Universidade de Aveiro 2023

VIVIANE DA SILVA SOUZA

O POTENCIAL DA ECOGAMIFICAÇÃO NA PROMOÇÃO DO TURISMO URBANO SUSTENTÁVEL

THE POTENTIAL OF ECOGAMIFICATION TO PROMOTE SUSTAINABLE URBAN TOURISM

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Tese apresentada à Universidade de Aveiro para cumprimento dos requisitos necessários à obtenção do grau de Doutor em Turismo, realizada sob a orientação científica da Doutora Susana Regina Bacelar de Vasconcelos Marques, Professora e diretora do Mestrado em Marketing e Comunicação Digital do Instituto Superior de Contabilidade e Administração de Aveiro (ISCA-UA).

Sincere gratitude to my grandmother
Maria do Carmo Silva
and my family
Uilton Santos and Sofia Santos.
Lastly, to my parents Vilma Souza and
Valmir Souza, examples of impeccable pillars.

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From the beginning of the development of this thesis I tried to focus on the process rather than the end. The process offered me the opportunity to evolve personally and professionally. Many lessons and learnings were acquired over these 6 years of dedication and abdication.

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palavras-chave turismo inteligente, turismo urbano, sustentabilidade, ecogamificação, tecnologia persuasiva, recetividade à ecogamificação

resumo

A gamificação tem tido um impacto positivo no Turismo. O setor tornou-se mais sensível às oportunidades de criação de novos serviços e produtos gamificados, nomeadamente numa perspetiva de sustentabilidade. Este aspeto é reforçado pelo aumento da investigação que tem sido desenvolvida sobre o potencial da gamificação no contexto do turismo e a sua contribuição para a sustentabilidade. No entanto, ainda são escassos os estudos sobre o potencial da ecogamificação para a promoção de destinos turísticos urbanos sustentáveis na perspetiva de diferentes stakeholders. Diante deste contexto, este estudo explora as potencialidades da ecogamificação para promover destinos turísticos urbanos sustentáveis na perspetiva dos stakeholders a montante (compradores e fornecedores) e a jusante (turistas). A presente tese assume a forma de compilação de artigos científicos, dos quais quatro fazem parte do corpo da tese, e está estruturada em seis partes. No capítulo I é apresentada a Introdução, com foco na relevância do estudo, objetivos, visão geral da metodologia e estrutura da tese. O capítulo II explora stakeholders específicos - aqueles que se posicionam no lado a montante do processo de gamificação - e suas perspetivas sobre os benefícios e os desafios da gamificação. O capítulo III apresenta um estudo teórico que analisa os pontos de contato entre a literatura sobre segmentação e tipologias turísticas baseadas na sustentabilidade e a literatura sobre tipologias de utilizadores de jogos. O capítulo IV aborda a influência do comportamento ambiental doméstico e de viagem, das motivações de viagem, dos tipos de entretenimento e da proficiência tecnológica na recetividade dos turistas urbanos a diferentes elementos de jogo num contexto de transporte e mobilidade. O capítulo V visa perceber diferentes tipos de recetividade dos turistas urbanos à ecogamificação, considerando suas perceções em relação à tecnologia, ambiente e entretenimento. O capítulo VI apresenta a discussão e os resultados dos artigos, as contribuições e as implicações dos estudos que compõem esta investigação, as suas limitações e sugestões para estudos futuros. Através de uma diversidade de abordagens metodológicas e cruzando a perspetiva de diferentes atores, este estudo contribui para uma visão holística do processo de ecogamificação. Simultaneamente, apresenta novas lentes teóricas e evidências empíricas que abrem caminhos de investigação sobre o turismo inteligente, nomeadamente em termos de recetividade, preferências e segmentação dos turistas.

keywords

smart tourism, urban tourism, sustainability, ecogamification, persuasive technology, receptivity to ecogamification.

abstract

Gamification can make a positive impact on Tourism. The sector has become more sensitive to opportunities to create new gamified services and products, namely from the perspective of sustainability. Also, research on the potential of gamification in the context of tourism and its contribution to sustainability has increased. However, studies on the potential of ecogamification to promote sustainable urban tourism destinations on different stakeholders' perspectives are still scarce. With that in mind, this study explores the potentials of ecogamification to promote sustainable urban tourism destinations from upstream (buyers and providers) and downstream (tourists) stakeholders. This thesis assumes the form of a compilation of scientific articles, four of which are part of the body of the thesis and is structured in six parts. Chapter I presents the Introduction, focusing on the study's relevance, objectives, methodology overview and structure of the thesis. Chapter II examines specific stakeholders - those positioned at the upstream side of the gamification process - and their perspectives concerning not only the benefits, but also the challenges of gamification. Chapter III presents a theoretical study, which analyses the points of contact between the literature on tourist segmentation and typologies in the face of sustainability and the literature on game user typologies. Chapter IV examines how home and travel environmental behaviour, travel motivations, types of entertainment and technology proficiency influence the receptivity of urban tourists to different game elements in a transport & mobility context. Chapter V aims to perceive different types of urban tourists' receptivity to ecogamification, considering their perceptions towards technology, environment and entertainment. Chapter VI presents the conclusions and implications. This section summarizes the discussion and results of the articles, the contributions and implications of the studies that make up this investigation, its limitations, and suggestions for future studies. Through a diversity of methodological approaches and crossing the perspective of different actors, this study contributes to a holistic view of the ecogamification process. At the same time, it presents new theoretical lenses and empirical evidence that open avenues for research on smart tourism, namely in terms of receptivity, preferences, and tourist segmentation.

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List of Abbreviations

ANOVA: Analysis of Variance

DMOs: Destination Marketing Organizations

EU: Europe Union

GDP: Gross Domestic Product

ICT: Information and communication technologies

NGO: Non-Governmental Organizations

OCD: Organization-Centered Design

SDGs: Sustainable Development Goals

SPLACH: Spatial Planning for Change

SPSS: Scientific Package for Social Sciences

TAM: Technology Acceptance Model

UCD: User-Centered Design

UNWTO: United Nations World Tourism Organization

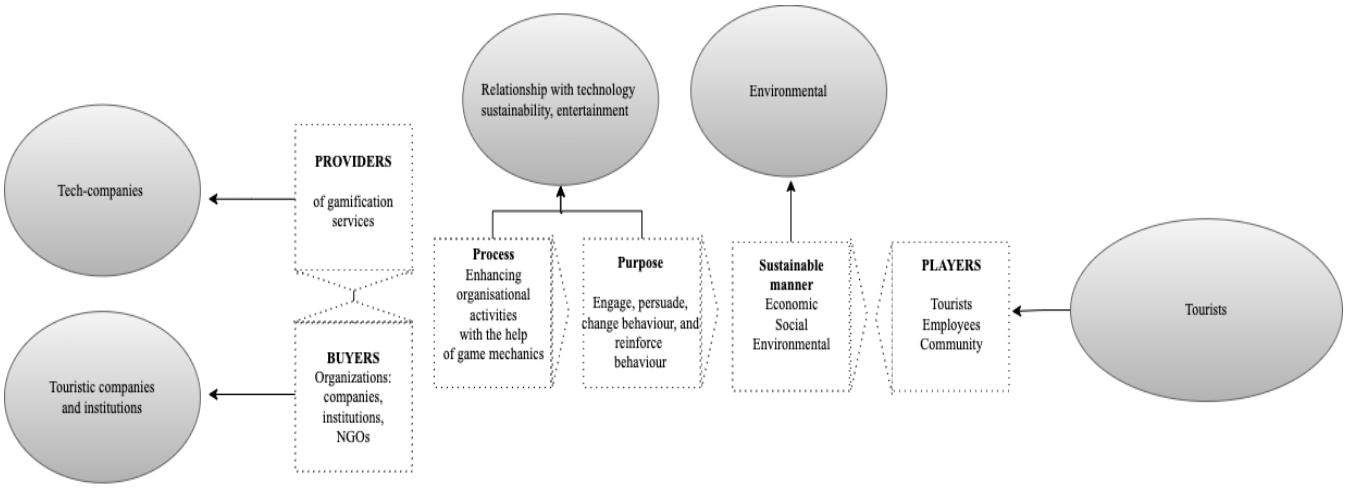
USD: United States Dollar

WebQDA: Web Qualitative Data Analysis

Chapter I
Introduction

1. Introduction

The present doctoral thesis aims to explores the potentials of ecogamification to promote sustainable urban tourism destinations on different stakeholders' perspectives. In the pursuit of an integrative view of gamification for sustainable tourism, this study enriched the interpretative framework of Negrusa et al. (2015) (see figure 1). This research examines in depth the less studied upstream stakeholders to empirically analyze the perspectives of specific buyers and providers of ecogamification in the context of tourism. Also, the downstream specific stakeholders were studied, for the purpose of understanding how ecogamification is processed from the perspective of tourists and their relationship with



technology, entertainment, and environment. The blackness framework is represented by Negrusa and the gray elements were added to demonstrate the specific angles of this study.

Figure 1. The mind map of a sustainable gamification process in tourism on different stakeholders' perspectives
Sourse: Adapted from Negruşa et al., (2015)

The thesis is composed by six articles (Table 1), in which four are in the main body of the thesis and two in the appendices. From the four articles that compose the body of the thesis, three correspond to publications indexed in Scopus and/or Web of Science. The first article, entitled How can gamification contribute to achieve SDGs? Exploring the opportunities and challenges of ecogamification for tourism, published in the Journal of Hospitality and Tourism Technology has as main goal examines specific stakeholders - those positioned at the upstream side of gamification process - and their perspectives concerning not only the benefits, but also the challenges of gamification. The second article published in Portuguese in the Journal of Tourism and Development as Potential of urban tourist receptivity to ecogamification: Framework and research propositions aims to develop a theoretical approach based on an analysis of the points of contact between the literature on

tourist segmentation and typologies facing sustainability and the literature on game user typologies.

The third article, entitled Factors influencing urban tourists' receptivity to ecogamified applications: A study on transports and mobility, published in the International Journal of Tourism Cities has as main goal examines how home and travel environmental behaviour, travel motivations, types of entertainment and technology proficiency influence the receptivity of urban tourists to different game elements in a transport & mobility context. The fourth article, entitled Potential receptivity to ecogamification in mobility & transport: A typology of urban tourists based on their relationship with technology, environment, and entertainment has as main goal perceived different types of urban tourists' receptivity to ecogamification, considering their perceptions towards technology, environment, and entertainment. Finally, regarding the two articles in the appendices, one corresponds to a conference paper also indexed on scopus, entitled Gamification as a research strategy to promote sustainable urban tourism, with the main goal of addresses the methodological paths of a P.h.D. research and the other article entitled Gamification and marketing for sustainable tourism: An exploratory review, developed at the beginning of the investigation, has as main goal analyse the literature on the potential of gamification towards a more sustainable tourism and understand how gamification is being perspectived and applied to solve problems of sustainability in the context of tourism, being published in a journal that at the time was not indexed to Scopus.

This chapter explores the current research scenario, clarifying its importance, research gaps and objectives, and finally, the research design.

Table 1
Thesis articles

Publication Status	Year of Publication	Authors	Article	Journal	Conference	Quartiles	Indexed
Published	2017	Souza, V.S., Marques, S.	Gamification and Marketing for Sustainable Tourism: An exploratory review	Journal of Tourism and Development	INVTUR 2017 International Conference		
Published	2020	Souza, V.S., Marques, S.R.B.V., Veríssimo, M.	How can gamification contribute to achieve SDGs? Exploring the opportunities and challenges of ecogamification for Tourism	Journal of Hospitality and Tourism Technology		Q1	Scopus /Web of Science
Published	2020	Souza, V., Marques, S., Veríssimo, M., Costa, C.	Gamification as a research strategy to promote sustainable urban tourism	Proceedings of the European Conference on Research Methods in Business and Management Studies	ECRM 2020 20th European Conference on Research Methodology for Business and Management Studies		Scopus
Published	2021	Souza, V.S., Marques, S.	Potencial de recetividade do turista urbano à ecogamificação: Framework e proposições de investigação	Journal of Tourism and Development	INVTUR 2021 International Conference	Q4	Scopus
Published	2022	Souza, V.S., Marques, S.	Factors influencing urban tourists' receptivity to ecogamified applications: A study on transports and mobility	International Journal of Tourism Cities		Q2	Scopus// Web of Science
Under submission	2022	Souza, V.S., Marques, S.	Potential receptivity to ecogamification in mobility & transport: A typology of urban tourists based on their relationship with technology, environment, and entertainment				

Follow the links regarding the content presented in the table 1:

Author's Scopus Publication List:
https://www.scopus.com/authid/detail.uri?authorId=57215876703

Author's Web of Science Publication List:
https://www.webofscience.com/wos/author/record/14857758

Science Citation Index:
Journal of Hospitality and Tourism Technology - https://www.scijournal.org/impact-factor-of-j-of-hospitality-and-tourism-tech.shtml
International Journal of Tourism Cities - https://www.scijournal.org/impact-factor-of-intl-j-of-tourism-cities.shtml

Scimago Journal & Country Rank:
Journal of Hospitality and Tourism Technology - https://www.scimagojr.com/journalsearch.php?q=21100220156&tip=sid&clean=0
International Journal of Tourism Cities - https://www.scimagojr.com/journalsearch.php?q=21100844181&tip=sid&clean=0
Journal of Tourism & Development - https://www.scimagojr.com/journalsearch.php?q=21100933997&tip=sid&clean=0

Journals indexing and ranking:
Journal of Hospitality and Tourism Technology - https://www.emeraldgrouppublishing.com/journal/jhtt
International Journal of Tourism Cities - https://www.emeraldgrouppublishing.com/journal/ijtc

1.1 Relevance, gaps, and objectives

The increase in urban populations has created challenges for cities (Buhalis & Amaranggana, 2013). To mitigate some of these challenges, cities have adopted information and communication technologies (ICTs) in infrastructure, services, and utilities to be efficient in their dynamics (Alfamicro & Alfamicro, 2015). A Smart City "represents an environment where technology is embedded within the city" (Buhalis & Amaranggana, 2013, p. 554), facilitating access to services with high value involved, both for residents and tourists (Buhalis & Amaranggana, 2013).

Viewed as a subset of the smart city, smart tourism provides tourists with solutions that add value to specific travel related needs (Khan et al., 2017). Liberato et al. (2018) suggest that smart tourism destinations can take advantage of ICT infrastructures to create value and memorable experiences for tourists, to generate competitive advantages and benefits for the destination.

Smart tourism has contributed to propagate the promotion of sustainability in destinations, especially in the context of mobility and transport. Aguiar-Castillo et al. (2019, p. 2) explain that "the mobility of the tourist is posing a pressing problem in those cities with a floating population markedly superior to its permanent population". This fact has resulted in several types of problems in destinations (e.g., high emission of CO_2 to the atmosphere, frequent traffic jams, noise pollution). For that reason, urban centers are interested in individuals who have better behaviours in relation to mobility (Kazhamiakin et al., 2015).

Thus, efforts to promote sustainable tourist behaviour have been massively encouraged by different tourism stakeholders and the concept of persuasive technologies has been a strong ally in this process. Persuasive technologies available in transport & mobility applications have the potential to impact travellers' decisions, attitudes, and behaviours, as well as leading them to more sustainable route options (Anagnostopoulou et al., 2018). Persuasive technology is characterized as a technology created to change users' attitudes and behaviour through persuasion mechanisms and social support (Fogg, 2003). One of the most widely used extensions of persuasive technology is gamification. Gamification is considered the combination of game mechanisms and design in the context of non-games (Deterding, 2011). It has been recognized as a viable and strategic form to overcome environmental problems that emerge from tourism (Souza et al., 2020). Its applicability in the context of

environmental sustainability is called ecogamification (Yen, 2015), which has been applied in different contexts as recycling, overtourism and sustainable transport & mobility.

Gamification is a recent concept, but it has ancient foundations since the notion of game itself was considered the basis for the emergence of culture in its various manifestations (Huizinga, 1999; Albornoz, 2009). Gamification has appropriated game elements as a premise to involve and motivate individuals in activities, actions, and behaviours at various times in history and in different sectors of society. Long before the concept of gamification emerged, some North American companies had applied game thinking to improve customer engagement and loyalty (Werbach & Hunter, 2012). Werbach and Hunter (2012) expose some common examples of gamification in the 19th and 20th centuries, when companies as S&H Green Stamps and Cracker Jack were considered pioneers in using game elements in business contexts. In 1896, the first company, created the green seals, a retail loyalty program that worked as a mileage system (points were accumulated to exchange for products or services). Today, this type of tool is widely used by airlines, hotels, and restaurants. In 1912, the second company, began to include Toy Surprise in popcorn boxes as a way to engage and entertain its consumers. These examples illustrate the introduction of game fundamentals such as scoring and rewards, which were used with the purpose of adding value and building proximity with consumers. Also, the game elements were used without the help of technology.

At the end of the 20th century, the use of game mechanics began to have online functionalities. Richard Allan Bartle was a leading player in the development of the online multiplayer games industry. Nike Pelling is considered “the father of gamification” in its current meaning, although he was not quite successful in trying to popularize the tool. In 2010, gamification started to gain notoriety in the business and academic worlds by designers who were interested in discussing, promoting, and exploring the potential of video games. A broader application of game dynamics into real problems contributed to materialize the tool. According to Fortune Business Insights, the global gamification market reached USD 6.33 billion in 2019 and project to achieve USD 37.00 billion by 2027. The numbers suggest that the demand for gamified systems will continue to grow in the coming years, generating business in several areas, including tourism.

As gamification penetrates all levels of the travelling experience (Xu et al., 2015; Negruşa et al., 2015) it is possible to find more examples of this trend. In the context of smart

urban tourism, gamified services can be identified in different tourism experiences such as fighting over tourism and apps that sensitize tourists to the appropriate use of infrastructures for recycling (e.g., 'Play London with Mr. Bean' and 'WasteApp'). In the context of sustainability, gamification can be extended to ecogamification, considering the purpose of solving environmental problems, e.g., mobility and green transport. It can be directed towards the demand for goods and services in tourism (e.g., transports to attractions) and applied to promote travel behaviour change, being designed to impact activities that demand transport (Yen et al., 2019). Additionally, it can reinforce sustainable behaviour, supporting tourists in their transport and mobility choices on holiday, with ecogamified mobile apps.

Despite the numerous successful cases of (eco)gamification, the tool is still the target of criticism. In 2010, the game designer Margaret Robertson created the term "pointsification" to criticize the superficial use of the points system in gamified services. Aguiar-Castillo et. al. (2018) calls "gamipulation" the use of game elements for the purpose of manipulating user behavior without their consent. Also, the game designer Bogost (2011) is known for criticizing gamification. In his book, Gamification is Bullshit, Bogost supports the best word to explain the real meaning of gamification is "exploitationware", a combination of the words Exploration (exploitation) with Software, conveying the idea that gamification makes use of games to replace real incentives with non-real incentives. Such terms present an ambiguity between the ideas of a constructive, motivating tool for users and a source of tension, with dangerous impacts to one's mental and social well-being (Shahri et al., 2014). Therefore, such challenges are even more critical in ecogamification, because even though it is a fundamental tool for dealing with sustainability issues (which are complex and demand long term planning) it can create even more barriers if the use of game elements is neglected. Less romanticized and more critical views on (eco)gamification have emerged, but these are not explicit enough. In this sense, Chou (2015) emphasizes that to have a successful gamification strategy, it is necessary to have a correct perception of the environment where the user is inserted, that is, it is essential to understand the target audience and their motivations.

1.1.1 Literature gaps

Despite the growing of the number of studies that cross gamification with other areas of knowledge such as sustainability and tourism, there are still few studies exploring the potentials of ecogamification to promote sustainable urban tourism destinations in the

perspective of different stakeholders, namely, those positioned upstream (buyers and providers) and downstream (tourists). Concerning this general research gap, specific gaps emerged that will be presented separately, based on their respective articles, to clarify the underexplored areas of each study, facilitating the individual and integrated contributions and the directions for future research (see figure 2).

The chapter "How can gamification contribute to achieve SDGs? Exploring the opportunities and challenges of ecogamification for Tourism[1]"(Souza et al., 2020), presents the following scientific fields underexplored in the literature: 1) Current literature demonstrates a considerable research increase on ICT and tourism (e.g., Gössling & Hall, 2019; Buhalis et al., 2019, Xu et al., 2014), ICT and smart tourism and cities (Ling et al., 2020; Xu, 2020; Boes et al., 2016), sustainability (e.g., Artal-tur et al., 2018; Lerario & Turi, 2018; Bonadonna et al., 2017) and gamification (e.g., Garcia et al., 2019; Skinner et al., 2018; (Xu et al., 2017a). 2) Regarding the intersection between gamification, tourism and sustainability, research is also increasing, but it is still scarce. In this specific domain, there are relevant and recent empirical studies on how to influence tourists' environmental behaviour (Aguiar-Castillo et al., 2019; Aguiar-Castillo et al., 2018) and some research focused on reviewing gamification case studies and best practices, considering the roles of providers, buyers, and players (i.e., Negruşa et al., 2015). This study contributes to filling the gap through examining specific stakeholders - those positioned at the upstream side of gamification process - and their perspectives concerning not only the benefits, but also the challenges of gamification.

