main answers (Graph 8) regarding the improvement for the city are including transportation (3) and bus (2), events (2) and public services (2).



| 1 | improve | Verb | 5 |
| 2 | city | Noun | 3 |
| 3 | holiday | Noun | 3 |
| 4 | transportation | Noun | 3 |
| 5 | bus | Noun | 2 |
| 6 | event | Noun | 2 |
| 7 | public | Adj | 2 |
| 8 | service | Noun | 2 |
| 9 | arrive | Verb | 1 |
| 10 | bar | Noun | 1 |
| 11 | basic | Adj | 1 |
| 12 | better | Adj | 1 |
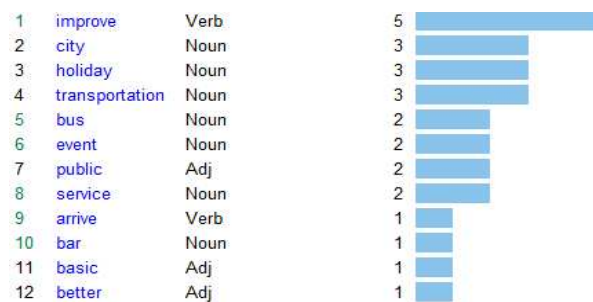
**Graph 8 –** Keywords frequency of the improvement of the holiday by smart tourism (Source: Elaborated by KH Coder)

Successively the participants are asked to imagine a scenario of a smart city in Peniche and the first question regarding the nine blocks of the business model canvas for the entrepreneurs is *Who do you think can be the key partners and suppliers?* referring to the hypothetical scenario. From the Graph 9 the words more associated with these two concepts are company (3), business (2), council (2) and municipality (2). On the other hand, what emerged from the frequency of the answers of the tourists (Graph 10) the focus is on the municipality (3), on the surf business (3), in the hotel company (2) and in the bus companies (2). What is shown here is that the enterprises participants and the tourist one agree on seeing the main partners as the municipality and on the main business related to the city.

| | | | |
|---|---|---|---|
| 1 | key | Adj | 8 |
| 2 | partner | Noun | 8 |
| 3 | company | Noun | 3 |
| 4 | business | Noun | 2 |
| 5 | council | Noun | 2 |
| 6 | investor | Noun | 2 |
| 7 | municipality | Noun | 2 |
| 8 | private | Adj | 2 |
| 9 | technology | Noun | 2 |
| 10 | Associacao | ProperNoun | 1 |

| | | | |
|---|---|---|---|
| 1 | key | Adj | 6 |
| 2 | partner | Noun | 6 |
| 3 | local | Adj | 4 |
| 4 | municipality | Noun | 3 |
| 5 | surf | Noun | 3 |
| 6 | activity | Noun | 2 |
| 7 | bus | Noun | 2 |
| 8 | business | Noun | 2 |
| 9 | city | Noun | 2 |
| 10 | company | Noun | 2 |
| 11 | hotel | Noun | 2 |
| 12 | accommodation | Noun | 1 |

**Graph 9 & 10 –** Keywords frequency of key partners and suppliers (Source: Elaborated by KH Coder)

The second question regarding the nine blocks is *Which key activities do the business need?* It emerged that the words with more frequency were information (2), transportation (2) and facilities (1) from the entrepreneur perspective (Graph 11). From the tourists question *Which key activities are missing in the city?* the analysis is showing that is going to the beach (2), using the bus (2), going to eat food (2) and using Wi-Fi (2) are the main key activities for them (Graph 12). Their perspective compare to the one of the entrepreneur are focusing more on specific and basic services that are looking for during their stay. The overview of the business participants is more general, but still underlining the individualization of basic services for the key activities of the business model.

| | | | |
|---|---|---|---|
| 1 | activity | Noun | 9 |
| 2 | key | Adj | 8 |
| 3 | provide | Verb | 3 |
| 4 | public | Adj | 3 |
| 5 | information | Noun | 2 |
| 6 | people | Noun | 2 |
| 7 | tourist | Noun | 2 |
| 8 | transportation | Noun | 2 |
| 9 | bank | Noun | 1 |
| 10 | better | Adj | 1 |
| 11 | city | Noun | 1 |
| 12 | club | Noun | 1 |

| | | | |
|---|---|---|---|
| 1 | activity | Noun | 9 |
| 2 | key | Adj | 6 |
| 3 | provide | Verb | 3 |
| 4 | beach | Noun | 2 |
| 5 | bus | Noun | 2 |
| 6 | connection | Noun | 2 |
| 7 | example | Noun | 2 |
| 8 | food | Noun | 2 |
| 9 | relate | Verb | 2 |
| 10 | wi-fi | Adj | 2 |
| 11 | access | Noun | 1 |
| 12 | boat | Noun | 1 |