Another literature gap was identified in the chapter "Potencial de recetividade do turista urbano à ecogamificação: Framework e proposições de investigação"(Souza & Marques, 2021), in which it is possible to know that the intersection between gamification, tourism and sustainability has deserved increasing research attention (Souza & Marques, 2017). However, there are still few studies on the potential of urban tourist receptivity to ecogamification. To fill this gap, this study develops a theoretical approach based on the analysis of the connection between literature on tourist segmentation and typologies facing sustainability and literature on game user typologies.

The chapter "Factors influencing urban tourists' receptivity to ecogamified applications: A study on transports and mobility"(Souza & Marques, 2022) identified the

missing piece in research literature since a considerable amount of studies have been published on persuasive technology and tourism (Xu et al., 2017), persuasive technology, smart tourism, and cities (Aguiar-Castillo et al., 2018; Cardoso et al., 2019; Yoo et al.,2017), sustainability (García et al., 2015; Pan & Liu, 2018) and ecogamification/game elements (Kazhamiakin et al. 2015; Klock et al., 2020; Xu et al., 2015). Literature on the factors that enhance ecogamification and the intention to use smart tourism applications is vast and increasing (Cardoso et al., 2019; Millonig & Mitgutsch, 2014; Yoo et al., 2017). However, most studies tend to focus on the "user", rather than the "tourist". Such gap triggered this research, which also examines how home and travel environmental behaviour, travel motivations, types of entertainment (digital and non-digital) and technology proficiency (professional vs non-professional) influence the receptivity of urban tourists to different game elements in a transport & mobility context.

Finally, the chapter "Potential receptivity to ecogamification in mobility & transport: A typology of urban tourists based on relationship with technology, environment, and entertainment" identified the following gaps: 1) Literature on smart urban tourism (e.g., Mehraliyev et al., 2020, Femenia-Serra et al, 2019, Encalada, 2017, Yoo et al., 2017), ecogamification (e.g., Aguiar-Castillo et al., 2019, Negruşa et al., 2015) has gained considerable attention from scholars and practitioners. Although research studies that intercept these fields of knowledge have made important advances in the last few years, there are also several gaps to be filled. 2) Regarding smart tourism literature, Mehraliyev et al. (2020) point out there is a lack of comprehension about tourist preferences, that is, little is known about the following questions: i) Which tourism segments prefer / do not prefer smart tourism? ii) What and to what degree? iii) Which aspects of smart tourism are most / less preferred? These unanswered questions help infer that our study contributes to this gap. A small number of studies focus on the types of tourists who are more receptive or not to ecogamified applications and suggest the extent to which tourists are interested or not in smart tourism. 3) Regarding ecogamification, there are few studies that focus on meaningful gamification (e.g., Aebli, 2019, Xu et al., 2017), which is an important perspective to deeply understand individuals' values and needs, precisely because its bases are anchored in the fundamentals of human-centric design, as seen in Aebli (2019). Furthermore, most studies focus on the "user" rather than the "tourist" (Souza & Marques, 2021). In other words, the tourist is seen only as a "user", and a broader approach is needed to understand what explains

the receptivity to ecogamification in the context of travel. In this context, the purpose of the study is understanding the relationship with technology, entertainment, and environment to perceive different types of urban tourists' receptivity to ecogamification. Rather than focusing on the "user" or on the "gamer", a broader approach is applied, one that focus on the "tourist", whether he/she is a gamer or not.

As previously observed, although there are many studies about gamification and tourism, there are few that empirically explore the potentials of ecogamification to promote sustainable urban tourism destinations from the perspective of different stakeholders. Such scarcity means this study can be important and unique for literature encompassing tourism, sustainability and gamification, as it helps to clarify the potential of ecogamification from the perspective of the different stakeholders, namely, those positioned upstream (buyers and providers) and downstream (tourists).

1.1.2 The study's objectives

Based on the literature presented and designed to fill the identified gaps, this study aims at exploring the potentials of ecogamification to promote sustainable urban tourism destinations on different stakeholders' perspectives, namely, those positioned upstream (buyers and providers) and downstream (tourists). To achieve this general objective, four scientific articles were developed with the following specific objectives (see figure 2):

- Examines specific stakeholders - those positioned at the upstream side of gamification process - and their perspectives concerning not only the benefits, but also the challenges of gamification;
- Develop a theoretical approach based on an analysis of the points of contact between the literature on tourist segmentation and typologies facing sustainability and the literature on game user typologies;
- Examines how home and travel environmental behaviour, travel motivations, types of entertainment (digital and non-digital) and technology proficiency (professional vs non-professional) influence the receptivity of urban tourists to different game elements in a transport & mobility context;
- Perceive different types of urban tourists' receptivity to ecogamification, considering their perceptions towards transport & mobility applications, environmental behaviour on holiday, and types/need for entertainment.

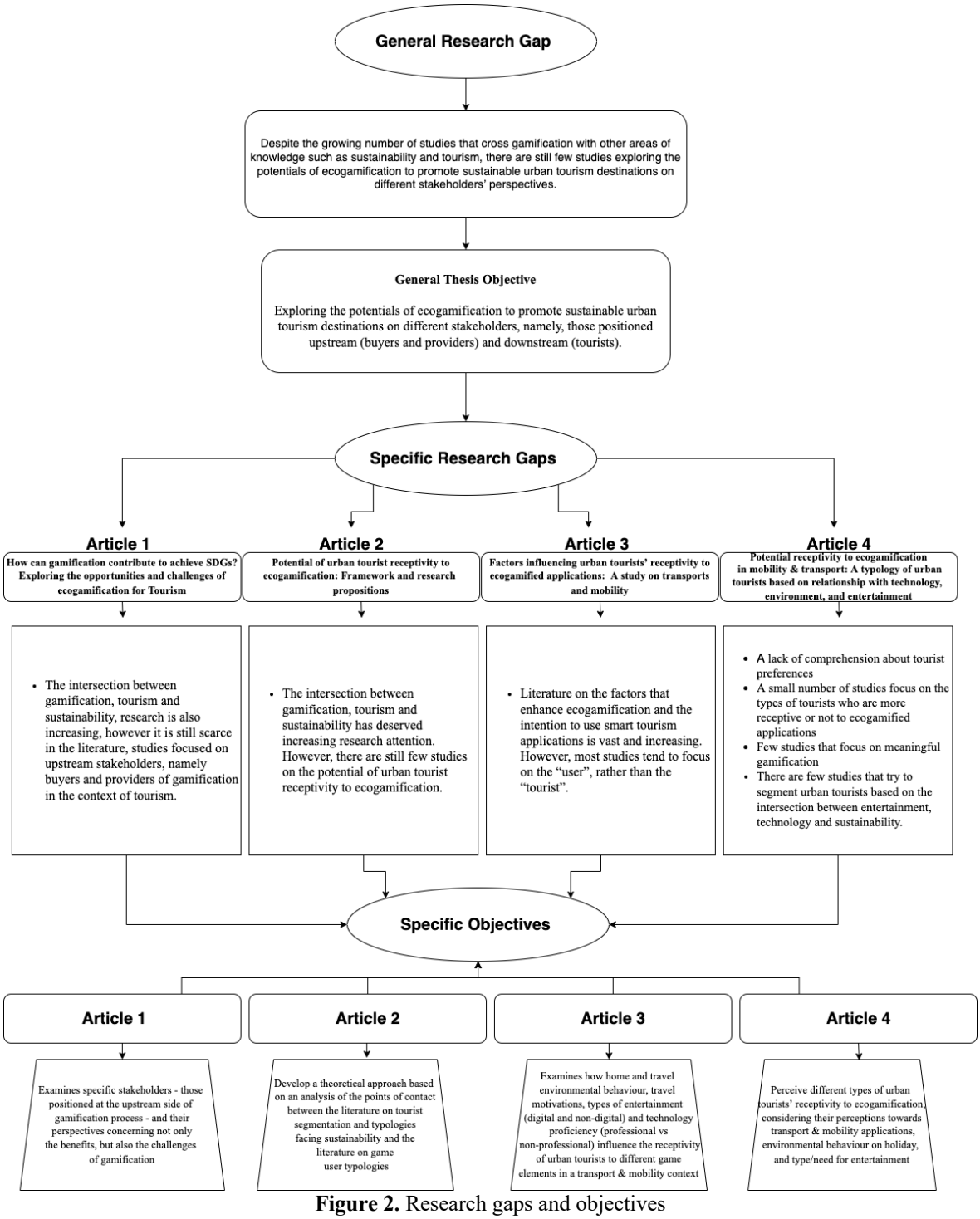


Figure 2. Research gaps and objectives
Source: The authors

1.2 Methodology overview

This section will provide an overview of the thesis methodology and the construction of the study's research design (Figure 3). The methodology is underpinned on the research onion concept, proposed by Saunders et al. (2012), describing the methodological process of the study according to the philosophies, approaches, methodology strategy and choices, time horizons and thechnique/procedures, as shown by Figure 3.

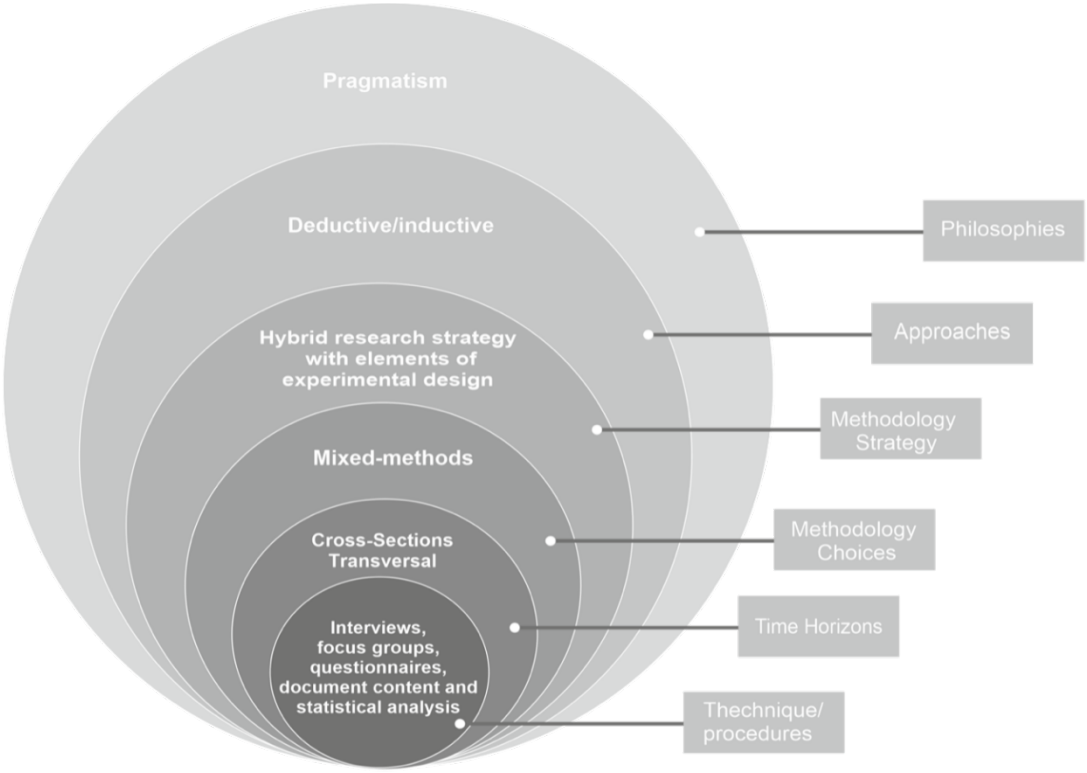


Figure 3. Methodology construction and design (based on Saunders et al., 2012)
Source: The authors

Philosophies – The study follows the pragmatic research paradigm, as according to Creswell (2009). The pragmatists' concern lies in the solution of problems, in which researchers are free to use different approaches to achieve the understanding and solution of the proposed problem.

Approaches – According to Saunders et al. (2012) the deductive approach starts from the general to the specific, which involves literature review and experience, also basing its hypothesis on the theory random observations, to obtain a confirmation or rejection of the hypothesis. On the other hand, the inductive approach, which starts from the specific to the general, makes observations, finds patterns, creates hypotheses, exploring and validating

them, forming a theory without hypotheses. This investigation adopts a deductive approach combined with some elements of the inductive approach.

Strategy - It is related to the nature of the research question and objectives and to the coherence with the other elements of the research design, as the choice of its method (e.g., survey, grounded theory, case study, experiment, etc.). In the social sciences, studies with an exploratory nature recurring to qualitative experiments can be applied to tourism. Besides, perspectives that explore elements of experimental design can be used to predict the impact that controlled changes may have on attitudes or behaviours (Guadalupe et al., 2014; Mekler et al., 2017; Sailer et al., 2017). This investigation adopts a hybrid methodological strategy that merges elements of experimental design, which can be verified in more detail in the investigation phases, especially in phases III and IV.

Choices - There are two types of choices: Mono-method (quantitative or qualitative) and multiple-method (multimethod or mixed-method) (Saunders et al., 2012). This study follows the mixed methods, considering that quantitative and qualitative research are combined in the research design, in a mixed and integrated way.

Time horizon – it can be longitudinal or cross-sectional. The two methods are defined based on the research objectives, in which the first has as its principle a long data collection stage, whereas the second has as its premise a shorter data collection period. This research is cross-sectional because it studies a phenomenon at a particular time.

Techniques and procedures - it is characterized by data collection and analysis processes. This study used a miscellaneous of interviews, qualitative experiment with focus groups, questionnaires, content, and statistical analysis. It was conducted in four different phases:

The first phase encompassed a literature review about the role of technology and the potential of ecogamification in the urban tourism field, as well as the relevance of pro-environmental behaviour in promoting sustainable tourism. The second phase covered the conduct of in-depth interviews with stakeholders, namely with potential buyers from

tourism-related institutions and technology providers. The third phase comprised the design and prototype development of a gamified app, supported and validated by a panel of experts that included web developers, designers, and test engineers. The fourth and fifth phases, consist in conducting a qualitative experiment with focus groups and questionnaires with urban tourists. The phases second, fourth and fifth are composed by empirical articles. More details regarding the methodology summary see the figure 4.

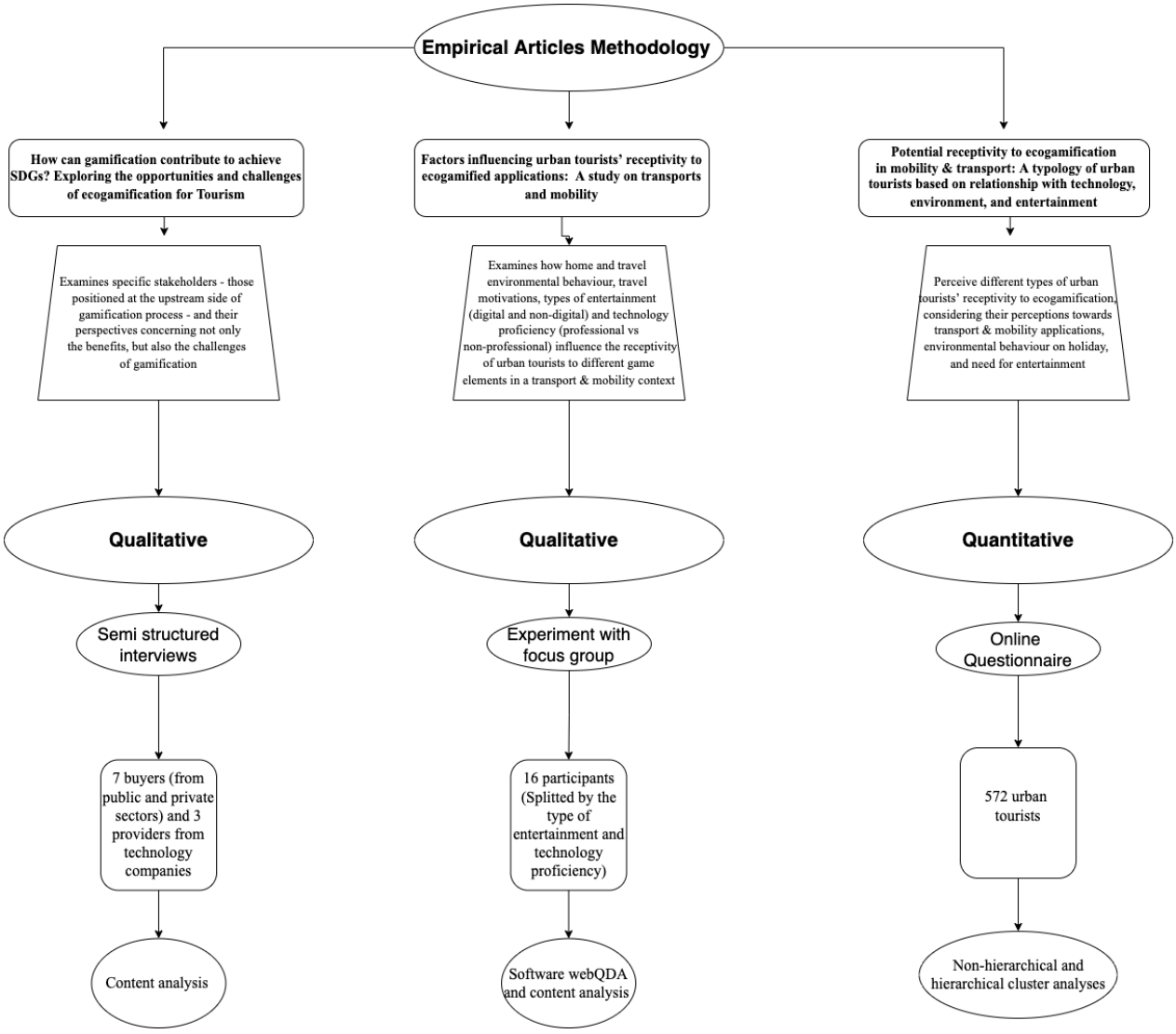


Figure 4. Empirical articles methodology
Source: The authors

Phase I – Literature review

In this phase, secondary data, such as journals, articles, reports, websites, games, scientific journals, conference proceedings and specialized books were analysed. A literature review was carried out on central and transversal themes such as (eco)gamification, environmental sustainability, tourism, and the environment, pro-environmental behaviour, smart tourism, and persuasive technology. For that purpose, online databases, such as SCOPUS and B-on were used to collect information, further analysed in Souza and Marques (2017). This phase was crucial for finding the research gaps and defining the research goals.

Phase II - Conduction of in-depth interviews with upstream stakeholders (buyers and providers)

This phase aimed at identifying the opportunities and challenges that ecogamification may bring for tourism, considering the perspectives of the upstream stakeholders. For that purpose, 10 semi-structured in-depth interviews were conducted with 7 buyers (from public and private sectors) and 3 providers from technology companies, to contextualize the emerging touristic and technological Portuguese context. The interviewees' selection followed the snowball sampling method, and the profiles suggested by others had been previously analysed to avoid bias. Data was collected from January to March 2018 through face-to-face interviews and had an average duration of 40 minutes, recorded with the interviewees' previous permission. The interviews were translated into English and evaluated through content analysis. The results of this phase are published in Souza et al. (2020).

Phase III - Prototype development and validation

This phase aimed at developing a prototype that facilitates users' perception about the gamification elements incorporated in a mobile application to sustainable tourism services (mobility & transport). The prototype was built based on the suggestions of Morschheuser et al. (2017) in which the processes of project preparation follow the phases of analysis, ideation, design, implementation, and evaluation. The ideation and design of the prototype were based on the inputs of phases I and II, while the implementation and evaluation referred to phases IV and V. The prototype development took into consideration the knowledge gained from literature review, besides buyers and providers' perspectives. Those perspectives underline the potential of ecogamification to promote "green" behaviour, to

transmit complex information through entertainment, to reward users for good practices, to improve engagement and to help avoiding overtourism. Additionally, the prototype included game design elements as cooperation, ranking, rewards, and endorsement through an avatar.

The prototype was built using Adobe XD, which allows the creation of interactive prototypes that simulate the actual navigation of a mobile application, without the need to create the final product. After concluding the prototype, we consulted a set of experts from different areas including 5 web developers, 2 designers and 1 tester engineer, to offer inputs on the prototype. The experts evaluated its functionalities and consistency with the implemented gamification elements. The feedback was positive and most of their suggestions were incorporated. The experts also suggested the idea of naming the avatar as 'Greta Thunberg', the popular and young environmental activist, but, naturally, that idea was not applicable. The final version is shown in the following image:

Figure 5. Login page

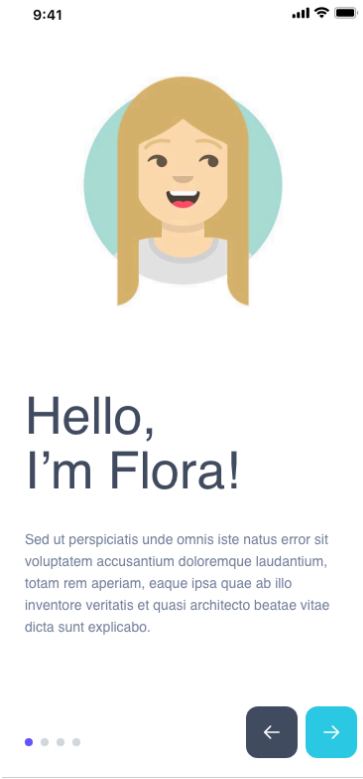


Figure 6. Avatar introduction

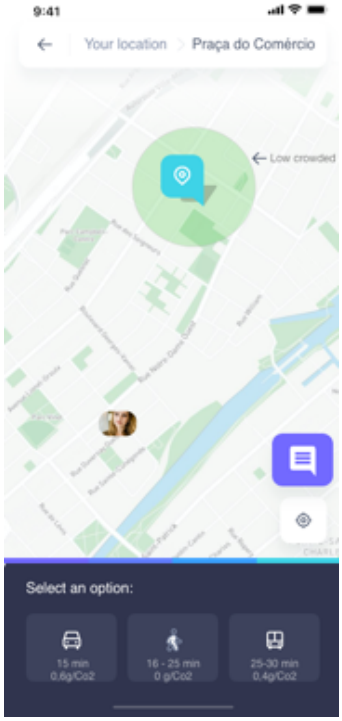


Figure 7. Route planning

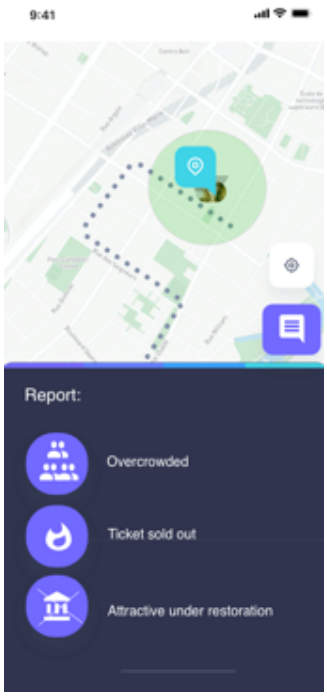


Figure 8. Route evaluation

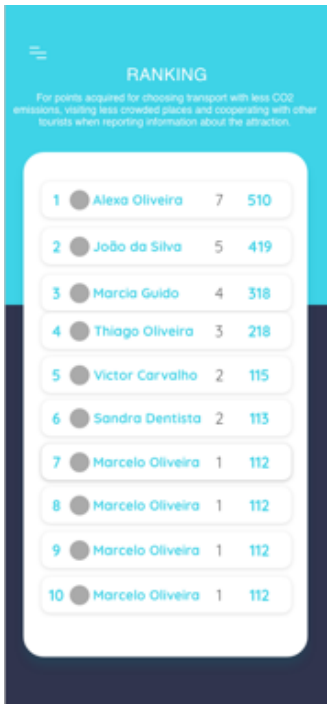


Figure 9. Ranking panel

Phase IV – Qualitative experiment with focus groups

The main objective of phase IV is to assess differences and similarities in terms of receptivity of urban tourists to ecogamified service. To achieve that purpose, a qualitative experiment method with focus groups was held to examines how home and travel environmental behaviour, travel motivations, types of entertainment (digital and non-digital) and technology proficiency (professional vs non-professional) influence the receptivity of urban tourists to different game elements in a transport & mobility context.

Qualitative experiment method is defined as an 'intervention on an (social) object to research its structure, that is, the exploratory and heuristic form of the experiment' (Kleining, 1986, p. 724). The method submits participants to a certain experiment (e.g., task, game, or stimulus) with the aim of perceiving attitudes and behaviours (Kleining & Witt, 2001). Operations of this type have been applied to studies in social sciences to explore a certain daily life, without resorting to defined hypotheses and with semi-delimited research questions (Kleining & Witt, 2001; Semerci et al. 2018). Simultaneously, the method allows an alliance with other qualitative methods, offering flexibility and dynamism for research.

Focus groups are considered a strategic way of measuring in depth attitudes, behaviours and opinions about a problem, product, or service (Kumar, 2011). Freitas et al. (1998) explain that there are advantages and disadvantages of using the technique. In one hand, it allows 1. collecting an adequate amount of data in a short period of time, 2. flexibility in collecting data that is not usually achieved when applying an instrument individually and 3. spontaneity of interaction between participants. On the other hand, it requires a better preparation of the site itself (where focus groups will take place) and an in-depth analysis of the results. Furthermore, applying a focus group technique can be a valuable complement to quantitative methods of research (Freitas et al., 1998). Therefore, it will be used in this study in sequence with phase 5, aiming at achieving similar and complementary goals.

Regarding focus groups with urban tourists, due to the limitations related to COVID-19 issues, the face-to-face approach was replaced by online data collection strategies. The focus group was carried out in December 2020 through Google Meet platform. Each focus group meeting lasted between 1 and 1.5 hours and was recorded with the participants' previous permission. A pre-test was carried out with 8 participants to try the prototype and to calibrate the steps to be followed in the final focus group. They were recruited through posts in professional social media profiles and groups, as LinkedIn, for one week, following

a set of criteria: 1) The participant was a user of persuasive technology and 2) The participant had taken at least one holiday trip to an urban destination in the past 3 years. In addition to these two criteria, it was also important to ensure participants had different preferences in types of entertainment (digital and non-digital) and types of technology proficiency (professional vs non-professional). Finally, 16 participants were segmented into 2 groups: A1/A2 – B1/B2. Type of entertainment and technology proficiency were used as segmentation criteria for being manageable factors to operate and divide the sample. Sustainable behaviour when travelling/home could bring bias when segmenting groups, since it is a more subjective and complex dimension to classify groups of small samples. The sample size followed the minimum and maximum sampling rules for focus group studies and its selection was based on criteria that allowed respondents to provide relevant data.

During data collection, to assure validity and reliability (e.g., Brink,1993), researchers took a neutral position, maintaining the ability to take a subjective look at the focus group, without compromising the behaviour and attitude of the participants. Several strategies were also followed to increase the validity of answers: building an environment of trust, ensuring participants had a clear understanding of the research nature and the processes during the focus group, providing notes throughout the process; validating responses through confirmatory questions at different times. The mechanical recording was used to increase the accuracy of transcriptions.

The data analysis procedure was carried out using the software webQDA (Web Qualitative Data Analysis) to systematize and categorize data. The content analysis procedure was qualitative, based on the presence or absence of a characteristic or set of characteristics in the analysed messages, instead of the purely descriptive objective of quantitative techniques (Capelle et al., 2003). Researchers sought to identify elements that could express the opinions and attitudes of the participants regarding the dimensions specified in the literature review previously presented, instead of simply counting the frequency of the appearance of terms referring to these judgments. Data analysis followed the steps of coding and classification of categories.

Phase V - Questionnaires with urban tourists

Phase V is the last phase of the research, and its main goal is to verify the potential receptivity of urban tourist to ecogamification and their intention of using the

ecogamification service. Online questionnaires were the data collection instrument of this phase, which was applied with tourists who had over 18 years old and have travelled to urban destinations in the past 3 years. According to Hung and Law (2011), the application of online surveys offers some advantages for researchers, as they are efficient instruments with fast response time, that enables the possibility to reach hard-to-find target audiences and may offer a fun / novel / enjoyable experience. Basing the quantitative collection of data on internet surveys will allow the access to a wider range of respondents, with heterogeneous profiles and from different geographical areas.

The questionnaire was published in different social media channels (i.e., LinkedIn, Facebook, and Instagram) and groups (e.g., gamers and online travellers) through Google Forms, since the platform offers a friendly interface, it is free and it allows researchers to control the integrity of their research, reducing the levels of missing values in the responses. In the final survey, questions were organized in six parts: (i) travel motivations, (ii) travel environmental behaviours; (iii) perceptions towards transport & mobility applications, (iv) use and non-use of green mobility & transport applications and types of rewards, (v) behaviour for different types of entertainment and need of entertainment and (vi) sociodemographic profile. The questionnaire includes open and closed questions with multiple choice and 5 points Likert-type scales. For the statistical data analysis was used the Scientific Package for Social Scientist (SPSS 20.0), in which the data were subjected to different analyzes and methods, such as: descriptive analyses, ANOVA, Hierarchical and Non-Hierarchical Cluster Analysis and K-means Cluster Analysis. The score of the dimensions mentioned above, for each case of the sample, was performed by calculating the average of the items that constitute them, according to the theory

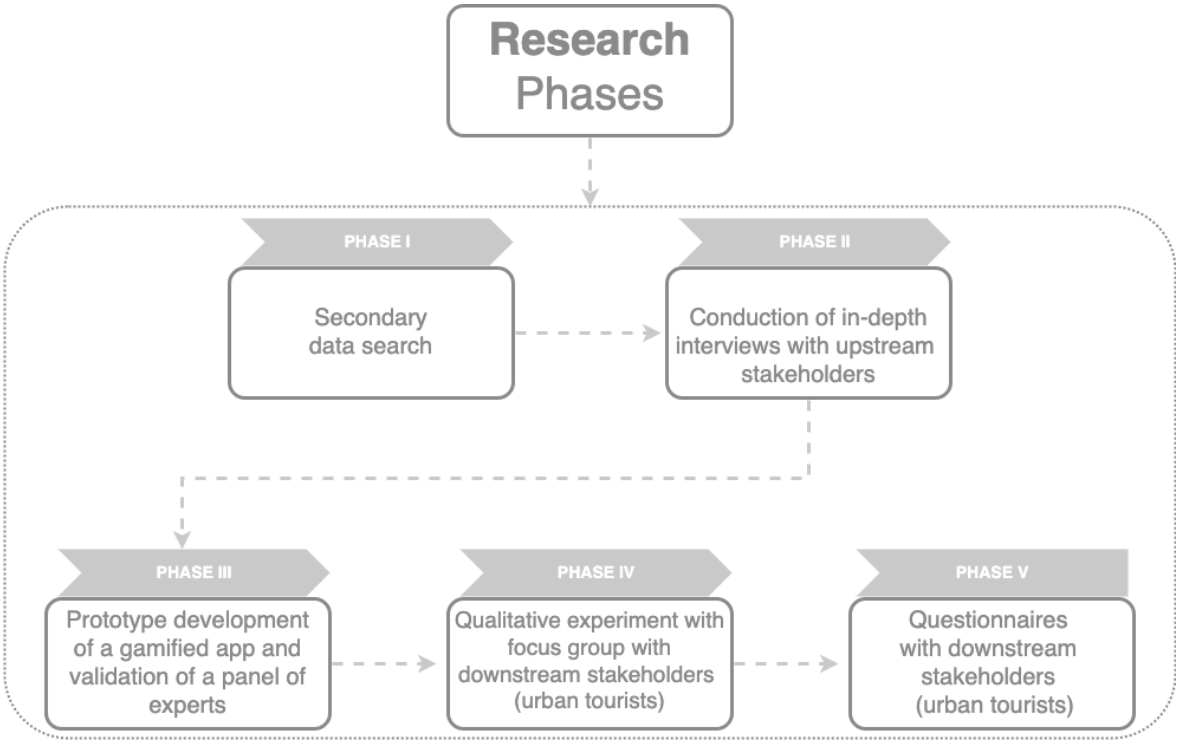


Figure 10. Thesis research phases

1.4 Structure of the thesis

The thesis is divided into six chapters (see figure 11). The first chapter contains the introduction, chapters two to five correspond to four scientific articles that aimed to respond to the specific objectives of the thesis. The first three articles were submitted to peer-reviewed scientific journals, and they were accepted and published as mentioned in footnotes. The article inserted in chapter V is in under submission. Finally, there is the sixth chapter that corresponds to the conclusion and implications for the study.

The chapter "How can gamification contribute to achieve SDGs? Exploring the opportunities and challenges of ecogamification for Tourism"(Souza et al., 2020) examines specific stakeholders - those positioned at the upstream side of gamification process - and their perspectives concerning not only the benefits, but also the challenges of gamification. In short, it contributes for a better understanding of Ecogamification in tourism through the eyes of buyers and providers, providing insights concerning the role of these specific stakeholders and the relationship between them. Also, in the pursuit of an integrative view of gamification for sustainable tourism, the study hopefully will enrich the interpretative framework of Negrusa et al. (2015).

The chapter “Potential of urban tourist receptivity to ecogamification: Framework and research propositions”(Souza et al., 2021) is a theoretical study based on an analysis of the points of contact between the literature on tourist segmentation and typologies in the face of sustainability and the literature on game user typologies. From this intersection, a framework and a set of theoretical propositions are built around six categories of analysis that correspond to factors such as sociodemographic profile, behavioral profile, environmental travel behavior, personal motivation, travel motivation and game elements.

The chapter “Factors influencing urban tourists’ receptivity to ecogamified applications: A study on transports and mobility”(Souza et al., 2022) examines how home and travel environmental behaviour, travel motivations, types of entertainment (digital and non-digital) and technology proficiency (professional vs non-professional) influence the receptivity of urban tourists to different game elements in a transport & mobility context. The results suggest differences and similarities in terms of receptivity of urban tourists to ecogamification which might have implications for future studies on urban tourists’ typologies and segments and providers of ecogamified services.

The chapter V, entitled, “Potential receptivity to ecogamification in mobility & transport: A typology of urban tourists based on relationship with technology, environment, and entertainment” aims to perceive different types of urban tourists’ receptivity to ecogamification, considering their perceptions towards mobility & transport applications, environmental behaviour on holiday, and types/need for entertainment. It follows a segmentation approach, using a self-administered online questionnaire. The data derived from 572 respondents who were over 18 years old and have travelled to urban destinations in the past 3 years and were analysed through a combination of non-hierarchical and hierarchical cluster analyses. The results reveal four clusters of urban tourists with different types of potential receptivity to ecogamification: “Mobi Wholeheartedly”; “Mobi Whatever”; “Mobi Profiter”; and “Mobi Utilitarian”. This approach brings novelty to gamification literature because it not only addresses the degree of receptivity to (eco)gamified apps, but also how that disposition might occur. The implications provide tailored managerial strategies to reach and deliver value to different types of urban tourists and might also contribute to the scarce literature on smart tourism segmentation.

Finally, in chapter VI, the conclusions and implications of the thesis are presented. Simultaneously, this chapter presents the theoretical and managerial implications of the study. Finally, it ends with limitations and suggestions for future research.

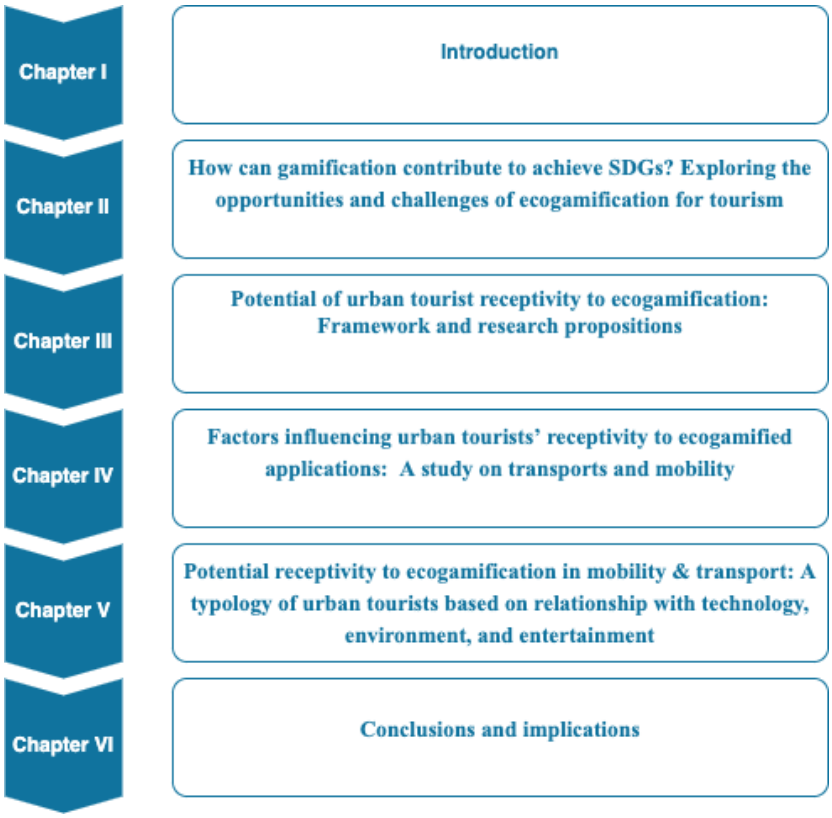


Figure 11. Structure of the thesis

Chapter II

How can gamification contribute to achieve SDGs? Exploring the opportunities and challenges of ecogamification for tourism

How can gamification contribute to achieve SDGs? Exploring the opportunities and challenges of ecogamification for Tourism

Abstract

Purpose:

There is a considerable growth in research focusing on information and communication technologies (ICT) in tourism, including its contribution to smarter and greener destinations. However, empirical literature on the specific intersection between gamification, tourism and sustainability is still scarce. Gamification can be used as a strategic tool to help overcoming the sustainability challenges brought to destinations and companies by tourism. Its application for environmental purposes, known as ecogamification, is well suited and applicable to tourism activities, particularly when it is designed having Sustainable Development Goals (SDGs) in mind. Within this context, the present study examines specific stakeholders - those positioned at the upstream side of gamification process - and their perspectives concerning not only the benefits, but also the challenges of gamification.

Design/methodology/approach:

The study follows a qualitative-exploratory approach and bases its results on the analysis of 10 in-depth interviews conducted with buyers and providers from the emerging Portuguese tourism and tech markets.

Findings:

Results shed light on some of the benefits ecogamification can bring, as well as the challenges both buyers and providers face in order to apply it in the tourism sector. On the one hand, the interviewees pointed out: (i) the lack of investment, (ii) the resistance to new technologies/ideas, (iii) the low eco-consciousness levels of tourists and (iv) the distraction from issues that matter are the main barriers they face when planning to sell or adopt ecogamified tools. On the other hand, six opportunities were identified, namely, the fact that it can be used to: (i) promote 'green' behaviour and sustainable tourism, (ii) transmit complex information more easily through entertainment, (iii) reward users for good practices, (iv) improve engagement and the tourism experience, (v) reach new target groups and (vi) help avoid overtourism.

Research limitations/implications:
The limitations of the research are related to the findings that are restricted to the qualitative analysis and the limited sample size.

Practical implications:
Specific benefits and challenges of Ecogamification arise from buyers and providers. The practical implication of it relates to the application of Ecogamification, which implies micro and macro corporate structures; it is essential that the involved market structures, such as governments and tourist companies, share the same logic of integration to benefit not only the tourism industry but also the society.

Originality/value:
In short, it contributes for a better understanding of Ecogamification in tourism through the eyes of buyers and providers, providing insights concerning the role of these specific stakeholders and the relationship between them. Also, in the pursuit of an integrative view of gamification for sustainable tourism, the study hopefully will enrich the interpretative framework of Negrusa et al. (2015).

Keywords: Gamification, Ecogamification, Sustainability, SDGs, Tourism.

1. Introduction

Gamification is the process of "turning something into a game - using the features of games to accomplish a real-world objective" (Grossberg et al., 2015, p. 1). Nowadays, as gaming is also considered to contribute to developing problem-solving skills, it is also playing an increasingly important role in society and people's daily lives (Weber, 2014).