**Graph 11 & 12 –** Keywords frequency of key activities (Source: Elaborated by KH Coder)

The third block is related to the key resources and the question for it is *What key resources do the business required?* the main frequency is represented as it is seen in the Graph 13 by financial (2), infrastructure (2), investment (2), money (2), people (2) and vehicle (2). Also the tourists were answering to the question *Which key resources do the city require?* the result in the Graph 14 also underline as resources money (4), infrastructure (3) and financial investment (2). What emerged from this analysis is that the participants are seeing mainly the financial resource as the center for the possible achievement of the business.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | resource | Noun | 9 | | 1 | key | Adj | 6 | |
| 2 | key | Adj | 8 | | 2 | resource | Noun | 6 | |
| 3 | financial | Adj | 2 | | 3 | money | Noun | 4 | |
| 4 | infrastructure | Noun | 2 | | 4 | infrastructure | Noun | 3 | |
| 5 | investment | Noun | 2 | | 5 | business | Noun | 2 | |
| 6 | money | Noun | 2 | | 6 | financial | Adj | 2 | |
| 7 | people | Noun | 2 | | 7 | make | Verb | 2 | |
| 8 | vehicle | Noun | 2 | | 8 | road | Noun | 2 | |
| 9 | bus | Noun | 1 | | 9 | service | Noun | 2 | |
| 10 | business | Noun | 1 | | 10 | bicycling | Noun | 1 | |
| 11 | capital | Noun | 1 | | 11 | city | Noun | 1 | |
| 12 | communication | Noun | 1 | | | | | | |

**Graph 13 & 14** – Keywords frequency of key resources (Source: Elaborated by KH Coder)

When participants were asked *Which customer's need would you contribute to satisfy?* the graph 15 shows the connection with the combination of words like finding information (2), easier accessibility (1) and contribution to culture (1). Instead what the tourists have been asked was *How would you be satisfied?* their answer was more related as shown in the Graph 16 saving time (4), facilitated the movement (3), the access (2) and activity (2). This shows an affinity to the two point of view with the fact that the idea of a value proposition is to make easily access to all the facilities and services.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 4 | information | Noun | 2 | | 4 | movement | Noun | 3 | |
| 5 | make | Verb | 2 | | 5 | access | Noun | 2 | |
| 6 | need | Noun | 2 | | 6 | activity | Noun | 2 | |
| 7 | place | Noun | 2 | | 7 | city | Noun | 2 | |
| 8 | possible | Adj | 2 | | 8 | feel | Verb | 2 | |
| 9 | satisfy | Verb | 2 | | 9 | free | Adj | 2 | |
| 10 | tourist | Noun | 2 | | 10 | place | Noun | 2 | |
| 11 | accessibility | Noun | 1 | | 11 | available | Adj | 1 | |
| 12 | best | Adj | 1 | | 12 | convenient | Adj | 1 | |
| 13 | business | Noun | 1 | | 13 | easily | Adv | 1 | |
| 14 | contribute | Verb | 1 | | 14 | Easy | ProperNoun | 1 | |
| 15 | create | Verb | 1 | | 15 | efficiency | Noun | 1 | |
| 16 | culture | Noun | 1 | | 16 | enjoy | Verb | 1 | |
| | | | | | 17 | equipment | Noun | 1 | |
| | | | | | 18 | gain | Verb | 1 | |

**Graph 15 & 16** – Keywords frequency of value proposition (Source: Elaborated by KH Coder)

Regarding the customer segment is being asked *Who are the most important customers and for whom are you creating value?* the entrepreneurs answered (Graph 17) nomad (2), surfers (2), tourists (2) and travelers (2). While the results coming from tourists answering to *Which customers can the scenario of a smart city attract?* (Graph 18) are surfers (3), family with kids (1), millennials (1) and digital nomads (1). These results are showing that the main segment is represented by surfers and as secondary there are tourists in general, but also digital nomads and families.