The gaming industry is currently a global and growing market evaluated in $960.5 million and expected to increase another $23 million by 2022 (P&S Market Research, 2017). There are three main reasons for this increase: i) the relevance of social media; ii) the fact companies and organizations are increasingly resorting to gamified strategies; and iii) the evolution of mobile technology (P&S Market Research, 2017). As gamification penetrates all levels of the travelling experience (Xu et al., 2015; Negruşa et al., 2015) you can find more and more examples for this trend. In addition to social media games that promote

tourist destinations, such as Ireland Town (apps.facebook.com/irelandtown [6 September 2019]), or that fight overtourism (e.g., 'Play London With Mr Bean' - https://www.play.london [8 September 2019]); there are also apps that promote social responsibility and tourist engagement with host communities (e.g., Hotel Prinz Luitpold-Ba, in Baviera, Germany (Weber, 2014)), and that sensitize tourists to the appropriate use of infrastructures for recycling, as the URBAN-WASTE H2020 EU project, and its 'WasteApp' (Aguiar-Castillo et al., 2018). These examples illustrate not only how gamification has grown, but also its receptiveness and potential to branch out, including through ecogamification.

Several factors have been contributing to make gamification popular in the tourism sector, namely, new technological trends and the efforts from governmental organizations, such as the United Nations World Tourism Organisation (UNWTO), which have been defining public policies regarding innovation and technology in order to improve the participation of tourism in the universal 2030 Agenda for Sustainable Development (Jones et al., 2017). Moreover, companies, taking advantage of the affordances of the sustainability agenda as a gateway for using innovative and sustainable businesses' practices and models (turismo4sdgs.org), are also contributing to gamification's popularity. These factors have played a significant role in promoting the potential of ecogamification as a way of achieving Sustainability Development Goals (SDGs), particularly in what concerns sustainable cities and communities (SDG 11) and the promotion of responsible production and consumption (SDG 12). As to the first, the UNWTO recommends that government institutions should promote the technological knowledge of tourism buyers, so they can build on this knowledge and provide solutions for sustainable integrated urban development and. Regarding the latter, the UNWTO's recommendation is that institutions and companies must consecutively develop public policies that encourage the use of recyclable materials and implement innovative solutions that meet sustainability trends and promote sustainable consumption among stakeholders (UNWTO, 2019).

Simultaneously (and inevitably), as it becomes a trend, gamification is also becoming the object of critical approaches and research by professionals and academics from various areas of knowledge (Souza & Marques, 2017). Serious and multidisciplinary reflections that go beyond the technical applicability of this tool are gaining relevance (Fizek et al., 2015). For example, the anthology The Gameful World: Approaches, Issues, Applications, edited

by Walz e Deterding (2015) connects very different perspectives and points of view, including critical perspectives and strong positions, like the ones of Froehlich (2015) and Bogost (2015), a renowned game designer. Such approaches enrich the debate surrounding the challenges and opportunities of gamification, especially when it comes to its contribution to finding solutions for complex problems and issues, such as sustainability.

Current literature demonstrates a considerable research increase on ICT and tourism (e.g., Gössling & Hall, 2019; Buhalis et al., 2019, Xu et al., 2014), ICT and smart tourism and cities (Ling et al., 2020; Xu, 2020; Boes et al., 2016), sustainability (e.g., Artal-tur et al., 2018; Lerario & Turi, 2018; Bonadonna et al., 2017) and gamification (e.g., Garcia et al., 2019; Skinner et al., 2018; (Xu et al., 2017a). In what concerns the intersection between gamification, tourism and sustainability, research is also increasing, but is still scarce. In this specific domain, it is important to mention that there are relevant and recent empirical studies on how to influence the environmental behaviour of tourists (Aguiar-Castillo et al., 2019; Aguiar-Castillo et al., 2018) and some research focused on the review of gamification case studies and best practices, considering the roles of providers, buyers and players (i.e., Negruşa et al., 2015). Within this context and building on the study of Negrusa et al. (2015), this study aims at analysing specific stakeholders - those at the upstream of the gamification process – with a particular focus on their perspectives on the challenges (and not just the benefits) of gamification. Finally, this study intends to suggest ways of applying ecogamification in tourism, by bringing evidence from the emerging Portuguese market.

2. Literature review

2.1 Benefits and challenges of gamification

The concept of gamification within the academic scope was first defined in 2011 and, despite the diversity of concepts and definitions, the most common seems to be the one that defines it as the ‘use of game design elements in non-game contexts’ (Deterding et al., 2011, p. 2). Furthermore, this concept has been extensively applied in studies on gamification and tourism. Thus, the gamification concept has evolved and has been incorporated into many different scopes, including education, where it refers to ‘using game-based mechanics, aesthetics and game thinking to engage people, motivate action, promote learning, and solve problems’ (Kapp, 2012, p. 202), service marketing, as ‘a process of enhancing a service with affordances for gameful experiences in order to support user’s overall value creation’

(Huotari & Hamari, 2016, p. 20), among others. In order to have a more holistic understanding of the concept in varied contexts (including business), it is important to examine different points of view on gamification.

Nicholson (2012) explains there are two categories of gamification that can be developed by technological companies: User-Centered Design (UCD) and Organization-Centered Design (OCD). The former focuses on users as the centre of attention of those who think and develop the gamified service or product. The latter is also user-oriented, but its objectives are not to prioritize the interests and desires of users, but of the organization. This approach makes use of 'external rewards to control user behaviour, creating a negative feeling for those who actually use that product or service' (Nicholson, 2012, p. 5).

In this sense, Werbach and Hunter (2012) reinforce that effective gamification requires the understanding of game design and, above all, business techniques, which involve segmentation and market feasibility, aiming to achieve long-term involvement in gamified experiences. The authors emphasize that only a few companies have been successful at achieving both skills, which justifies why managers believe that gamification is something new and challenging for their businesses. In line with this idea, Kamasheva et al. (2015) explain that the development of services and products is complex, especially because there are no formulas to make the product adaptable to different organizational realities. According to the authors, if the implementation of gamification is not related to a company's culture, there will not be significant results from it.

The benefits of gamification are well documented in the literature, including employee engagement and performance in the workplace (e.g., Robson et al, 2016; Negruşa et al., 2015), and communication and marketing (e.g., Sever et al., 2015; Yılma and Coşkun, 2016). Negruşa et al. (2015) argue that gamification can be positive not only to companies, but also to society and the environment. For example, gamification can improve the ability of employees to learn a company's working processes, reduce spending, and develop innovative ways of recruiting, which might be beneficial to the company's image. Consequently, it benefits society because such investment in employee training may lead to higher levels of employability and quality of jobs. Also, the environment indirectly benefits from it, as the carbon footprint is reduced since travelling resources are not necessary (Negruşa et al., 2015). Robson et al (2016) explore the use of gamification to involve employees and consumers and identify four different types of collaborators and clients that

act as users on gamified experiences, namely, Slayers, Strivers, Socialites and Scholars. Additionally, they present five lessons for managers with an interest in implementing gamified services in their business: understand your players before deciding on gamification mechanics, timing of rewards is key, add new levels, tasks, or players as needed, managers must act as referees and use gamification mechanics to keep track of the score.

From a marketing's perspective, gamification can be helpful in many ways, namely for enhancing loyalty, communication, advertising and involvement. Yılma and Coşkun (2016) explain that there is a tendency for new communication and marketing tools to embrace new approaches in order to engage their consumers, since traditional forms do not captivate consumers of recent generations. Concerning the potential of gamification for tourism marketing and communication, Sever et al. (2015) argue that ICTs have contributed to transforming tourism business structures and that gamification has been useful as it creates fun experiences while transmitting data and content. Another opportunity provided by gamification is that users participate in the creation of content, which improves involvement between the parties (Sever et al., 2015).

Regarding gamification´s potential, the tourism industry relies on some good-bad cases, worth mentioning. As a successful case, there is the Costa Cruise Company example that has used gamification to inform travel agents, retailers and sales staff about existing offerings in tourist destinations. In order to achieve that, the company used an e-learning platform with gaming mechanisms to engage its target audience through a game. Marriott Hotel has also successfully used the strategy in the recruitment sector to reach younger candidates for the hospitality industry. On the other hand, Disneyland is referred as an unsuccessful case of gamification in the tourism context. The company developed a scoring monitoring system to rank – and show, in a panel - their cleaning crew's work speed, in which those who were faster organizing sheets, towels and pillows had their name displayed with their individual efficiency ranking (Lopez, 2011). However, the system did not meet the expected goal of generating healthy competition among employees. On the contrary, it was actually responsible for creating negative effects on the team, such as fear and feelings of exacerbated control (Negruşa et al., 2015; Lopez, 2011).

In this context, it is important to further examine the challenges raised by gamification and the problematic effects it may have. Shahri et al. (2014) suggest that the ethical use of gamification is characterized by the use of game design, which does not create serious

consequences to users, as long as there is moderate competition and volunteer participation, aligned with the values of the target audience. However, it is not always that gamification uses an ethical approach and this has been a reason for criticism from researchers and game developers, mostly due to the negligent use of game mechanics and elements (Nicholson, 2012). For example, the term "pointsification" is related to reducing gamification to a point system, not considering more efficient functionalities such as intrinsic and extrinsic motivation, with the objective of engaging users in long term gamified actions (Robertson, 2010; Nicholson, 2012). From a different perspective, "gamipulation" refers to a bad intentioned use of game design elements, with the purpose of manipulating users' behaviour without their consent (Aguiar-Castillo et al., 2018). Those terms show the ambiguity between the ideas of a constructive, motivating tool for users and a source of tension, with dangerous impacts to one's mental and social well-being (Shahri et al., 2014). Therefore, such challenges are even more critical in ecogamification, because even being a fundamental tool for dealing with sustainability issues (which are complex and demand long term planning); it can create even more barriers if the use of game elements is neglected.

A particularly critical evaluation is provided by Bogost (2015) who considers that gamification has been used as a marketing phenomenon to deceive and tame consumers. Simultaneously, Froehlich (2015) presents a pragmatic view towards gamification's applicability. The author highlights that environmental problems are tough issues to solve, questioning whether gamification is the solution for them. As a possible answer, a combination of environmental psychology approach, persuasive technology and gamification is suggested to promote sustainable behaviour, describing real successful and unsuccessful cases to support his argument. The conclusion is that "instead of conserving the tool as a source of damage and disappointment, it is going to be perceived as an empowerment, knowledge tool, which can be used for good, particularly when it comes to people’s health and environmental sustainability" (Froehlich, 2015, p. 36). In that sense, it is possible to understand the importance of looking at gamification in different contexts and perspectives in order to build a holistic and critical perspective. This is especially important when it comes to contributing with solutions for complex problems and challenges, like sustainability.

2.2. What is ecogamification?

Ecogamification is a segmentation of the broader concept of gamification. Its main purpose is to enhance the performance of products and services which have an ecological appeal (Yen, 2015). The term ecogamification gained great popularity with the contribution of Paula Owen (2013) regarding the links between gamification, business, and sustainability. Her argument is that ecogamification is underpinned by the pillars of sustainability, providing a great potential and applicability to different contexts, such as transport, energy, water and recycling. Currently, the concept has expanded to new fields, including, health, education, citizenship and tourism.

Yen (2015, p.1) adds that ecogamification is characterized by the use of "game mechanics and experience design to engage and motivate individuals to achieve the environmental awareness goals". That is to say, the main appeal behind ecogamification is the potential to induce significant and lasting changes in the user's behaviour. Ecogamification presupposes the efficient use of game elements (mechanic, aesthetic, dynamic and emotions), as suggested in the more general gamification field (Bunchball, 2016; Hunicke et al., 2004; Robson et al., 2015), prioritizing aspects of sustainability. Ecogamification differs from previous tools because it goes beyond entertainment, seeking to involve the user's experience through learning by doing (Chelliah et al., 2017), to engage in an environmental cause (Grossberg et al., 2015), to participate in a loyalty program and to have fun (Sigala, 2015). Ecogamified tools are gradually redefining the social, environmental, political, technological, and economical ways through which companies and consumers interact with sustainable issues (Negruşa et al., 2015). However, further studies are needed to evaluate and monitor the application of ecogamification in broader fields, tourism included.

2.3. Ecogamification and tourism

Currently, there is an increasing interest of the scientific and business fields in gamification techniques. The tourism sector, for example, is being influenced by gamification in several perspectives, such as business, leisure, health, cultural and ecological. Some studies suggest that gamification holds the power to bring a set of benefits to the sector, such as promoting tourist destinations (Kachniewska, 2015) and enhancing tourist experience in new attractions and leisure activities (Kiráľová, 2015). Studies on ICT

especially targeting gamification and tourism suggest that both tourism companies in technologically developed urban destinations and small businesses in digitally disadvantaged destinations will reap the positive results of smart tourism as, in both cases, buyers will need to adapt their tourism services to meet the needs of a generation of tourists seeking authentic and increasingly playful digital experiences (Skinner et al., 2018).

From a sustainable perspective, some actors in the tourism value chain are still beginning to discover the benefits of promoting tourists' sustainable behaviour. Even though there are still few studies that combine the themes of gamification, tourism, and sustainability, based on the context and our research purpose, special attention was paid to some of them, specifically Aguiar-Castillo et al. (2019, 2018) and Negruşa et al., (2015). Aguiar-Castillo et al. (2019) developed an empirical study involving 141 tourists as to determine whether an ecogamified mobile application can be a successful tool to promote recycling and enhance the destination's image. From the tourist point of view, the tool improves tourist satisfaction, as technology is considered to facilitate environmental behaviour during the trip, which, as a result, will bring a positive perception of the destination. However, if rewards are not useful for behavioural promotion this might discourage the use of the tool. In another perspective, Aguiar-Castillo et al. (2018) developed a study with 79 experts to evaluate the intention to use an ecogamification mobile application, designed to help promoting environmental sustainability, in 11 major tourist cities. The authors suggest that in order to better engage users in ecogamified services, providers should develop mechanisms that make use of social networks as a way of providing visibility to users, presenting credible sustainability information, and, ultimately, implementing elements of simple game design. Through the examination of different case studies, Negruşa et al. (2015), identified gamification techniques and applications used by tourism industry organizations to enhance their sustainable activities. The authors demonstrate that, in the context of sustainable tourism, there is a structured market involving the development of ecogamified solutions, targeting hotels, restaurants, travel agencies, government and non-governmental organizations (NGOs) as potential buyers of gamified services for the sector.

Negruşa et al. (2015) also explain that the ecogamification market for tourism encompasses both providers (gamification companies) and buyers (tourism companies, institutions and NGOs); and players (tourists, employees and community), that is, the target

audience that will effectively use the tool. The ‘process’ being everything that happens in between and that is characterized by the development of the solution itself (see figure 12).

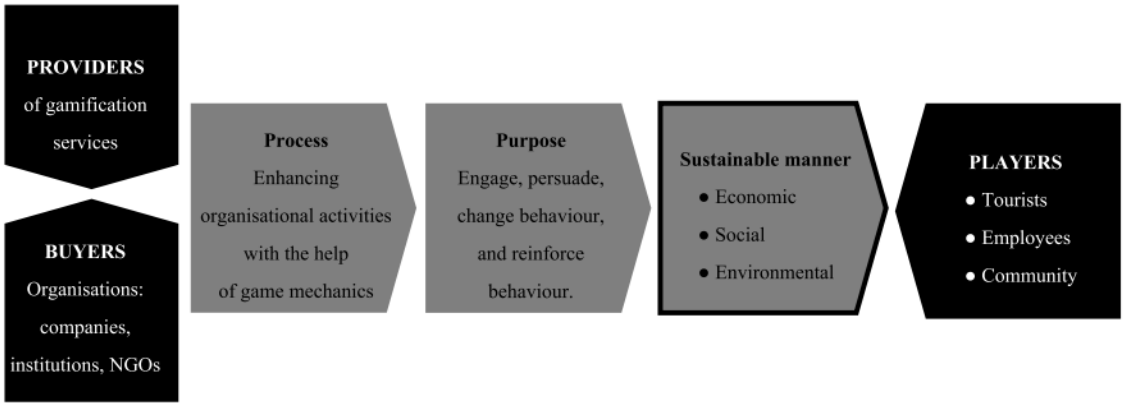


Figura 12. The mind map of a sustainable gamification process in tourism**.**

Through a mind map of a sustainable gamification process in tourism, the authors explain that providers and buyers are the ones responsible for developing ecogamification within the sector. By providers are meant all the companies responsible for developing ecogamified tools, while buyers are the tourism organizations, which hold the potential to buying those tools. This is to say, providers are the ones who develop ecogamified solutions for the market, whereas buyers are mostly made up of large companies with enough financial resources and developed market strategies to acquire technological tools directed to sustainability issues. As an example, there is the Marriott hotel chain, which has implemented an ecogamification app to stimulate pro-environmental guest behaviour by saving energy and water.

Negruşa et al. (2015) draw attention to the fact that neither tourism is explored by tech-companies as a potential market, nor tourism companies and institutions are totally aware of ecogamification benefits. Therefore, the lack of awareness on both sides is a challenge to overcome in order to encourage providers to develop effective and innovative solutions for the sector and encourage buyers to see ecogamified tools as a potential solution for tourism issues. Bunchball (2016), on the other hand, lays out different ecogamified elements, namely mechanics (points, levels, classifications), dynamics (reward, achievement, self-expression, competition, altruism) and aesthetics (fantasy, sensation, narrative, challenge, and discovery). These elements can be used for different purposes, such as involving, persuading, and changing and/or reinforcing behaviour (Negruşa et al., 2015). Moreover, ecogamified tools must be based on the pillars of sustainability (environmental, social, and

economic), that is to say, ecogamification must solve sustainability issues for tourism by approaching sustainability in easy and playful ways.

Finally, there is the ultimate target of ecogamified services, the players for whom these tools are developed and those who will in effect use them. Players can take on different profiles, including that of tourist, member of the local community and tourism and hospitality worker (Negruşa et al., 2015). Within this framework the concept of ecogamification is considered to reinforce 'significant' gamification, in the way it must focus on what the target audience wishes and needs (Nicholson, 2012). Thus, to develop a big picture of ecogamification in tourism, it is necessary to consider that ecogamified tools require careful planning and reflection on tourism and sustainability trends, towards a better balance between demand and supply interests.

3. Methodology

Studies on gamification are predominantly based on a qualitative approach (Kisurina, 2017; Kärp, 2013, Lawder, 2011) and have mostly been analysed through individual information, besides user behaviour and motivation (Dawson, 2002). This research follows a qualitative-exploratory approach, focusing on the supply side and on the perspectives of buyers and providers concerning the discussion of ecogamification for sustainable tourism. The study reports empirical evidence collected from the emerging touristic and technological Portuguese context. It aims at identifying the opportunities and challenges that ecogamification may bring for tourism.

Portugal was chosen as case study due to its increasing growth and relevance on the tourism and technology sectors. Over the last few years, the Portuguese government has been promoting the country as an international technological hub to attract national and international investors. According to the 'State of European Tech' report, Portugal reached 400 million dollars in terms of tech investments in 2018, being the second tech workforce in Europe, with the city of Porto appearing as the third fastest growing hub in Europe (Atomico, 2018). Moreover, tourism is a fast-growing industry, representing 8.2% of the GDP and source of 1.6 billion € 2018 in revenue which demonstrates an increase of 9.6% compared to the previous year. However, the economic increase brought by tourism brought attention to sustainable growth, which has led to the promotion of medium and long-term policies and

strategies to guarantee the sustainability of Portugal as a competitive tourist destination (Turismo de Portugal, 2018).

The results presented in this study emerged from the analysis of 10 semi-structured in-depth interviews, conducted with 7 buyers (from public and private sectors) and 3 providers from technology companies. The interviewees' selection followed the snowball sampling method, a non-probabilistic sampling technique in which individuals selected to be studied invite new people from their network to participate (Smith & Albaum, 2012). Considering ecogamification is a recent topic and an underexplored market, the snowball sampling method has been chosen to facilitate the access to hard-to-reach populations, in order to attain the saturation, point more easily (Smith & Albaum, 2012). Respondents were selected based on three decisive criteria: availability, company position and qualifications. Since it is known that one of the limitations of the aforementioned method is the impossibility of using a larger sample, this has been taken into consideration. In that sense, all the interviewees' profiles suggested by others have been previously analysed in order to avoid bias, as indicated by Robbinson (2010).

As shown in Table 2, from the seven buyers analysed, three of them represent transportation companies. Regarding public institutions, one buyer represents a Tourism Government agency and one, a municipal Department. Besides, one interviewee is from the hospitality/accommodation sector and the other one works at a tourist attraction. From the providers analysed, all three are tech companies (and one of them is a start-up).

All interviewees hold an academic degree, with most of them holding leadership positions as Executive Directors. From the ten interviewees, seven are male and three are female, with ages ranging from 33 to 45. All respondents have considerable knowledge about gamification and ecogamification. At the same time, it is important to say that, considering their positions and roles across the tourism value chain, the nature of expertise is also different. Knowledge becomes more direct and technical among providers, since they are the developers of the tool; buyers, on the other hand, have a more indirect knowledge and tend to see ecogamification as marketing tool.