| | | | |
|---|---|---|---|
| 1 | customer | Noun | 6 |
| 2 | segment | Noun | 5 |
| 3 | people | Noun | 3 |
| 4 | include | Verb | 2 |
| 5 | nomad | Noun | 2 |
| 6 | surfer | Noun | 2 |
| 7 | tourist | Noun | 2 |
| 8 | traveler | Noun | 2 |
| 9 | backpack | Verb | 1 |
| 10 | backpacker | Noun | 1 |
| 11 | budget | Noun | 1 |
| 12 | business | Noun | 1 |
| 13 | costumer | Noun | 1 |

| | | | |
|---|---|---|---|
| 3 | surfer | Noun | 3 |
| 4 | attract | Verb | 2 |
| 5 | tourism | Noun | 2 |
| 6 | type | Noun | 2 |
| 7 | beach | Noun | 1 |
| 8 | camper | Noun | 1 |
| 9 | city | Noun | 1 |
| 10 | come | Verb | 1 |
| 11 | digital | Adj | 1 |
| 12 | disposal | Noun | 1 |
| 13 | easy | Adj | 1 |
| 14 | family | Noun | 1 |
| 15 | holiday | Noun | 1 |
| 16 | income | Noun | 1 |
| 17 | kid | Noun | 1 |

**Graph 17 & 18** – Keywords frequency of customer segmentation (Source: Elaborated by KH Coder)

Concerning the customer relationship, the following question is *Which is the relationship with the customers?* for the entrepreneurs (Graph 19) and for the tourists (Graph 20) *Which is the relationship with the business?* With the first question there is a variety of different words like passive (2), personal (2) and self-service (1). On the other side for tourists there is passive (2), indirect (1), but also co-creation (1) and directly (1). This is underlining the fact that especially entrepreneurs see the role of tourist and the tourist themselves as a passive role and only the tourists see themselves with an active role of co-creation.

| | | | |
|---|---|---|---|
| 1 | customer | Noun | 6 |
| 2 | relationship | Noun | 6 |
| 3 | business | Noun | 2 |
| 4 | passive | Adj | 2 |
| 5 | personal | Adj | 2 |
| 6 | service | Noun | 2 |
| 7 | % | Noun | 1 |
| 8 | active | Adj | 1 |
| 9 | benefit | Verb | 1 |
| 10 | client | Noun | 1 |
| 11 | connect | Verb | 1 |
| 12 | connection | Noun | 1 |
| 13 | directly | Adv | 1 |
| 14 | enjoy | Verb | 1 |
| 15 | experience | Noun | 1 |
| 16 | improve | Verb | 1 |

| | | | |
|---|---|---|---|
| 1 | relationship | Noun | 5 |
| 2 | active | Adj | 2 |
| 3 | business | Noun | 2 |
| 4 | feedback | Noun | 2 |
| 5 | passive | Adj | 2 |
| 6 | relation | Noun | 2 |
| 7 | service | Noun | 2 |
| 8 | use | Verb | 2 |
| 9 | co-creation | Noun | 1 |
| 10 | come | Verb | 1 |
| 11 | community | Noun | 1 |
| 12 | contribution | Noun | 1 |
| 13 | customer | Noun | 1 |
| 14 | different | Adj | 1 |
| 15 | directly | Adv | 1 |

**Graph 19 & 20** – Keywords frequency of customer relationship (Source: Elaborated by KH Coder)

Taking in consideration the channels, the question asked is *How do you reach the customers?* and the results are social media (3), advertisement (2), websites (2) and word-of-mouth (2) (Graph 21). Form the tourist perspective when asked *How would you like to be reached?* the results are social media (3), advertisements (2), app (2) and flyers (1) (Graph 22). From this result it seems the two point of view are combining and the visual of the person that has to reach the customer is actually matching with the one that has to receive it.

| 1 | customer | Noun | 5 |
| 2 | reach | Verb | 5 |
| 3 | channel | Noun | 4 |
| 4 | media | Noun | 3 |
| 5 | social | Adj | 3 |
| 6 | advertisement | Noun | 2 |
| 7 | website | Noun | 2 |
| 8 | word-of-mouth | Noun | 2 |
| 9 | advertising | Noun | 1 |
| 10 | app | Noun | 1 |
| 11 | bus | Noun | 1 |
| 12 | city | Noun | 1 |

| 1 | channel | Noun | 5 |
| 2 | reach | Verb | 5 |
| 3 | information | Noun | 3 |
| 4 | media | Noun | 3 |
| 5 | social | Adj | 3 |
| 6 | advertisement | Noun | 2 |
| 7 | city | Noun | 2 |
| 8 | people | Noun | 2 |
| 9 | pop | Verb | 2 |
| 10 | accessible | Adj | 1 |
| 11 | addition | Noun | 1 |
| 12 | advance | Verb | 1 |
| 13 | App | ProperNoun | 1 |