Table 2.
Interviewees profile

Interviewee	*Profile*	*Position*	*Business Sector*	*Search/Offer solutions for*
Buyer 1	Male, 45 Bachelor's degree	Executive director	Transportation	Sustainable mobility
Buyer 2	Female, 43 Post graduated	Executive Director	Tourist attraction	Museum's visitation
Buyer 3	Male, 35 Bachelor's degree	Service Manager	Transportation	Sustainable mobility
Buyer 4	Male, 38 Post graduated	Executive Director	Transportation	Sustainable mobility
Buyer 5	Male, 31 Post graduated	Guest Experience Ambassador	Accommodation	Zero-waste and guests' awareness on environmental issues
Buyer 6	Male, 44 Post graduated	Director, Knowledge Management & Corporate Affair	Tourism Government agency	Planning and organisation of destinations
Buyer 7	Female, 42 Post graduate	Superior Technician	Department of urban hygiene	Recycling and decreasing of citizens/tourists' waste
Provider 1	Male, 39 Post graduated	Chief Technology Officer	Tech-company	Gamified services/platforms
Provider 2	Male, 33 Bachelor's degree	Chief Marketing Officer	Tech start-up company	Gamified Sustainable/Eco-friendly practices for hotels
Provider 3	Female, 36 Bachelor's degree	Executive Director	tech-company	Gamified services/platforms

Source: the authors

The interview guide encompassed four sections. The first section aimed at identifying the role of the company/public institution in what concerns tourism and/or technology markets. The second section explored in-depth questions regarding the type of Ecogamified services interviewees provide or need/buy. The third section focused on discussing the main benefits and challenges in developing/implementing gamified services. The fourth section covered socio demographic characteristics.

Data was collected from January to March 2018 through face-to-face interviews. They were conducted by the same interviewer in order to reduce bias, as suggested by Yin (1994) and had an average duration of 40 minutes, recorded with the interviewees' previous permission. All interviews were recorded and transcribed with the support of the audio to text converter application, Speech to Text Notepad, set to Portuguese. According to Greener

(2012), making a transcription is an opportunity to review information and important details that could contribute to the analysis. Afterwards, the interviews were translated into English and analysed manually.

A content analysis by evaluation was used to code data and generate meaning (Capelle, Melo, & Gonçalves, 2003), measuring respondents' attitudes towards the studied object. This technique seeks to understand the emitters' attitudes towards the object to which they refer (people, things, events, etc.) and is based on the fact that language represents and reflects the subject that uses it (Minayo, 2002).

The analysis followed the procedures and steps proposed by (Bardin, 2004):

(1) Pre-analysis, as a time to organize the material to be analysed and determine an analysis plan. This phase involves the definition of the hypothesis and objectives, preparation of the material, floating reading and so on.

(2) Material exploration, which consists of the coding operations of the analysed material. The material was classified into themes or categories to understand what is behind the interviewees' speeches (Silva & Fossá, 2013). In this phase, coding emerged from an inductive development of categories and the deductive application of the created categories, as suggested by Mayring (2000).

(3) Treatment of results, inference, and interpretation. In this phase, in view of the results of the analysis, one can make inferences and interpretations in function of the expected objectives or in relation to emerging facts that were not foreseen (Bardin, 2004). All the results were verified for consistency and validity by coming back to the literature review. This action supported the justification of the findings of the study.

4. Results

The interviews with tech-company providers and current and potential buyers shed light on some of the benefits ecogamification may bring for the tourism sector, as well as the challenges both buyers and providers have to face in order to apply it. On the one hand, six key benefits were identified: 1. to promote 'green' behaviour and sustainable tourism; 2. to transmit complex information more easily through entertainment; 3. to reward users for good practices, 4. to improve engagement and tourism experience, 5. to reach new target groups and 6. to help avoiding overtourism. On the other hand, the interviewees pointed out that the lack of investment, the resistance to new technologies/ideas, the low eco-

consciousness of tourists and the distraction from issues that matter are the main barriers they face when planning to sell or adopt ecogamified tools (see figure 13).

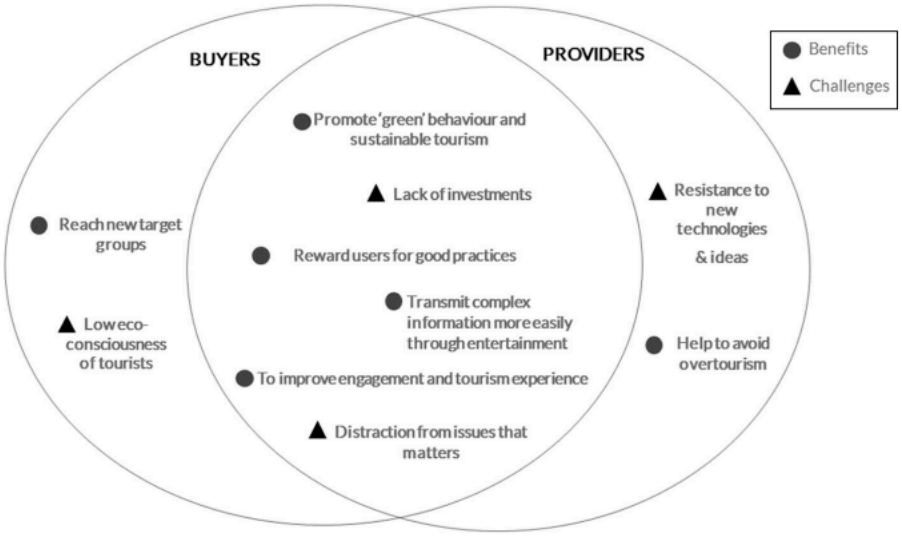


Figure 13. Benefits and challenges of ecogamification

4.1 Benefits

To promote 'green' behaviour and sustainable tourism

The tourism industry has made efforts to reduce tourism impacts on the environment. On the one hand, tourists seem to be more worried about their impact on destinations; on the other hand, tourism companies search for 'greener' practices not only to please this new demand, but also to remain in the market and to preserve their assets. Since they are conscious about the dimensions of ecotourism, providers and buyers referred that promoting green behaviour and sustainable tourism is one of the main benefits ecogamification may bring to the sector. All the interviewees recognized that gamification has the power to create some sense of 'green' conscious on users, changing their behaviour for good. Therefore, buyers and providers agree that the use of playful and technological tools might help to facilitate the promotion of sustainable actions.

All the interviewees showed to believe in ecogamification, mostly as a way of promoting 'green behaviour' and sustainable tourism, considering its benefits for the demand and supply sides. Providers focused more on the big 'picture', that is to say, how the services they develop will contribute to sustainable tourism as a whole, whereas buyers

seemed to think, first, on the direct impacts that influence final users' behaviour (tourists, community and other stakeholders). The following excerpts sustain their point of view:

'We have developed an app that rewards users with points… But it is up to the buyer's organization to manage it in a proper and creative way to promote good practices for tourism… It can be a valuable asset to promote tourism, sustainable tourism and to relate tourism and ecology.' (Provider 1)

'It (gamification) can be used to inform, to make the tourist perceive and be aware that when he/she uses an ecological mean of transportation, for instance, they are contributing to the environment. Tourist have to feel that they are having a good time, getting to know a city, enjoying, at the same time that they contribute to the planet.' (Buyer 1)

To transmit complex information more easily through entertainment

Gamification is recognized for engaging people in simple or complex activities through entertainment. Considering that it is possible to apply it to different contexts and situations, some buyers stated that communication with users about ecological and sustainable issues is quite complex for them. The point is that, most times, those topics are presented to users in a problem-based rather than in a solution-based approach. For this reason, buyers consider ecogamification beneficial to share more complex information in a more playful way. Likewise, providers reinforced the idea that when developing gamified tools it is critical to bring together both fun and information, trying to approach 'serious' issues, such as the environment, in an informal, funny, appealing and soft way.

'Through gamification it is possible to engage people in contributing to the environment through simple games… it is possible to educate people, for example, by explaining Ecopoints… Games can alert people about environmental issues (e.g., plastic in the ocean), transmit more serious content and, at the same time, allow people to play and have fun.'(Provider 3)

To reward users for good practices

One of the fundamentals of gamification is to recognize users through material and immaterial rewards. Accordingly, buyers and providers argue that rewarding users for good practices is a positive strategy to motivate and engage them in eco-practices. Both, buyers and providers stated they believed that rewards have the power to increase users' involvement level. However, especially providers, showed their concern regarding the need to create a reward system that is capable of meeting users' expectations, otherwise the level of engagement decreases, weakening the gamified platform. Additionally, buyers mentioned the need to create a solid network of stakeholders and partners that provide those rewards to users. Furthermore, many interviewees gave examples on how to reward users of Ecogamified tools:

'It is possible to mix different types of rewards, from a bottle of wine with regional cheese….to a recognition letter which states the person is an eco-friendly tourist that contributes to the environment.' (Buyer 5)

'Let me give you an example…a tourist that visited many different spots, recycled in a destination… collects points that in the future can be converted in a free stay at a hotel.' (Provider 1)

'Destinations should start by involving different stakeholders and partners into the project, for them to get discounts and tickets to offer.' (Buyer 7)

To improve engagement and tourism experience

Current research highlights the growing interest of tourists in living new experiences, which consequently generates a search for greater engagement with destinations. In this sense, buyers and providers mention the benefits of gamification, which are related to its potential to enhance tourism experience and engagement, by involving not only the tourist, but also other stakeholders, such as the host community and buyers.

Buyers consider that when tourists are aware that destinations follow and care about sustainable principles, they are more likely to have a better experience. Additionally, providers are conscious about the role of experience and take it into consideration when developing gamified services. Simultaneously, providers present strategies on how to

improve tourists' engagement, thereof suggesting examples of gamified elements such as cooperation, rankings, status, rewards and achievements.

Therefore, some interviewees suggested that providing tips about what to visit on the destination and on how people can contribute to the environment, in addition to engaging users to generate and share content, is more likely to extract greater benefits.

'Tourists can upload their videos, share their experiences, engage with the destination, and be recognized… this is something they (tourists) appreciate. When they adopt eco-friendly practices and are aware that the product is sustainable, they consequently have a better experience. This is the best way to reward someone who is on holiday (Buyer 6)

'We are developing an app that aims at providing a completely different experience for the tourist… which will involve them and help them get to know the tourist spot better, having a more sustainable visit.' (Provider 1)

'The way we thought of gamification was something that we fed with points and here we would create a set of rules, rankings and winner identifications, so that it would not only give away prizes to individuals, but also reward groups. So, this issue of collaboration and challenging others to participate is very important. Therefore, our entire gamification platform is designed to foster group collaboration and participation '(Provider 1)

'Our solution works through a sensor, which is installed on the shower and tap of the hotel room, then this information is designed for the guest and hotel management through a tablet containing a dashboard…. The guests can see their consumption in real time and interact with the system. If the consumption is marked in red the guest is consuming a lot, if it is yellow, there is an average consumption and if it is green the guest is an eco-guest. The idea of showing the dashboard gamification mechanics through colours and showing the guests where they are in relation to their own consumptions may motivate them to stay in the green zone - or, if they are not there yet, the hotel needs to encourage it. If you are an eco-guest, the hotel will reward you…' (Provider 2)

To reach new target groups

Young people tend to be the target audience for technology services because they were born in a highly technological context and are more likely to get involved in gamified services. Considering this scenario, buyers share the belief that gamification is a valuable tool to reach younger audiences, providing the type of dynamic engagement they have come to expect. New generations are considered by most buyers as the right audience to focus on, not only because of the relevance of young travellers to the future of tourism, but also their role in assuring and promoting sustainable tourism. In their opinion, young people are more worried about environmental issues and are more likely to engage in eco-causes, unlike senior populations. Furthermore, some interviewees were concerned about the inefficacy of traditional tools to reach new targets and argue that gamification must be seen as a complementary tool.

'We have to reach a younger audience because seniors are hard to convince…someone who has lived all their life adopting some type of behaviour will not change easily. We should definitely bet on the youth target.' (Buyer 2)

'…Technological tools are important, and we should use them to embrace specific generational cohorts. If we want to capture younger generations, we should invest in specific tools. (…) That is to try to maintain a balance between the different methodologies and approaches for the different audiences.' (Buyer 7)

To help avoiding overtourism

Overtourism has become a problem for many tourist destinations around the world and technology has been pointed as one of its main contributors. However, if on the one hand social media (e.g., Instagram) and peer-to peer platforms (such as Airbnb) are mentioned as one of the causes of excessive tourism, on the other hand, technology is also being used as a strategy to overcome social, environmental and economic impacts that overtourism may cause. There are several examples of intelligent mobile device systems that can be used to understand travel behaviour and manage tourist influxes, including the use of gamified apps to help prevent overtourism. In line with this argument, some providers mentioned gamification as an opportunity to overcome overtourism challenges. According to the respondents, ecogamified apps might help destinations to better manage tourist flows.

'We are currently negotiating to implement our app in an international tourist destination and of course they can use it to benefit tourism…they can use it to intelligently manage people's flow in the city… I can say to users: if you go to point A (less crowded) you gain more points /rewards… this way, it is possible to manage the number of people in a more rational way.' (Provider 1)

4.2 Challenges

Lack of investment

In the past few years, Portugal has been investing heavily in technology and in the tourism sector, allowing many entrepreneurs to access funds in order to develop their businesses (Jornal de Negócios, 2018; Diário de Notícias, 2018). At the same time, despite the apparent promising context for companies to invest in innovative solutions, interviewees referred that the lack of investment remains a major barrier to implement ecogamified tools.

Buyers argue that technological tools are too expensive to invest in, while providers complain about the buyers´ low investment and budget, which is particularly critical in the case of customized (more expensive) solutions. Some buyers, mainly from the public sector, gave an account of their own experiences and difficulties, as the implementation of new processes takes more time, causing instability to invest in technological companies that may rapidly go out of business. Providers (tech-companies), on the other hand, state that their products demand a great amount of investment, which is hard to get for gaming applications. Furthermore, start-ups mentioned the unbalanced scenario comparing companies closer to big city centres to more distant ones. In this context, it is even more difficult for companies that are far from the two major cities (Lisbon and Porto) to access the investment funds.

'As a public institution we face two mains problems. It is difficult for us, first, to access investments, second to keep up with the rapid dynamic of technological tools, as they get out of hand very quickly.' (Buyer 2)

'Budgets are scarce and do not invest heavily in gaming applications. The municipality supports the company by providing a physical space, as a way to encourage this type of business segment and there was this municipal initiative to use the apps and games to boost

tourism… Although there is a lot of willingness on part of the supporting institutions for companies like ours, there is a disadvantage for companies which are far from the big centres, as it is more difficult to access national and European funds.' (Provider 3)

Resistance to new technologies/ideas

The aforementioned issue regarding the lack of investment is felt by most providers as resulting from buyers' resistance to adopt new technologies and ideas, which is a current issue in technology businesses: they argue that most companies are used to deal with it because they sell innovative solutions. However, some interviewees consider that this resistance is related to sectorial and cultural contexts and, in that context, a specific provider referred that the Portuguese market is less open to innovative solutions, when compared to other European countries.

'Those who sells innovation suffer with that (resistance) on a daily-basis…it is difficult to sell people just the idea ... buyers are afraid of buying something which is in development…The issue of being innovative and an early adopter is always a challenge. This does not surprise us, but we have to overcome barriers…usually buyers only want to invest after seeing (our services') impact and solving problems of other clients.' (Provider 1).

'From my point of view hoteliers are more conservative and need more time to get used to new technology… in general many sectors showed resistance to new technologies, and this is also a cultural issue. Here in Portugal, they are more conservative… in other countries as Germany, Netherlands and Northern countries, they are less (conservative). There is also the issue of the company's size… for big brands, such as Marriot and Hilton, it is easier (to implement gamified apps), but for small companies it is not.' (Provider 2)

Low eco-consciousness of tourists

Some studies refer that environmental awareness is increasing among travellers. Nevertheless, there is a long path ahead regarding environmental promotion, awareness and engagement of tourists. In this respect, most buyers mentioned the low eco-consciousness of tourists regarding eco-practices as one of the barriers they face when considering

implementing ecogamified services. The buyers' perception is those tourists are not motivated to or willing to take part in environmental causes. Thus, the challenge would be to translate awareness into effective action towards sustainability.

'People are sick of seeing urgent news on TV about global warming, and no one is doing anything to change it.' (Buyer 1)

'Most times people seem to choose some form of 'green' transportation because it is the quickest way to move around the city. The environmental issue does not seem to be the main factor…also, the high demand for electric bikes seems more like the curiosity of testing something new and to reduce physical effort rather, than an eco-conscientious decision of users. (Buyer 4)

'Environmental - awareness is indeed a challenge …because we can never impose the situation on users, we should see things from their perspective and let people choose whether they wish to add it (the service) or not.' (Buyer 7)

Distraction from issues that matters

Gamification is recognized as a way to promote fun and it has been quite successful in using enjoyment as a method to engage people in complex activities. This hedonic appeal of games could be helpful in engaging users in relevant causes, but eventually, it can overshadow the intended content. In this sense, it is not an easy task to combine the entertaining aspect of gamification with its educational potential.

Accordingly, buyers and providers showed some concern on how gamified tools may not be effective in achieving the goals they were designed for, distracting users from core issues, as, in the case of ecogamification, environmental issues.

'Technology has a huge added-value in every sense, but it must come with a theoretical component, because we cannot risk losing content over interaction. However, it is undeniable that when these two are aligned it can bring fantastic results in terms of active participation.' (Buyer 2)

'People play a game because it is fun, but the main message, that the planet is, in fact, at risk, must be transmitted' (Provider 2)

5. Discussion, implications and contributions

Ecogamification can be used as a strategic tool to overcome the challenges brought by tourism to destinations and companies. Its application for environmental purposes serves tourism activities well, especially with regard to strategic planning and management towards Sustainable Development Goals (SDGs). Within this context, the main objective of this article is to explore the opportunities and challenges of ecogamification in tourism, considering the perceptions of buyers from tourism-related institutions and technology providers. Based on the results, it was possible to draw discussions, conclusions, limitations and paths for future studies.

Regarding the benefits and challenges of ecogamification, empirical evidence shows that ecogamification takes on different roles for buyers and providers (see figure 14). Buyers see ecogamification as an alternative to overcome challenges, such as engaging tourists in environmental actions, while having the potential to reach new clients. Meanwhile, providers are more concerned about overcoming buyers' technological resistance and perceive ecogamification as a facilitator for addressing sustainability issues in tourism.

In addition, this research identifies that most challenges and benefits of ecogamification have been mentioned by both providers and buyers. Challenges such as *lack of investment* and *distraction from the issues that really matter* have been identified and show divergence and convergence of opinions. Concerning the *lack of investment*, the perspectives are different: while buyers mention the high value of technology and the fact it can quickly become obsolete, providers refer to the pressure of buyers, who demand low prices, even in situations of highly customized solutions.

Opinions between buyers and providers converge on the challenge of *distraction from issues that matter*, as they both express their concerns about the difficulties faced when combining the fun aspects of the tool with the necessity of conveying serious meaning on environmental issues. Buyers and Providers' opinions converge when it comes to the benefits of ecogamification *to promote 'green' behaviour and sustainable tourism*; *to transmit complex information more easily through entertainment*, *to reward users for good practices and to improve engagement and tourism experience*. They present similar opinions

when mentioning the potential opportunities that the tool can bring to guarantee a more sustainable tourism.

Those opportunities are in line with the benefits previously mentioned and suggested in the literature (Sever et al., 2015). However, other important benefits were not mentioned by the interviewees, as the improvement of employee performance in tourism environments (Robson et al., 2016) and the use of analytics to obtain information about tourist behaviour (Garcia et al., 2019).

These results, when deeper interpreted and integrated, bring further insights and implications. They strongly suggest that effective ecogamification depends on the integration of the supply and demand sides and, at the same time, on the responsibility of different stakeholders (providers, buyers, players) across the value chain, through a broad logic of *B2B2C*. This is quite evident in the concerns of both buyers and providers concerning the rewarding process of gamification. To be consistent and well managed, the rewarding system must be planned ahead with the involvement of different stakeholders and partners. At the same time, results suggest that high investment requirements, resistance to technology from buyers and their limited budgets, might hinder the desirable and necessary alignment. This collaboration between stakeholders is very present in the recommendations of UNWTO concerning SGD 11 (supporting sustainable cities and communities) and 12 (promoting responsible production and consumption).