**Graph 21 & 22** – Keywords frequency of channels (Source: Elaborated by KH Coder)

The cost structure question asked to the people with a business in Peniche is *What are the costs inherent to the business model?* and the most frequent words (Graph 23) are costs related to infrastructure (4), costs related to transportation (3) and busses (2). The question asked to tourists is *For what would you be willing to pay?* and the words with the main frequency (Graph 24) are busses (3), Wi-Fi (2) and membership (1). The conclusion for the costs are pretty clear since in the city the main services are still missing.

| 1 | cost | Noun | 9 |
| 2 | infrastructure | Noun | 4 |
| 3 | transportation | Noun | 3 |
| 4 | bus | Noun | 2 |
| 5 | inherent | Adj | 2 |
| 6 | mainly | Adv | 2 |
| 7 | people | Noun | 2 |
| 8 | public | Adj | 2 |
| 9 | relate | Verb | 2 |
| 10 | app | Noun | 1 |
| 11 | better | Adj | 1 |
| 12 | business | Noun | 1 |
| 13 | company | Noun | 1 |

| 1 | pay | Verb | 4 |
| 2 | bus | Noun | 3 |
| 3 | cost | Noun | 3 |
| 4 | good | Adj | 2 |
| 5 | price | Noun | 2 |
| 6 | weekly | Adj | 2 |
| 7 | Wi-Fi | ProperNoun | 2 |
| 8 | accessible | Adj | 1 |
| 9 | account | Noun | 1 |
| 10 | app | Noun | 1 |
| 11 | connection | Noun | 1 |
| 12 | coverage | Noun | 1 |

**Graph 23 & 24** – Keywords frequency of cost structure (Source: Elaborated by KH Coder)

The last question regarding the nine blokes is *What are the revenue related to this business?* and the main keywords for the revenue are more people coming to the city (4), more income for the city (2) and more experience and more demand (1) regarding the answers from the entrepreneurs (Graph 25). Concerning the tourist, the question to *What are you gaining from it?* brought to the results are (Graph 26), more experience (3), more money (2), more time (2) and more freedom and movement (1). This is showing that from the entrepreneur's point of view the focus is more on the benefits the city will have with a smart innovation while the tourists are focusing more on the time and money they would save with more improvements in the city.

| | | | | |
|---|---|---|---|---|
| 2 | business | Noun | 4 | |
| 3 | people | Noun | 4 | |
| 4 | come | Verb | 3 | |
| 5 | city | Noun | 2 | |
| 6 | income | Noun | 2 | |
| 7 | tourism | Noun | 2 | |
| 8 | tourist | Noun | 2 | |
| 9 | advertisement | Noun | 1 | |
| 10 | area | Noun | 1 | |
| 11 | demand | Noun | 1 | |
| 12 | especially | Adv | 1 | |
| 13 | experience | Noun | 1 | |
| 14 | higher | Adj | 1 | |
| 15 | important | Adj | 1 | |
| 16 | improvement | Noun | 1 | |
| 17 | increase | Verb | 1 | |
| 18 | incrementation | Noun | 1 | |
| 19 | join | Verb | 1 | |

| | | | | |
|---|---|---|---|---|
| 2 | experience | Noun | 3 | |
| 3 | connected | Adj | 2 | |
| 4 | gain | Verb | 2 | |
| 5 | money | Noun | 2 | |
| 6 | save | Verb | 2 | |
| 7 | stream | Noun | 2 | |
| 8 | time | Noun | 2 | |
| 9 | better | Adj | 1 | |
| 10 | community | Noun | 1 | |
| 11 | consume | Verb | 1 | |
| 12 | development | Noun | 1 | |
| 13 | especially | Adv | 1 | |
| 14 | feel | Verb | 1 | |
| 15 | freedom | Noun | 1 | |
| 16 | good | Adj | 1 | |
| 17 | home | Noun | 1 | |
| 18 | instead | Adv | 1 | |
| 19 | just | Adv | 1 | |

**Graph 25 & 26 –** Keywords frequency of revenue streams (Source: Elaborated by KH Coder)

One last question is asked at the end of the interview to get the conclusion and a general idea how this business model could help the improvement of the city of Peniche. Both to entrepreneurs and to tourist is asked the following question *What is the result of this business model canvas for the city of Peniche?* In the Graph 27 from the answers of the entrepreneurs it is possible to see the focus is in to bring more people and tourists in the city. Therefore, they see the business model as a positive impact.
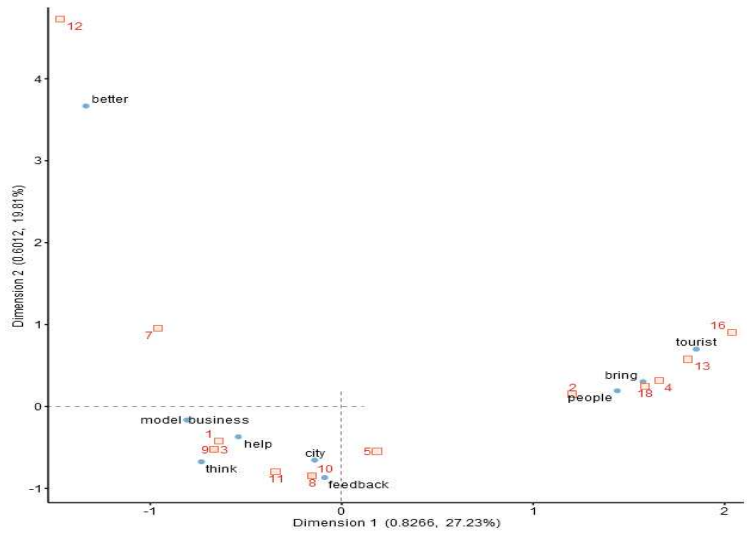
**Graph 27 -** Correspondence analysis of the final idea entrepreneurs have for a business model for Peniche (Source: Elaborated by KH Coder)

While in the Graph 28 the answers from the tourists are that a business model for Peniche would bring more tourism development and the city will attract more people. Also considering the business model with a positive impact for the city.
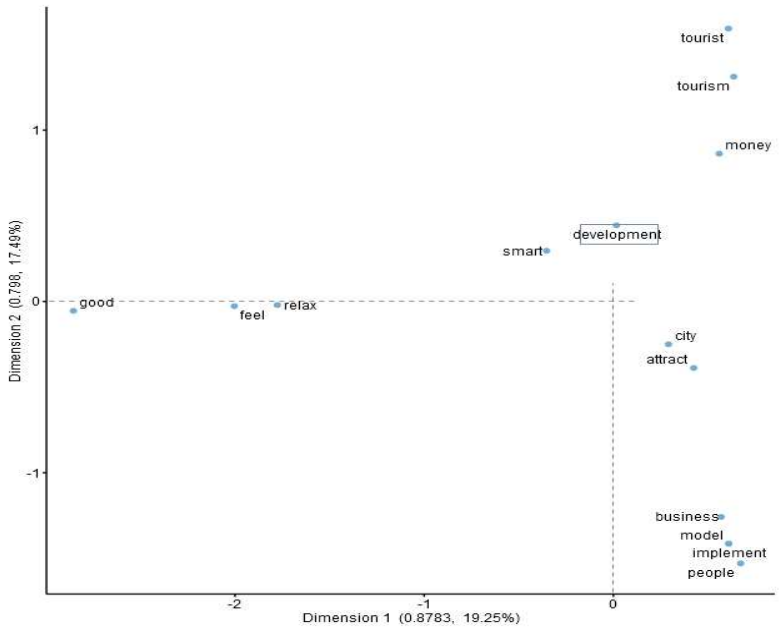


**Graph 28 -** Correspondence analysis of the final idea tourists have for a business model for Peniche (Source: Elaborated by KH Coder)

## 5. Discussion and findings

Taking now in consideration the Table 2 with the key and sub key research questions and the answers from the interviews with the contribution of the literature review it is possible to give a possible conclusion. Overall, from the answers of the tourists and entrepreneur to the sub key research question *What does smart tourism mean for people and what services are they looking for* it appears that the knowledge regarding the topic is still vague and very limited and in most of the time they are looking for something specific to define the smart city while the concept is very wide. The services they are looking for in a city like Peniche are mainly public transportation and good connection to Wi-Fi.