Results also suggest that interviewees are concerned with the balance between technical, managerial and ethical dimensions of (eco)gamification. Buyers feel there is a gap between tourists´ environmental concerns (what they say) and tourists' behaviour (what they do), suggesting there might be a hype phenomenon (rather than a true commitment). Simultaneously, results suggest that young people might be more concerned and prone to act, also being more receptive to ecogamification and technology. However, it is also important to remember that gamification should be seen as a complementary tool, rather than an end in itself. Furthermore, as argued by interviewees, ecogamification is a powerful tool to combine fun and seriousness but, again, cautious is needed so that people do not forget the real purpose

Further, the research findings point to several benefits and potentialities of (eco)gamification concerning tourism experience and tourists´ engagement with the destination, its citizens and the host community. Sustainable destinations are good for

tourists but also for locals. A smart ecogamification strategy will help avoid overtourism, for example, dispersing tourists from crowded attractions. This might promote collective thinking, based not only on competition, but also on collaboration. Ultimately, it might also help tourists become more aware of their role and impact, which aligns with the rationale of SGD 11 (supporting sustainable cities and communities) and 12 (promoting responsible production and consumption).

Recent works highlight that the more tourists become involved in environmental actions, the more cities and local communities will gain in welfare, quality of life and reduction of solid waste in the city. Within this context, the results of the study have practical implications for tourism destinations, gamification companies, tourism organizations and the local community. Therefore, a deeper understanding of the challenges and benefits projected by developers and buyers can help design tailor-made ecogamified tools for destinations, increasing the likelihood of use by different audiences of environmental actions.

Consequently, as it has already been mentioned, the study brings results that are in line with SDG 11 and SDG 12 when it refers to ecogamification as a tool that can help increase conscious production and consumption, i.e., more than just another tool to help making cities more sustainable and inclusive. Initial contributions in this regard can be verified from evidence on how buyers tend to implement ecogamified services in their different tourist business areas, such as museums, sustainable transport and hotels. This will eventually create more jobs, protect cultural and natural heritage and stimulate the consumption of local products, contributing to the development of sustainable tourism in its three pillars (environmental, social and economic).

Specific benefits and challenges of ecogamification arise from buyers and providers. The practical implication relates to the application of ecogamification, which implies micro and macro corporate structures. It is essential that the involved market structures, such as governments and tourist companies, share the same logic of integration to benefit not only the tourism industry but also the society.

This study explores the benefits of ecogamification, but goes further and beyond, through an explicit focus on challenges. In short, it contributes towards a better understanding of ecogamification in tourism, through the eyes of buyers and providers, also providing insights regarding the role of these specific stakeholders and the relationship between them. Also, in the pursuit of an integrative view of gamification for sustainable

tourism, the study will hopefully enrich the interpretative framework of Negrusa et al. (2015).

Research limitations are related to the findings that are restricted to the qualitative analysis and the limited sample size. Finally, considering the potential and challenges explored in this study on ecogamification, future research is necessary in this area and should refine and operationalize tangible and expressive results in the field of ecogamification in the promotion of sustainable behaviour. Also, it might be interesting to undertake relevant research to segment the profile of tourism-related players that fit in as potential users of ecogamified services, aiming at bringing results that show, both providers and buyers, their own true needs and interests.

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Chapter III

Potencial de recetividade do turista urbano à ecogamificação: Framework e proposições de investigação

Potencial de recetividade do turista urbano à ecogamificação: Framework e proposições de investigação

Resumo | A gamificação tem-se revelado uma aliada valiosa do turismo, especialmente no que se refere aos esforços desse setor para um desenvolvimento mais sustentável. A investigação sobre o potencial da gamificação no contexto do turismo e da sua contribuição para a sustentabilidade tem aumentado, no entanto, são ainda escassos os estudos sobre o potencial de recetividade do turista urbano à ecogamificação. Neste contexto, o objetivo é identificar os fatores que influenciam essa recetividade, o que distingue os turistas mais e menos recetivos à ecogamificação e o que pode explicar essas diferenças. Para cumprir esse propósito, desenvolve-se uma abordagem teórica assente numa análise dos pontos de contacto entre a literatura sobre segmentação e tipologias do turista face à sustentabilidade e a literatura sobre tipologias do game user. A partir dessa interseção, constrói-se um *framework* e um conjunto de proposições teóricas em torno de seis categorias de análise que correspondem a fatores como o perfil sociodemógrafico, o perfil comportamental, o comportamento ambiental em viagem, a motivação pessoal, a motivação de viagem e os elementos do jogo. Estes fatores ajudarão a identificar diferenças relevantes entre turistas urbanos, contribuindo assim para o desenvolvimento de tipologias e segmentos de turistas com diferentes níveis de recetividade à ecogamificação. Por sua vez, essas tipologias poderão ser aplicadas para traduzir a heterogeneidade em estratégias diferenciadas e recomendações operacionais mais eficazes.
Palavras-chave | Sustentabilidade, Ecogamificação, Turismo, Recetividade à Ecogamificação, Tipologias de turistas

Abstract | Gamification has proven to be a valuable ally for tourism, especially as it relates to tourism efforts for more sustainable development. Research on the potential of gamification in the context of tourism and its contribution to sustainability has increased, however, studies on the potential receptivity of urban tourist to ecogamification are still scarce. With that in mind, this paper aims to identify which factors influence the receptivity to gamification, the differences between tourists that are the most and the least receptive to it and to explain the reasons behind those differences. To achieve this purpose, a theoretical approach is developed based on an analysis of the points of contact between the literature on

segmentation and tourist typologies in relation to sustainability and the literature on typologies of the game user. Thus, a framework and a set of theoretical propositions were built from the intersection between the topics. Six categories were created, related to various factors, as for sociodemographic, travel environmental behaviour, behavioural profile, personal motivation, travel motivation, and game elements. Therefore, it was possible to identify relevant variations between urban tourists, which can contribute for developing tourist typologies and segments with distinct levels of receptivity to ecogamification. These definitions could then be applied to implement more effective strategies and operational recommendations.
Keywords | Sustainability, Ecogamification, Tourism, Receptivity to Ecogamification, Tourists Typologies

1. Introdução

Nos debates sobre o desenvolvimento sustentável, o turismo é reconhecido como uma atividade que oferece oportunidades para o desenvolvimento económico e proteção do meio ambiente (Lindberg et al., 1997). Apesar dos benefícios gerados pela atividade turística, os impactos negativos nas esferas ambientais, sociais e económicas também são inerentes a esta atividade, especialmente no contexto de turismo urbano em que são expressivos os efeitos no aumento dos preços dos imóveis, bens e serviços (Kleeman, 2001; Mason, 2008), gentrificação (Silva et al., 2021), congestionamento dos espaços urbanos e ameaça à identidade cultural (García et al., 2015), poluição, perda de paisagem natural, diminuição de espaços abertos, destruição da flora e fauna e escassez de água (Kleeman, 2001). Os problemas ambientais advindos do turismo são cada vez mais visíveis e alarmantes (Pan & Liu, 2018). É possível constatar que os destinos turísticos urbanos estão marcados por ações indesejáveis que se refletem na qualidade ambiental, como por exemplo a produção de lixo, consumo excessivo de materiais não biodegradáveis, a vandalização de monumentos, em que parte dessas degradações podem ser provocadas pelos turistas. Costa et al. (2015) explicam que, talvez, essa degradação ambiental aconteça porque o turista não possui uma consciência clara sobre o seu papel em termos de contribuição para um turismo mais sustentável. Por outro lado, não se pode negar que ao longo dos anos têm acontecido mudanças no comportamento dos consumidores, e dos turistas, que colocam exigências adicionais relativamente à produção de produtos e serviços mais sustentáveis (Adongo et al.,

2018). Marin et al. (2009) sugerem que essa nova forma de comportamento do turista é uma tendência natural e poderá implicar uma progressiva troca de consumo de serviços habituais de uma determinada marca por outros serviços de marcas ou empresas que estejam mais relacionadas com os desejos e necessidades desse turista mais sustentável.

Esse 'novo turista' procura experiências autênticas, diferenciadas e únicas, impulsionadas pela economia das experiências, com suporte na tecnologia, que tem transformado parte desses turistas num 'ser' em busca de personalização, em todas as esferas, em especial a sustentável, fazendo-os caminhar no sentido contrário ao turismo de massas (Lima & Partidário, 2002; Weaver & Oppermann, 2000). O desenvolvimento da componente tecnológica tem facilitado a progressiva transformação do turista 'consumidor' em turista 'produtor', ao permitir o domínio da construção das experiências e das decisões de viagens (Ramos & Fernandes, 2014). O fator tecnológico pode sugerir mudanças no comportamento desse novo turista, que tende a ser reconhecido como um segmento de mercado com forte potencial de crescimento (Lima & Partidário, 2002).

No entanto, tem sido um desafio identificar turistas com interesse em envolver-se em práticas ambientais durante a viagem. Neste contexto, o setor tem recorrido a ferramentas tecnológicas com o potencial de promover comportamentos mais sustentáveis. A ecogamificação é um exemplo de uma ferramenta tecnológica que tem sido utilizada com o objetivo de promover comportamentos mais sustentáveis, uma vez que tem a capacidade de envolver, persuadir, mudar e reforçar comportamentos (Negruşa et al., 2015a). No entanto, o conhecimento académico ainda é limitado sobre o funcionamento efetivo da gamificação no que se refere a tópicos ambientais, ou seja, ainda há desconhecimento sobre as suas principais características, desempenho no mundo real e potencial para ativar o envolvimento dos utilizadores (Ouariachi et al., 2020).

Simultaneamente, há um desafio persistente e difícil de ser ultrapassado, que se relaciona com o desenvolvimento de uma ecogamificação significativa, que esteja adequada aos desejos, motivações e perfis dos utilizadores (Xu et al., 2017b). Atualmente, a gamificação tem alcançado um mercado global crescente, avaliado em 960,5 milhões de dólares, com projeção de aumentar outros 23 milhões de dólares até 2022 (P&S Market Research, 2017) e haverá três razões principais para esse aumento: a relevância dos media sociais, a entrada da gamificação em empresas e instituições e, também, a evolução da tecnologia móvel (P&S Market Research, 2017). A introdução da gamificação na indústria

do turismo foi observada em todos os níveis da experiência de viagem (Xu et al., 2015; Negruşa et al., 2015) e há muitas ilustrações dessa tendência: jogos que promovem um destino turístico, como a Ireland Town (apps.facebook.com/irelandtown [6 de setembro de 2019]); combate ao turismo excessivo, como 'Play London With Mr. Bean' (https://www.play.london [8 de setembro de 2019]); promoção da responsabilidade social e envolvimento do turista com comunidades anfitriãs, como o Hotel Prinz Luitpold-Ba, na Baviera, Alemanha (Weber, 2014); sensibilização dos turistas para a utilização adequada de infraestruturas para processos de reciclagem, como no projeto da UE URBAN-WASTE H2020 e na sua 'WasteApp' (Aguiar-Castillo et al., 2018); promoção da mobilidade sustentável, exemplo da Ilha da Madeira-Portugal (Cardoso et al., 2019) e aplicações móveis para envolver utilizadores na mudança de comportamento ambiental como SaveOhno e JouleBug (Ouariachi et al., 2020). Os exemplos mencionados ilustram de forma bastante elucidativa o interesse crescente pela gamificação e ecogamificação.

O cruzamento entre gamificação, turismo e sustentabilidade tem merecido uma crescente atenção em termos de investigação (Souza & Marques, 2017), no entanto, ainda são escassos os estudos sobre o potencial de recetividade do turista urbano à ecogamificação. Neste contexto, o objetivo deste trabalho é explorar potenciais fatores que possam influenciar essa recetividade e analisar o que poderá distinguir os turistas mais e menos recetivos à ecogamificação.

Em termos metodológicos, a estratégia seguida consiste numa reflexão teórica assente na interseção da literatura sobre segmentação e tipologias do turista face à sustentabilidade com a literatura sobre tipologias do game user. Com base nessa análise desenvolve-se um *framework* e um conjunto de proposições teóricas em torno de seis fatores como o perfil sociodemógrafico, o perfil comportamental, o comportamento ambiental em viagem, a motivação pessoal, a motivação de viagem e os elementos do jogo. Em termos de aplicabilidade e de implicações práticas, os fatores identificados neste trabalho permitirão detetar diferenças relevantes entre turistas urbanos, servindo de base a futuros estudos empíricos sobre tipologias e segmentos de turistas com diferentes níveis de recetividade à ecogamificação. Por sua vez, empresas de tecnologia (fornecedores) e compradores de serviços ecogamificados (clientes) poderão utilizar essas tipologias para traduzir a heterogeneidade em estratégias diferenciadas mais eficazes e soluções mais customizadas.

2. Turismo urbano, sustentabilidade e gamificação

2.1 Impactos do turismo em destinos urbanos

São escassos os estudos no âmbito do turismo urbano sustentável (Miller et al., 2015). Os poucos estudos que abordam o tema apresentam uma abordagem ancorada nos princípios do ecoturismo em ambientes urbanos, considerado um nível micro de análise do turismo urbano sustentável (Miller et al., 2015). Apesar de o ecoturismo estar relacionado com as áreas rurais e de proteção, no geral, a massa turística está centrada nos grandes centros (Dodds & Joppe, 2001).

Gibson et al. (2003) explicaram que as questões relacionadas com o impacto negativo no meio ambiente dos destinos urbanos estão relacionadas com o desperdício, o crescimento e a degradação, os quais poderão ser minimizados através do turismo verde urbano. Miller et al. (2015) procederam a uma pesquisa com turistas de Melbourne, na Austrália, para entender o comportamento do turista em termos de reciclagem, utilização de transportes verdes, de energia sustentável, entre outros. Os autores identificaram que o hábito de agir em prol do meio ambiente no dia a dia influencia fortemente o comportamento pró-ambiental do turista no destino. Além disso, os autores sublinham que o desenvolvimento de uma infraestrutura ambiental no destino, que ofereça fácil acesso aos turistas, poderá contribuir para o alcance de um destino turístico urbano mais sustentável.

Peeters e Schouten (2010) analisaram a pressão ambiental do turismo em Amesterdão e identificaram que, em primeiro lugar, na pegada ecológica, está o transporte, seguido do alojamento e das atividades turísticas em geral. Além disso, os autores destacaram que os turistas que vêm de destinos mais distantes são responsáveis por pegadas ecológicas mais negativas nos destinos urbanos. Concluiram também que, para reduzir a pegada ecológica dos turistas provenientes de destinos mais distantes, é necessário reforçar as campanhas de marketing através da gestão de turismo local, para atrair turistas de regiões mais próximas em detrimento dos turistas que precisem de fazer viagens mais longas.

Apesar das abordagens do ecoturismo e da pegada ecológica oferecerem contribuições importantes para a promoção do turismo urbano sustentável, é necessário apostar em abordagens que ofereçam abordagens mais holísticas e coerentes com o comportamento do novo turista de forma a definir políticas eficazes para o alcance do turismo urbano sustentável (Miller et al., 2015). Por exemplo, Scott e Cooper (2010) sugerem que novas abordagens que visem desenvolver políticas e utilizar as melhores estratégias de marketing

para atrair a atenção do turista sensível à sustentabilidade, sejam providenciadas através de ferramentas inovadoras. Segundo os autores, estas inovações podem englobar mapas, transporte local, ciclovias, produtos culturais, reciclagem, energia renovável, reutilização da água e turismo de baixo impacto ambiental. Miller et al. (2015) argumentam que a abordagem mais atual sobre a sustentabilidade do turismo urbano deverá ser coerente com um sistema integrado de sustentabilidade que se foque simultaneamente nos esforços da oferta e da procura turística.

2.2 Conceito de turista sustentável

Investigações sobre o comportamento turístico ambientalmente sustentável são mais populares em determinados segmentos ou grupos sensíveis às questões da sustentabilidade ambiental (Juvan & Dolnicar, 2016). Estudos no âmbito da procura turística têm sido objeto de estudo em vários campos de conhecimento e a partir de diversas perspectivas (Juvan & Dolnicar, 2016). Segundo os autores, estes turistas têm sido classificados como turista alternativo, responsável, novo turista, turista sustentável, turista ambientalmente solidário, turista verde e outros. Mas seja qual for o termo utilizado, um turista ambientalmente sustentável envolve sempre a interação entre o indivíduo e o meio ambiente.

A partir da literatura analisada para esta investigação, foi possível identificar uma diversidade de definições para o termo *turista ambientalmente sustentável*. Com base na classificação de Juvan e Dolnicar (2016), em que apresentaram o significado do termo sob várias perspetivas, é possível perceber que, apesar de existirem termos iguais, diferentes definições são apresentadas por diferentes autores. Esta constatação sugere que não há grande consenso relativamente à conceptualização do turista sustentável.

Juvan e Dolnicar (2016) desenvolveram um *framework* que agrupa as principais definições em dois grandes eixos, com base nos fatores que influenciam o comportamento ambientalmente sustentável do turista. Assim, num dos eixos agrupam-se as definições que remetem para os turistas que podem querer exibir um comportamento ambientalmente sustentável ou não (vertical) e, no outro integram-se as definições que remetem para os turistas que podem ter intenção pró-ambiental ou não (horizontal). A partir do *framework* é possível extrair que as boas intenções, as crenças e os valores pró-ambientais, por si só, não são variáveis suficientes para motivar o turista a adotar um comportamento ambientalmente

sustentável. Os autores sugerem, como fatores significativos para o comportamento ambientalmente sustentável, a junção da intenção e do comportamento efetivo.

Diante do explicitado, a definição mais adequada ao termo 'turista ambientalmente sustentável' engloba intenção e comportamento real. Essa definição é apresentada por Juvan e Dolnicar (2016, p.34) nos seguintes moldes: "o comportamento turístico ambientalmente sustentável pretendido é quando uma pessoa toma uma decisão relacionada com as férias ou exibe um comportamento no destino diferente da forma como teria decidido ou se comportado, por razões de sustentabilidade ambiental". Esta abordagem foi adotada como fundamental para a compreensão do presente estudo.

2.2.1 Tipologias de turistas ambientalmente sustentáveis

Apesar de o comportamento pró-ambiental do turista potenciar o desenvolvimento de um destino sustentável (Kastenholz et al., 2018), ainda são poucos os estudos sobre o perfil do turista ambientalmente sustentável. No entanto, apesar de escassos, é possível identificar estudos empíricos, aplicados em diferentes contextos do turismo, de tipologias e segmentação dos turistas baseadas nas atitudes face à sustentabilidade (ver tabela 1). Por exemplo, Kastenholz et al. (2018) procederam a uma segmentação de mercado, num contexto de turismo rural, com 786 turistas. As variáveis utilizadas para o estudo foram: comportamento de viagem ambiental, cultural, social e economicamente sustentável, que foram depois transformadas em cinco fatores de acordo com as dimensões do comportamento de viagens sustentáveis desses indivíduos (interação social com moradores locais, preservação da natureza e cultura, apreciando produtos e atividades locais, economizando recursos e reciclando, envolver-se em atividades de natureza e cultura). O resultado do estudo apresentou três perfis de turistas com comportamentos sustentáveis, sendo eles: *little concerned, active preservers of nature and culture and local nature, culture and community seekers*. Além disso, a pesquisa identificou que há diferenças em termos de características sociodemográficas, fonte de informação sobre o destino visitado, comportamento de viagem, satisfação e lealdade ao destino visitado entre os perfis identificados. Nas suas conclusões sobre a importância da segmentação dos turistas quanto aos seus comportamentos sustentáveis, as autoras destacam a relevância de segmentações que abordem os pilares sociais, económicos e ecológicos da sustentabilidade.

López-Sánchez e Pulido-Fernández (2016) desenvolveram uma investigação com 1188 turistas, num contexto de turismo de sol e mar, com o objetivo de segmentar os turistas de acordo com a sua inteligência sustentável. As variáveis selecionadas para definir a "inteligência sustentável" dos turistas foram: conhecimento do significado de destino turístico sustentável, importância de trabalhar pela sustentabilidade dos destinos turísticos, tipo de comportamento sustentável durante a estadia, avaliação de características relacionadas com a sustentabilidade do destino, disponibilidade para pagar por um destino turístico mais sustentável, reconhecimento de comportamento empresarial responsável, disponibilidade para pagar uma quantia adicional (para o custo total da viagem) garantindo por contrato que o dinheiro é destinado a projetos para melhorar a sustentabilidade do destino e disponibilidade para pagar o valor adicional (para o custo total da viagem), dedutível nos impostos, para melhorar a sustentabilidade do destino. Os resultados permitiram a identificação de três tipos de perfis de turistas, sendo eles: *reflective tourist, unconcerned tourist e pro-sustainable tourist.* O perfil *reflective tourist* é o agrega o maior número de participantes e que apresenta um entendimento geral e profundo sobre o significado de um destino sustentável. Além disso, esses turistas comportam-se de forma sustentável e são conhecedores das questões ligadas à sustentabilidade do destino. O segmento não está disposto a pagar mais por produtos e serviços sustentáveis e possui as seguintes características sociodemográficas: um alto nível educacional, viaja em casal, com um rendimento mensal entre 900 e 1500 euros, com custos de despesas de viagem em torno de 847.8 euros e demonstra intenção de voltar. O perfil *unconcerned tourist* engloba o menor número de turistas. Fazem parte deste perfil o turista que desconhece o significado de sustentabilidade, apresenta um comportamento insatisfatório quanto à sustentabilidade durante a sua permanência no destino, rejeita a possibilidade de pagar impostos e pagar mais por produtos e serviços sustentáveis. Sociodemograficamente este grupo apresenta com um perfil jovem, com um nível educacional superior (igual ao perfil anterior), viaja em casal, possui um rendimento médio e um custo médio de viagem mais elevados do que o perfil anterior. Por último, o perfil *pro-sustainable tourist*, agrega os turistas que possuem um bom conhecimento sobre a sustentabilidade, que estão dispostos a pagar mais por um destino sustentável, que aceitam pagar mais impostos desde que o montante arrecadado seja para melhorar o destino visitado. Em termos de caracterização sociodemográfica, também possuem uma idade mais elevada em relação aos outros perfis, viajam em pares e apresentam

um nível educacional, rendimento e custos de viagem superiores em relação aos perfis anteriores. Os autores concluiram que o impacto da inteligência sustentável do turista sobre o seu comportamento ou disposição em agir de acordo com a sustentabilidade é importante para entender o perfil do turista sustentável. Também sublinharam a complexidade e a heterogeneidade dos desejos dos turistas e a sua relação com as suas motivações sustentáveis.

Buffa (2015) pesquisou 1156 jovens turistas, em Itália, em função do seu interesse na sustentabilidade. As variáveis de segmentação foram definidas com base nas atitudes dos jovens em relação à sustentabilidade, nas suas motivações e nos comportamentos de viagem. No âmbito das motivações de viagem, estão relacionadas com as duas principais forças que são responsáveis por influenciar a motivação de viagem do turista – a abordagem *Pull* e *Push* (Crompton, 1979). Esses fatores reforçam que as pessoas viajam porque sofrem pressão das suas necessidades e desejos internos e, simultaneamente, são 'puxadas' pelas forças externas que advêm das características dos destinos (Khuong et al., 2014). Os parâmetros identificados por Buffa (2015) assentam essencialmente na abordagem do tipo *push,* relacionada com os desejos intangíveis ou intrínsecos dos viajantes (Crompton, 1979). Esses fatores são categorizados em sete motivos sociopsicológicos, sendo eles: fuga de um ambiente mundano, exploração e autoavaliação, relaxamento, prestígio, regressão, aprimoramento dos relacionamentos de parentesco, facilitação da interação social e dois motivos culturais (novidade e educação) (Crompton, 1979). Os fatores motivacionais, identificados acima, podem ser reconhecidos como fatores influenciadores das decisões de viagem dos turistas investigados por Buffa (2015), como poderá ser verificado através da tipologia. A autora identificou dois perfis de jovens turistas sensíveis às questões da sustentabilidade, sendo eles: *hard path young tourists* e *soft path young tourists*. O perfil sociodemográfico da amostra é constituído por universitários, solteiros e sem filhos, que organizam as suas férias de forma independente, onde a internet é a principal fonte de informação, que estão interessados em ler sobre questões ambientais, ecológicas e culturais, e os hotéis são o tipo de alojamento mais utilizado. Um conjunto de variáveis utilizadas para a elaboração da tipologia foram definidas, sendo elas: as motivações de viagem, a descoberta de novas culturas, a descoberta de novas paisagens, a contemplação do património natural / contacto com a comunidade local e o contacto com a natureza, o tipo de alojamento e operador turístico. Os perfis *hard path young tourists* apresentam o seguinte comportamento

sustentável: interesse em viver a cultura local e comprar produtos locais orgânicos e agrícolas, aceitam pagar mais por produtos sustentáveis, preocupam-se com as áreas protegidas e a poluição e estão atentos ao impacto do turismo no meio ambiente. Atividades de aventura e desportivas são as motivações de viagem desse perfil. O perfil *soft path young tourists* também está disposto a vivenciar a cultura local, mas menos disposto a pagar mais por produtos sustentáveis, atribui menos importância às áreas protegidas e está menos atento ao impacto do turista no destino. As suas motivações de viagem estão relacionadas com relaxamento e entretenimento. A autora conclui que estes perfis devem ser considerados nas estratégias dos destinos que tenham interesse em se diferenciar dos demais e aumentar a sua competitividade através da otimização dos recursos no território.

Moeller et al. (2011) investigaram 1003 turistas domésticos australianos para explorar o retorno percebido entre minimizar os danos ambientais e maximizar a receita. Os autores identificaram seis perfis de turistas que variam em função dos seus impactos ambientais e gastos em viagem (*nature lovers, outdoor seekers, unconcerned observers, activity seekers, environmental wanderers e environmentally unconcerned*). Os *nature lovers* respeitam o meio ambiente e durante as férias costumam visitar jardins botânicos, parques de vida selvagem e zoológicos, fazem caminhadas e costumam tirar férias mais curtas; o perfil sociodemográfico do grupo caracteriza-se por aposentados que costumam viajar em pares. Os *outdoor seekers* gostam de acampar, fazer churrasco e / ou caminhar durante suas férias, possuem um comportamento ambiental amigável, costumam viajar em grupo, com duração média de viagem de sete dias. Os *unconcerned observers* desfrutam do destino turístico e não estão preocupados com o seu impacto no meio ambiente, não demonstram um comportamento ambiental amigável durante as suas viagens, ou seja, não se esforçam para reciclar e utilizar transportes públicos. Além disso, as atividades ao ar livre não são muito procuradas por esse grupo (ainda que visitem jardins botânicos e parques). Quanto às questões sociodemográficas, não existem muitas diferenças em relação aos outros grupos. Os *activity seekers* gostam de atividades ao ar livre e não perdem a oportunidade de realizar atividades de aventura durante a viagem, andam a cavalo, de bicicleta ou a pé e / ou visitam jardins botânicos. Não se comportam de forma correta em relação ao meio ambiente, deitando lixo no chão, por exemplo. São caracterizados por um segmento mais jovem, ativos no mercado de trabalho e são maioritariamente do sexo masculino. Os *environmental wanderers* constituem um segmento com perfil ambiental e sociodemográfico similar aos

nature lovers. Diferem, no entanto, no que diz respeito ao comportamento geral de viagem, pois costumam realizar viagens mais longas e mais vezes ao ano. Por fim, o grupo dos *environmentally unconcerned* é caracterizado por um comportamento ambientalmente hostil. Envolvem-se em atividades ao ar livre e o perfil sociodemográfico corresponde a jovens estudantes. Assim como outros autores que tentaram traçar o perfil dos turistas sensíveis às questões sustentáveis, estes apresentaram conclusões que reforçam a importância da segmentação desses turistas como forma de viabilizar dados para a realização de estratégias e medidas que reduzam o impacto ambientalmente negativo dos turistas no destino turístico.

Bergin-seers e Mair (2009) realizaram uma investigação com 166 turistas na Austrália, para identificar e qualificar os turistas verdes sobre as suas atitudes e comportamentos. O estudo indicou dois grupos de turistas, os *less active consumers* e os *active consumers*. Os consumidores ativos apresentam comportamentos sustentáveis em casa, tais como: redução do consumo de energia através de equipamentos eficientes em termos energéticos, reciclagem ou compostagem de resíduos, coleta e utilização de água da chuva ou água cinza, utilização de transportes públicos e compra de produtos reciclados. Quanto à fonte utilizada para procurar informação ambiental em relação ao turismo, este perfil de turista costuma fazer as suas pesquisas através de agências de viagem, da internet, jornais, de amigos e de centros de informação. Também, este grupo é mais eficaz na poupança de recursos, mais propenso a proteger o meio ambiente e incentivar outras empresas a serem ambientalmente conscientes. Os dois grupos apresentam características semelhantes quanto aos seus comportamentos de compra de serviços sustentáveis durante a viagem, tais como como passeios ao ar livre e a escolha de alojamentos sustentáveis. As autoras concluíram que há diferentes perfis de turistas verdes e que, no geral, há uma perceção de mudança dos estilos de vida, sendo as questões ambientais uma parte importante dessa mudança.

Table 3.
Autor, abordagem, contexto de aplicação, tipologia e váriáveis utilizadas para a segmentação

Autor	Abordagem	Contexto de aplicação	Tipologia	Váriáveis utilizadas para a segmentação
Kastenholz et al. (2018)	Empírica	Turismo rural	Little concerned Active preservers of nature and culture Local nature, culture and community seekers	Comportamento de viagem ambiental, cultural, social e economicamente sustentáveis (interação social com moradores locais, preservação da natureza e cultura, apreciar produtos e atividades locais, economizar recursos e reciclar e envolver-se em atividades de natureza e cultura)
López-sánchez e Pulido-fernández (2016)	Empírica	Turismo de sol e mar	Reflective tourist Unconcerned tourist Pro-sustainable tourist	Conhecimento do significado de destino turístico sustentável, importância de trabalhar pela sustentabilidade dos destinos turísticos, tipo de comportamento sustentável durante a estadia, avaliação de características relacionadas com asustentabilidade do destino, disponibilidade para pagar por um destino turístico mais sustentável, reconhecimento de comportamento empresarial responsável, preparado para pagar uma quantia adicional (para o custo total da viagem) garantindo por contrato que o dinheiro é destinado a projetos para melhorar a sustentabilidade do destino e preparado para pagar o valor adicional (para o custo total da viagem), dedutível de impostos e para melhorar a sustentabilidade do destino.
Buffa (2015)	Empírica	Turismo urbano	Hard path young tourists Soft path young tourists	Atitudes dos jovens em relação à sustentabilidade, as suas motivações e e os seus comportamentos de viagem como parâmetro para a segmentação dos turistas
Moeller et al. (2011)	Empírica	Turismo urbano	Nature lovers Outdoor seekers Unconcerned observers Activity seekers Environmental wanderers Environmentally unconcerned	Impactos ambientais e gastos em viagens
Bergin-seers e Mair (2009)	Empírica	Turismo urbano	Less active consumers Active consumers	Atitudes e comportamentos sustentáveis

Fonte: autores (2019)

2.3. Conceito de ecogamificação

A ecogamificação é uma segmentação do conceito mais amplo de gamificação e o seu principal objetivo é melhorar o desempenho de produtos e serviços com apelo ecológico (Yen, 2015). O termo ecogamificação ganhou grande popularidade com a contribuição de Paula Owen (2013), especialmente no que toca à interseção entre gamificação, negócios e sustentabilidade. O seu argumento é que a ecogamificação assenta nos pilares da sustentabilidade, proporcionando um grande potencial de aplicabilidade a diferentes contextos, como transporte, energia, água e reciclagem. Atualmente, o conceito expandiu-se para novos campos, como agricultura, saúde, educação, alimentação, turismo e cidadania.

Yen (2015, p.1) acrescenta que a ecogamificação é caracterizada pela utilização de "mecânica de jogo e design de experiência para envolver e motivar indivíduos a atingir os objetivos de consciencialização ambiental". Ou seja, o principal apelo por trás da ecogamificação é a possibilidade de induzir mudanças significativas e duradouras no comportamento do utilizador. A ecogamificação pressupõe a utilização eficaz dos elementos do jogo (mecânico, estético, dinâmico e emocional), conforme sugerido na área mais geral da gamificação (Fox et al, 2010 ; Hunicke et al., 2004; Robson et al., 2015), dando prioridade às questões relacionadas com a sustentabilidade. A ecogamificação difere de outras ferramentas pois vai além do entretenimento, procurando envolver o utilizador em experiências através da aprendizagem (Chelliahet al., 2017), envolvimento em causas ambientais (Grossberg et al., 2015), e participação em programas de fidelização (Sigala, 2015). As ferramentas ecogamificadas estão a redefinir as formas sociais, ambientais, políticas, tecnológicas e económicas através das quais as empresas e os consumidores interagem com os problemas da sustentabilidade (Negruşa et al., 2015). No entanto, são necessários mais estudos para avaliar e monitorizar a aplicação da ecogamificação em contextos mais amplos, incluindo o turismo.

Os diferentes atores e agentes da cadeia de valor do turismo estão a descobrir os benefícios da promoção do comportamento sustentável do turista. Ainda existem relativamente poucos estudos que combinam os temas de gamificação, turismo e sustentabilidade, no entanto, estão a aumentar, sendo importante destacar alguns deles (e.g., Aguiar-Castillo et al., 2019; Aguiar-Castillo et al., 2018; Negruşa et al.,2015). Aguiar-Castillo et al. (2019) desenvolveram um estudo empírico com 141 turistas para avaliar a eficácia de uma aplicação móvel ecogamificada na promoção da reciclagem e na melhoraria

da imagem do destino. Os resultados sugerem que, do ponto de vista do turista, a ferramenta melhora a satisfação do turista, pois a tecnologia pode facilitar o comportamento ambiental durante a viagem, o que, consequentemente, traz uma perceção positiva do destino. No entanto, se as recompensas não forem úteis para a promoção comportamental, isso poderá desencorajar a utilização da ferramenta. Numa outra perspetiva, Aguiar-Castillo et al. (2018) desenvolveram um estudo com 79 especialistas para avaliar a intenção de utilizar uma aplicação móvel ecogamificada, que visa promover a sustentabilidade ambiental em 11 grandes cidades turísticas. Os autores sugerem que, para melhor envolver os utilizadores, as empresas de tecnologia que fornecem serviços gamificados devem disponibilizar mecanismos que envolvam as redes sociais como uma forma de fornecer visibilidade aos utilizadores, apresentando informações confiáveis de sustentabilidade e, finalmente, implementando elementos de design de jogo mais simples. Negruşa et al. (2015), através de resultados obtidos a partir de estudos de caso, identificaram técnicas e aplicações de gamificação usadas por organizações da indústria do turismo para aprimorar as suas atividades sustentáveis. Os autores sugerem que, no contexto do turismo sustentável, exista um mercado estruturado que envolva o desenvolvimento de soluções ecogamificadas, visando hotéis, restaurantes, agências de viagens, governo e ONGs como potenciais compradores de serviços gamificados para o setor.

Apesar de Negruşa et. al. (2015) sugerirem que no contexto do turismo deve existir um mercado estruturado e aberto à ecogamificação, este mercado parece estar muito no início. Em outros mercados, por exemplo, a aplicabilidade parece ser elevada e a boa notícia é que pode ser perfeitamente transferível para o contexto do turismo. Por exemplo, Ouariachi et al. (2020) identificam 181 casos práticos e experimentais de aplicabilidade da ecogamificação em diferentes contextos. O estudo elegeu dois casos práticos como melhores práticas com potencial para envolver os utilizadores na mudança de comportamento ambiental: SaveOhno e JouleBug. O primeiro caso corresponde a uma plataforma social focada em trabalhos relacionados com a mudança climática e envolvimento dos utilizadores com a mudança de comportamento ambiental. No início, a plataforma servia como meio para angariar fundos e, em poucos anos, evoluiu para uma comunidade de ativistas ambientais, incentivando os visitantes a inscreverem-se em petições. O segundo caso consiste numa aplicação móvel ecogamificada que visa envolver os utilizadores em práticas ambientais do seu quotidiano. Para manter os utilizadores ativos diariamente, a aplicação utiliza o

mecanismo de ‘buzz’, através do qual é possível registar uma determinada prática ambiental e assim obter pontos.

Negruşa et al. (2015) explicam que o mercado de ecogamificação para o turismo abrange, numa das extremidades, os providers (empresas de gamificação) e buyers (empresas de turismo, instituições e ONGs); e na outra extremidade estão os players (turistas, funcionários e comunidade), ou seja, o público-alvo que efetivamente utilizará a ferramenta. Entre essas extremidades desenrola-se o 'processo', caracterizado pelo desenvolvimento da própria solução ecogamifcada.

Figura 14. O mapa mental do processo da gamificação no turismo

Fonte: Adaptado de Negrusa et al., 2015

Através do Mapa mental de um processo de gamificação sustentável no turismo, os autores explicam que fornecedores (empresas responsáveis pelo desenvolvimento de ferramentas ecogamificadas) e compradores (organizações de turismo, com potencial para comprar essas ferramentas) são os responsáveis por fazer a ecogamificação acontecer no setor. Esses stakeholders a montante vêem a ferramenta como uma alternativa para superar desafios, envolver turistas em ações ambientais e atingir novos clientes. Simultaneamente, os fornecedores, também a montante, percecionam a ferramenta como forma de superar a resistência tecnológica dos compradores e como um facilitador para abordar as questões de sustentabilidade no turismo (Souza et al., 2020).

Por um lado, são os fornecedores que desenvolvem soluções ecogamificadas para o mercado; por outro, os compradores são caracterizados por grandes empresas que possuem recursos financeiros suficientes e que desenvolvem estratégias de mercado para adquirir ferramentas tecnológicas voltadas para as questões de sustentabilidade. Como exemplo disso, Negrusa et al. (2015) referem a cadeia de hotéis Marriott, que implementou uma

aplicação de ecogamificação para estimular os hóspedes a desenvolverem um comportamento pró-ambiental, economizando energia e água.

Simultaneamente, Negruşa et al. (2015) chamam a atenção para o facto de que nem o turismo é ainda explorado pelas empresas de tecnologia como mercado potencial, nem as empresas e instituições de turismo estão ainda cientes dos benefícios da ecogamificação. Portanto, a falta de consciencialização de ambos os lados é um desafio a ser superado, a fim de incentivar os fornecedores a desenvolver soluções eficazes e inovadoras para o setor e, ao mesmo tempo, incentivar os compradores a incluir ferramentas ecogamificadas como solução potencial para ajudar a resolver problemas de sustentabilidade no turismo.

De acordo com os autores, o processo é caracterizado pela maneira como os compradores melhoram os seus serviços e produtos ao utilizar elementos ecogamificados. Segundo Fox et al.(2010), os elementos mencionados são denominados como mecânica (pontos, níveis, classificações), dinâmica (recompensa, conquista, autoexpressão, competição, altruísmo) e estética (fantasia, sensação, narrativa, desafio e descoberta). Eles podem ser usados para diferentes propósitos como por exemplo, envolver, persuadir, mudar e reforçar comportamentos (Negruşa et al., 2015). Para além disso, as ferramentas ecogamificadas devem basear-se nos pilares da sustentabilidade (ambiental, social e económico), ou seja, a ecogamificação poderá ajudar através da introdução de maneiras mais fáceis, lúdicas e divertidas. Por exemplo, Lu e Ho (2020) demonstram bem o impacto da gamificação e da diversão no envolvimento dos consumidores com as marcas.

Finalmente, os players são o alvo dos serviços ecogamificados; por outras palavras, essas são ferramentas desenvolvidas para eles e são eles que efetivamente as utilizarão. Esta pesquisa centra-se nos players, mais especificamente, nos turistas urbanos.

2.3.1 Tipologias de game user

As tipologias de *game user* existentes não são suficientemente ricas em termos de uma verdadeira contextualização social e comportamental dos indivíduos, o que reforça a potencial contribuição deste estudo através de uma interseção entre tipologias de turistas urbanos face à sustentabilidade e tipologias de game users. A literatura sobre as tipologias do game user derivaram de algumas distinções fundamentais que estimularam pesquisas mais detalhadas sobre o perfil dos jogadores (Ver tabela 3). Bartle (1996) foi um dos primeiros a caracterizar os tipos de jogadores, enquanto outros autores que o sucederam trouxeram para a discussão teórica uma caracterização dos jogadores baseados em diferentes

pilares. Já os modelos de Bateman e Boon (2006) e Bateman et al. (2011) classificam o perfil desses jogadores com base nas suas habilidades e preferências. Kallio et al. (2011) apresentaram uma tipologia de mentalidades dos jogadores com base em jogos digitais. Yee (2005) também classificou o perfil dos jogadores com base nas suas motivações, assim como Tondello et al. (2018) que apresentaram classificações das principais motivações do jogador. Estes autores trouxeram contribuições significativas no âmbito da literatura científica sobre a tipologia do *game user*, e que servido de base para o desenvolvimento de novas abordagens nesta área de pesquisa.