Regarding the sub question *How the life of citizens and tourists can be improved in Peniche with smart tourism?* the overall view from the data collected is to have everything more connect from when the tourist arrives to the bus stop. They should be able to move around the city and to find the services easily in order to save time and money. Also for the entrepreneurs having good connection and services around the city it would help to have positive feedback what would automatically attract more tourists. As was also mentioned by Boes et al. (2016) in the literature review what smart tourism does is allowing the citizens to raise their living standards and their quality life.

Regarding the sub research question *Is the concept of smart city normalized and fixed in the literature?* what appeared from Giourka et al. (2019) in the literature review the concept is still theoretical and the process requires new strategies, better ecosystem and advanced reinforcement of the urban structure. From the answers of the participants in the interview the concept of smart city is understood, but what is missing in their idea is the means to achieve it.

The lack of business model for smart city is underlined by Giourka et al. (2019) and especially in smaller city this projects are not taken in consideration (Correira et al. 2021). The table 3 is presenting a proposal of a business model canvas for the city of Peniche based on the interview of tourist and business entrepreneur in Peniche even if it is including a small sample of the population. The new information added in the proposal are marked in blue, while the black one are from the business model canvas for smart city integrated with the literature. This table is answering to the main key research question *What is the proposal of a business model for smart city?* and to the sub key research question *How can be defined a business model for smart city in terms of product's value proposition, infrastructure, customers and finances?*

**Table 3** – Proposal of a business model canvas for a smart city (Source: Elaborated by the author)

| Key Partners | Key Activities | Value Proposition | Customer Relationship | Customer Segments |
|---|---|---|---|---|
| -Solution providers for public transportation<br>-Providers for internet connection<br><br>-Municipality<br>-Business company<br>-Surf company | -Transportation<br>-Connection<br><br>-Information<br>-Communication | -Price/cost reduction<br>-Accessibility<br>-Novelty Convenience/ Usability<br><br>-Facilitate movements<br>-Time saving | -Facilitating the co-creation<br>-End users evaluate or participate in the value co-creation<br>-Self service<br>-Personal | -Community<br>-Business<br>-Nonprofits<br>-Surfers<br>-Tourists<br>-Digital nomads |
|  | **Key Resources**<br><br>-Physical assets: buildings, public transports, energy grid<br>-Financial access to capitals<br>-Financial and infrastructure investment |  | **Channels**<br><br>-Advertisement<br>-Smart city applications<br>-Websites<br>-Word-of-mouth |  |

| Cost Structure | Revenue Streams |
|---|---|
| -Salaries<br>-Process of IoT sensors installation<br>-Technology installation<br>-Public transportation<br>-Membership | -Social value creation<br>-Usage fees<br>-More experience<br>-More time<br>-More money for the city and more tourists coming to the city |

(Source: Elaborated by the author)

After building this proposal of Business Model Canvas for Peniche, what emerged from this study regarding the sub research question *Is the information in the literature enough to complete a business model?* what can be answered, related also to the literature review, is that for every city there are specific needs and different possibility of development. The literature can help to have a general overview of what a model could be, however the words underlined in blue are showing that the model should be implemented.

The theoretical contribution this research wants to achieve is to show that solution for smart city are different depending on the contest the city finds itself. However, the smart city business model canvas aims are to co-create, capture and deliver value for the city with services while being socially inclusive, environmentally sustainable and economically feasible (Giourka et al., 2019).

## 6. Conclusion

The main aim of this research is to figure out a business model for a smart city and to give a contribution for a possible development of the city of Peniche, more precisely focusing on the smart development of the city using the Business Model Canvas. Furthermore, the study wanted to identify if the meaning of smart tourism is well known and understanding what both people living in the city having a business and people coming to the city as tourists are willing to find and experience. In addition, the research analyzes also to revise the concept of smart city and the level of maturity in the literature.

In order to fulfil these objectives, the research was based on secondary data with the literature review and on primary data with in-depth interviews conducted with 16 participants, 8 tourists in and 8 entrepreneurs Peniche. The interview was composed of two different scripts for the two category of interviewees. The firsts questions gave a general idea of the study providing an introduction while the second part was based on the 9 blocks of the Business Model Canvas from Osterwalder and Pigneur (2010).

The results are confirming the vision from the authors Giourka et al. (2019), Gretzel et al. (2015b), Schmidt-Rauch and Schwabe (2013) and Correia et al. (2021) underlining a gap in the business model for smart city. The businesses have to re-define their business model to be more competitive, to take the challenges of smart tourism (Schmidt-Rauch and Schwabe, 2013) and to propose customer value that meet the needs of the travelers (Gretzel et al., 2015b).

Taking in consideration the results of the interview, the collection of directions for a business model proposal for smart city are bringing the following results. The key partners individualized by the participants for the city of Peniche in order to have a proposal for a business model canvas are the municipality, the business and surf companies. Regarding the key resources financial and infrastructural investments are individualized and as key activities information and communication. The value proposition includes the saving time and the facility to move around the city. As customer's segmentation are individualized digital nomads and tourists especially surfers, while the customer's relationship is seen as personal and self-service one. The channels which the participants would like to be reached are websites and word-of-mouth. Speaking about cost structure what appeared are costs related to public transportation and membership while the revenue streams are gaining more time, more experience and more money for the city while attracting more tourists.

In addition, the investigation is analyzing also if the true concept of smart city is well known and the result shows a very weak knowledge regarding the topic. The participants once the business model

is presented, agree on the fact that their holiday and their business could be improved by smart tourism with more services and information connected like bus transportation and connection to Wi-Fi. It can be time saving for the one using the service and more income and attraction for the city itself.

Furthermore, what the research shows regarding the revision of the concept of smart city and its level of maturity is that the development is not homogenous. For example, in Peniche the concept is almost nonexistent and this research is giving just a proposal of what could be done in order for the city to be smarter. However, this study has some limitation regarding mainly the sample size which cannot allow to have a general answer for the business model canvas for smart city and the lack of previous study in the main topic. Therefore, further investigations should focus in the implementation of the model in order to have a better and wider image of the smart city scenario in Peniche.

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## 8. Appendices

### 8.1. Appendix A

Introductory questions to entrepreneurs of businesses connected with the city:

1. What does smart tourism mean and smart city mean for you?
2. What link do you see with Peniche and smart city?
3. Do you think that smart tourism has any relation to your business and contribute to it?
4. Which services should be improved to have benefits in your business as well?

If you imagine a smart city scenario in Peniche (Based on the 9 blocks of the Business Model Canvas:

5. Key partners: Who do you think can be the key partners and suppliers?
6. Key Activities: Which key activities do the business need?
7. Key Resources: What key resources do the business require?
8. Value Propositions: Which customer's need would you contribute to satisfy?
9. Customer Segments: Who are the are most important customers and for whom are you creating value?
10. Customer Relationships: Which is the relationship with the customers?
11. Channels: How do you reach the customers?
12. Cost structure: What are the costs inherent to this business model?
13. Revenue Streams: What are the revenue related to this business?

14 Conclusion: What is the result of this business model canvas for the city of Peniche?

Tourists (in this case surfers) in the city of Peniche:

1. What does smart tourism mean and smart city mean for you?
2. What is your opinion about the services that the city is offering you and at your arrival?
3. What changes do you think the city need to take in order to have all the facilities more connected?
4. How do you think your holiday can be improved by smart tourism?

If you imagine a smart city scenario in Peniche specifically for surfers (Based on the 9 blocks of the Business Model Canvas):

5. Key partners: Who do you think can be the key partners and suppliers?
6. Key Activities: Which key activities are missing in the city?

7. Key Resources: And what key resources do the city require? (in terms of physical, intellectual, human or financial resources)

8. Value Propositions: How would you be satisfied?

9. Customer Segments: Which customers can the scenario of a smart city attract?

10. Customer Relationships: Which is your relationship with the business?

11. Channels: How would you like to be reached?

12. Cost structure: For what would you be willing to pay?

13. Revenue Streams: What are you gaining from it?

14. Conclusion: What is the result of this business model canvas for the city of Peniche?

## 8.2. Appendix B

Sample of the participants to the interview with a business in Peniche.

| Interviewees | Relation to tourism |
|:---:|:---|
| 1 | Hotel Manager |
| 2 | Owner of a night club |
| 3 | Owner of a surf house |
| 4 | Owner of a surf school |
| 5 | Owner of a surf school |
| 6 | Owner of a restaurant |
| 7 | Owner of a surf house |
| 8 | Owner of a coffee shop |

Sample of the participants to the interview with tourist in Peniche.

| Interviewees | Tourists nationality |
|:---:|:---|
| 1 | Germany |
| 2 | Portugal |
| 3 | Portugal |
| 4 | Germany |
| 5 | Germany |
| 6 | Canada |
| 7 | Italy |
| 8 | Italy |