Tabela 4.
Tipologias e critérios para delimitação dos perfis

Autor	Tipologia	Critério
Bartle (1996)	Socializadores, realizadores, exploradores e assassinos	Ação versus interação e mundo real versus mundo do jogador
Bartle (2003)	Realizadores (planeador – explícito e oportunista - implícito), exploradores (cientista – explícito e *hacker* - implícito), socializadores (*networker* – explícito e amigo - implícito) e assassinos (político – explícito e *griefer* - implícito)	Mudança e persistência
Bateman e Boon, (2006)	Conquistador,gestores wanderers, e participante	Estilos de jogador
Yee (2008) e Yee et al. (2012)	Realização, social e imersão	Motivações do jogador (avanço, mecânica, competição, socialização, relacionamento, trabalho em equipa, descoberta, representação de papéis, customização, escapismo)
Kallio et al., (2011)	Mentalidades sociais, mentalidades ocasionais e mentalidades comprometidas	Culturas de jogos e heurística de mentalidade de jogos (motivações leves e casuais de jogos sociais)
Bateman et al., (2011)	Empreendedor, conquistador demolidor, mentor, explorador, socializador e sobrevivente	Habilidades, preferências e motivações dos jogadores (desafio, excitação, risco, raciocínio estratégico, exploração, curiosidade, interações sociais, experiências assustadoras e conclusão das atividades)
Ferro et al. (2013)	Dominante, objetivista, humanista, inquisitivo e criativo	Personalidades do jogador relacionado com os elementos dos jogos
Yee (2015)	Ação, social, maestria, realização, imersão criatividade	Motivações do jogador (destruição, excitação, competição, comunidade, desafio, estratégia, poder, fantasia, história, design e descoberta)
Marczewski e Holdings (2016)	Filantrópicos, socializadores, espíritos livres, empreendedores, jogadores e disruptores	Motivações e tipo de elementos da gamificação

Fonte: baseado em (Bartle (1996,2003); Bateman e Boon, (2006); Yee (2008) e Yee et al. (2012); Kallio et al., (2011); Bateman et al., (2011); Ferro et al. (2013); Yee (2015); Marczewski(2016))

Apesar da diversificação de perspetivas em termos de tipologias de potenciais utilizadores da gamificação, são poucos os estudos que desenvolvem uma relação abrangente entre as motivações e os elementos da gamificação. Com este pressuposto, este estudo opta por utilizar os Tipos de Utilizadores de Gamificação Hexad (Marczewski, 2015a) pois apresentam um maior potencial de adequação aos diferentes utilizadores.

O modelo de Tipo de Utilizador de Gamificação HEXAD tem por base os modelos de tipos de jogadores propostos por Bartle e BrainHex (Kotsopoulos et al., 2018). Andrzej Marczewski segmentou os seis tipos de utilizador de gamificação como Socializadores, Espíritos Livres, Empreendedores, Filantropos, Jogadores e Disruptores (Marczewski, 2016). Essa classificação, conforme Marczewski (2016), é baseada nos fatores intrínsecos (ex. autorrealização) e extrínsecos (ex. recompensas) da motivação, seguindo os princípios teóricos da Teoria da Autodeterminação (SDT) de Deci e Ryan (2004). Na figura 15 verifica-se os 6 tipos de utilizadores da gamificação e as suas respetivas motivações

Figura 15. Marczewski's User Type HEXAD
Fonte: (Marczewski, 2016)

Os autores promovem o mapeamento da personalidade dos utilizadores com recurso à tipologia HEXAD, visando a projeção e identificação com os elementos do *game design* que podem ser adequados para os perfis identificados (Kotsopoulos et al., 2018).

A tabela 5 apresenta os seis tipos que configuram o tipo de utilizador da gamificação HEXAD, as suas motivações e elementos da gamificação mais apropriado para cada perfil, segundo especificação dos autores (Marczewski, 2016;Tondello et al., 2016).

Tabela 5.
Tipo de utilizador da gamificação, motivações e elementos da gamificação

Tipo de utilizador da gamificação	Motivação	Descrição	Elementos da gamificação
Filantrópicos	Propósito	São altruístas e dispostos a dar sem esperar uma recompensa.	Coleta, negociação, *gifting*, compartilhamento de conhecimento e funções administrativas.
Socializadores	Parentesco	Querem interagir com os outros e criar conexões sociais.	Guildas ou equipas, redes sociais, comparação social, competição social e descoberta social.
Espíritos Livres	Autonomia	Gostam de criar e explorar dentro de um sistema.	Tarefas exploratórias, jogabilidade não linear, ovos de Páscoa, conteúdos desbloqueáveis, ferramentas de criatividade e personalização.
Empreendedores	Competência	Querem progredir dentro de um sistema, completando tarefas ou colocando-se à prova enfrentando desafios difíceis	Desafios, certificados, aprendizado de novas habilidades, missões, níveis ou progressão e desafios épicos (ou "batalhas contra chefes").
Jogadores	Recompensas extrínsecas	Farão o que for preciso para ganhar uma recompensa dentro de um sistema, independentemente do tipo de atividade.	Pontos, recompensas ou prémios,tabelas de classificação, distintivos ou conquistas, economia virtual e loterias ou jogos de azar.
Disruptores	Senso de mudança	Tendem a perturbar o sistema, seja diretamente ou através de outros, para forçar mudanças negativas ou positivas. Gostam de testar os limites do sistema e tentar avançar ainda mais.	Plataformas de inovação, mecanismos de votação, ferramentas de desenvolvimento, anonimato e jogabilidade anárquica.

Fonte: (Marczewski, 2016;Tondello et al., 2016)

De acordo com Tondello et al. (2016), é possível identificar semelhanças entre as motivações, no entanto, estas são ligeiramente sobrepostas pelos perfis dos tipos de utilizadores. Os autores providenciam, de maneira sucinta, as dicotomias e semelhanças entre as motivações e os perfis. Por exemplo, os Empreendedores e Jogadores comungam da mesma motivação - a conquista - no entanto, diferem quanto ao foco, uma vez que os

Jogadores se interessam pelas recompensas extrínsecas, enquanto os Empreendedores são mais orientados para a competência. Os Filantrópicos e Socializadores motivam-se pela interação com os outros utilizadores da gamificação, mas apresentam perspetivas diferentes de interesses, pois o Socializador está em busca da interação em si, enquanto um Filantrópico se motiva, essencialmente, com o interesse em ajudar o próximo. Por fim, os Espíritos Livres e os Disruptores comungam da autonomia e criatividade. Entretanto, os Espíritos Livres permanecem dentro dos limites do sistema sem o desejo de os mudar e os Disruptores buscam expandir esses limites para assim mudar o sistema.

Com base em Tondello et al. (2018) os estudos apresentados fornecem evidências empíricas que expõem confiança na validade estrutural da escala proposta pelos autores (Tondello et al., 2016). Neste contexto, decide-se utilizar este modelo como base do *framework* a ser proposto neste estudo.

3. Enquadramento das Proposições de Estudo

3.1 Potencial de recetividade do game user à ecogamificação

Com base na tipologia de *game user* de Tondello et al. (2018), é possível definir categorias de análise que contribuem para a perceção do potencial de recetividade do *game user* à ecogamificação (ver tabela 5). As categorias de análise identificadas foram a motivação pessoal, perfil comportamental e elementos do jogo. O potencial de recetividade do *game user* à ecogamificação é considerado "provável" para aqueles com perfil comportamental identificados como altruísta, sociável, estrategista e inovador, com motivações pessoais relacionadas com propósito, parentesco, recompensas extrínsecas, senso de mudança e elementos do jogo direcionados para desafios, competição, cooperação, recompensas externas, interação, níveis e ranking. Já os perfis enquadrados como "menos provável" possuem um perfil comportamental de "exploradores" e "progressistas"; as suas motivações estão relacionadas com a autonomia e o desenvolvimento de competências e os elementos do jogo estão ligados a certificados, missões e tarefas exploratórias.

Empreendedores: possuem um perfil comportamental do tipo "progressista", isto é, não têm medo de correr riscos e esperam progredir quando estão a realizar alguma tarefa/atividade. São motivados pelo aprimoramento das suas competências. Os elementos do jogo relacionados com este perfil são, por exemplo, certificados, aprendizagem de novas competências e missões. O *game user* com este perfil poderá ser "menos provável" quanto à recetividade à ecogamificação, por considerar a "competência" um gatilho motivador para

o envolvimento com a ferramenta. Tal improbabilidade pode acontecer porque a competência é uma dimensão de caráter subjetivo e com critérios de avaliação e resultados difíceis de serem alcançados através dos serviços ecogamificados. Assim, um grau de complexidade direcionado à ferramenta pode colocar em risco a expetativa do utilizador, que poderá eventualmente não acreditar no potencial da ecogamificação para o desenvolvimento das suas competências, especialmente no contexto de questões complexas como a sustentabilidade.

Jogadores: possuem um perfil comportamental do tipo "estrategista". O que motiva esse perfil são as recompensas e o elemento do jogo a ser priorizado são as recompensas extrínsecas como *voucher* de visita guiada para jardins emblemáticos da cidade, passeios em transporte sustentável, *tickets* para museus com foco na sustentabilidade e outros. Diferente do perfil Empreendedor, este perfil de *game user* poderá ter uma "provável" recetividade à ecogamificação, uma vez que a ferramenta se fundamenta, principalmente, nos princípios de reconhecimento através das recompensas extrínsecas e intrínsecas.

Filantrópicos: têm um perfil comportamental "altruísta", ou seja, possuem atitudes solidárias; esforçam-se por fazer algo pelo outro, sem esperar nada em troca. São motivados pelo desenvolvimento de relações com pessoas com o objetivo de ajudar e apoiar causas. O *game user* com esse perfil poderá ter uma "provável" recetividade à ecogamificação, pois muitos jogos e atividades no âmbito da sustentabilidade têm como propósito envolver os indivíduos em causas de forma voluntária. Esta probabilidade de recetividade acontece caso o gatilho motivador priorizado em serviços turísticos ecogamificados remeta para elementos do jogo como, por exemplo, aqueles que envolvam desafios entre os turistas ou atividades com sentido de cooperação. O objetivo, portanto, deve ser dar prioridade ao envolvimento em causas que visem melhorar a sustentabilidade do turismo no contexto urbano.

Socializadores: apresentam-se com um perfil comportamental "sociável", ou seja, são acessíveis para estabelecer conexões sociais. São motivados pelo simples facto de se relacionarem com pessoas. O elemento do jogo mais eficaz para envolver esse perfil pode estar relacionado com atividades que envolvam desafios caracterizados pela competição e pela interação entre os utilizadores, cuja finalidade seja melhorar a sustentabilidade do turismo no contexto urbano. O *game user* com este perfil tenderá para uma "provável" recetividade à ecogamificação, porque, no geral, os serviços ecogamificados tentam promover a socialização entre os utilizadores, seja por interação real (através de atividades

em conjunto no destino) ou através de conexões virtuais (por meio das redes sociais, por exemplo).

Espíritos Livres: têm um perfil comportamental de "exploradores", isto é, são pessoas que gostam de explorar e descobrir novas situações, seja em ambiente real ou em contexto de jogo. São motivados por situações e atividades que lhes permitam exercer a autonomia. O elemento do jogo a ser incorporado em serviços ecogamificados mais adequado a este perfil remete para mecanismos que envolvam tarefas exploratórias e que utilizem a criatividade para melhorar o envolvimento. O *game user* com este perfil poderá ser "menos provável" quanto à sua recetividade à ecogamificação, por considerar a independência/autonomia um gatilho motivador para o envolvimento com a ferramenta. Esta improbabilidade pode acontecer porque a autonomia é uma dimensão subjetiva, com critérios de avaliação e de resultados difíceis de serem alcançados. Assim, a utilização negligente desta dimensão em serviços ecogamificados pode pôr em risco a expetativa do utilizador e levar a consequências irreversíveis para a sua experiência.

Disruptores: apresentam-se com um perfil comportamental de caráter "inovador", ou seja, são *game users* de fácil adaptação às mudanças, com pensamento criativo e indagador. São motivados por situações que impliquem mudanças constantes. O *game user* com esse perfil poderá ter uma "provável" recetividade à ecogamificação caso o elemento do jogo a ser priorizado esteja relacionado com níveis e rankings. Para além disso, o serviço ecogamificado poderá tornar acessíveis certas experiências para esse perfil de utilizador. Por exemplo, possibilidades de co-criação em que o turista poderá registar fotografias das suas experiências sustentáveis no destino turístico urbano, com o propósito de alcançar um novo nível ou ranking.

Tabela 6.
Potencial de recetividade do game user à ecogamificação

Tipologia do *game user*	Perfil comportamental	Motivação pessoal	Elemento do jogo a ser utilizado	Recetividade à ecogamificação
Filantrópicos	Altruístas	Propósito	Desafios e senso de cooperação	Provável
Socializadores	Sociáveis	Parentesco	Desafios e senso de competição e interação	Provável
Espíritos Livres	Exploradores	Autonomia	Tarefas exploratórias	Menos Provável
Empreendedores	Progressistas	Competência	Certificados, aprendizado de novas habilidades e missões	Menos provável
Jogadores	Estrategistas	Recompensas extrínsecas	Rewards materiais	Provável
Disruptores	Inovadores	Senso de mudança	Níveis e ranking	Provável

Fonte: Autores (2019)

3.2 Potencial de recetividade do turista urbano à ecogamificação

Com base nas tipologias do turista face à sustentabilidade de Moeller et al.(2011) e na análise das motivações de viagem de Buffa (2015), foi possível identificar categorias de análise que poderão influenciar o potencial de recetividade do turista urbano à ecogamificação (ver tabela 6). As categorias de análise identificadas foram o comportamento ambiental em viagem, as motivações de viagem e o perfil sociodemográfico. O potencial de recetividade à ecogamificação é considerado "provável" para os perfis de turistas urbanos com comportamento ambiental amigável/responsável e "menos provável" para aqueles com comportamento ambiental não amigável/hostil. As suas motivações de viagens apresentam variações, isto é, os perfis de recetividade 'provável' podem estar motivados pela descoberta de novas paisagens, contacto com a natureza e contemplação do património natural. Já os perfis de recetividade 'menos prováveis' poderão possuir motivações de viagem relacionadas com entretenimento, relaxamento e contacto com a comunidade local.

***Nature lovers*:** o perfil sociodemográfico é caracterizado por aposentados que gostam de viagens com uma duração média de seis dias e que viajam em pares. Durante a viagem, costumam agir de forma responsável quanto à sustentabilidade. Apesar da tipologia de Buffa (2015) estar direcionada para o público jovem, é possível que os *nature lovers* se sintam motivados para visitar um determinado destino urbano que ofereça a oportunidade de descobertas de novas paisagens e contacto real com a natureza. A literatura científica sobre a gamificação indica que os indivíduos de mais idade tendem a ser menos recetivos à

ferramenta, no entanto, apesar desta dificuldade, é possível que este perfil tenha uma "provável" recetividade à ecogamificação, pois apresenta um comportamento sustentável de viagem ativo e poderá estar genuinamente interessado em serviços ecogamificados.

***Outdoor seekers* :** o perfil sociodemográfico é caracterizado por adultos que apreciam viagens com uma duração média de sete dias e em grupo. O seu comportamento ambiental de viagem é amigável. Para os *Outdoor seekers* , a motivação de viagem pode estar relacionada com contemplação do património natural e a descoberta de novas paisagens. Este perfil poderá ter uma "provável" recetividade à ecogamificação, visto que apresenta um comportamento ambiental ativo, podendo ser atraído por atividades ecogamificadas no destino urbano.

***Unconcerned observers* :** o perfil sociodemográfico é caracterizado por adultos que gostam de viagens com uma duração média de sete dias e em grupo. Diferentemente dos perfis *nature lovers e outdoor seekers* poderão ser motivados por destinos urbanos que ofereçam atrações turísticas com opções de bem-estar e relaxamento. O seu comportamento ambiental de viagem não é considerado amigável. Assim, este perfil poderá ser "menos provável" quanto à recetividade à ecogamificação, uma vez que apresentará pouca sensibilidade ao envolvimento em atividades sustentáveis no destino urbano.

***Activity seekers* :** o perfil sociodemográfico é caracterizado por jovens que gostam de viagens curtas e em grupo. Durante a viagem, costumam agir de forma irresponsável quanto à sustentabilidade. Esta tipologia pode ter como motivação de viagem o entretenimento, contacto com a comunidade local, já que o seu foco principal de viagem são as atividades. A literatura científica sobre a gamificação indica que os indivíduos mais jovens tendem a ser mais recetivos à ferramenta, no entanto, poderão ser "menos prováveis" quanto à recetividade à ecogamificação, pois não se mostram sensíveis a atividades sustentáveis no destino urbano.

***Environmental wanderers*:** o perfil sociodemográfico é caracterizado por aposentados que gostam de viagens com uma duração média de 11 dias e viajam em pares. Assim como os *nature lovers* , possuem as mesmas motivações de viagem e costumam agir de forma responsável quanto à sustentabilidade. Também, é possível que sejam menos recetivos à tecnologia, mas, por outro lado, poderá ser o caso de uma "provável" recetividade à ecogamificação, pelos mesmos motivos mencionados anteriormente no perfil '*nature lovers'*.

Environmentally unconcerned **:** o perfil sociodemográfico é caracterizado por jovens que gostam de viagens curtas e em grupo. Durante a viagem, costumam agir de forma hostil quanto à sustentabilidade. A motivação de viagem dos *environmentally unconcerned* pode estar relacionada com o entretenimento e o contacto com a comunidade local, uma vez que se trata de um perfil de turista jovem. Apesar de recetivos à tecnologia, tal como os *activity seekers* , este perfil poderá ser "menos provável" quanto a sua recetividade à ecogamificação, pois o seu comportamento sugere pouco interesse em participar em atividades ambientais no destino urbano.

Tabela 7.
Potencial de recetividade do turista urbano à ecogamificação

Tipologia de turista urbano face à sustentabilidade	Perfil sóciodemográfico	Comportamento ambiental em viagem	Motivações de viagem	Recetividade à ecogamificação
Nature lovers	Aposentados que costumam viajar aos pares e viagens de seis dias	Comportamento ambiental responsável	Descoberta de novas paisagens, contacto com a natureza	Provável
Outdoor seekers	Adultos, costumam viajar em grupo, duração média de viagem de sete dias	Comportamento ambiental amigável	Contemplação do património natural, descoberta de novas paisagens	Provável
Unconcerned observers	Adultos, costumam viajar em grupo, com uma duração média de viagem de sete dias	Comportamento ambiental não amigável	Relaxamento	Menos provável
Activity seekers	Jovens,viagens mais curtas e de grupo	Comportamento ambiental não amigável	Entretenimento, contacto com a comunidade local	Menos provável
Environmental wanderers	Aposentados que costumam viajar aos pares eviagens mais longas com uma duração média de onze dias	Comportamento ambiental responsável	Descoberta de novas paisagens, contacto com a natureza	Provável
Environmentally unconcerned	Jovens estudantes e viagens mais curtas	Comportamento ambiental hostil	Entretenimento, contacto com a comunidade local	Menos provável

Fonte: Autores (2019)

3.3 Potencial de recetividade à ecogamificação: proposições de estudo baseadas na interseção entre as tipologias de game users e de turistas urbanos.

Assentando no pressuposto de que são vários os impactos negativos do turismo em destinos urbanos, desenvolve-se um *framework* com a explicitação de construtos relevantes identificados na literatura. Da revisão desenvolvida emergiu a necessidade de investigar e compreender, de forma mais profunda, a interseção entre as tipologias de *game users* e dos turistas urbanos, tendo em conta o potencial de recetividade à ecogamificação. Embora sejam escassos os estudos científicos nesta perspetiva, a realidade é que se trata de uma área sobre a qual ainda existe muito por conhecer e explorar. Assim, a partir da interseção entre as tipologias, foi possível delimitar um conjunto de proposições de estudo, sendo elas:

I. O perfil sociodemográfico influencia a recetividade à ecogamificação;
II. O perfil comportamental (ex. altruístas, sociáveis, exploradores, progressistas, estrategistas, inovadores) influencia a recetividade à ecogamificação;
III. O comportamento ambiental em viagem (ex. amigável, não amigável, responsável, hostil) influencia a recetividade à ecogamificação;
IV. A motivação pessoal (ex. propósito, parentesco,autonomia, competência, recompensas extrínsecas, senso de mudança) influencia a recetividade à ecogamificação;
V. A motivação de viagem (ex. descoberta de novas culturas, descoberta de novas paisagens, contemplação do património natural, contacto com a comunidade local, contacto com a natureza, relaxamento e entretenimento) influencia a recetividade à ecogamificação;
VI. Os elementos do jogo (ex. desafios, competição, tarefas exploratórias, senso de cooperação, recompensas materiais, níveis, rankings, certificados, missões e outros) influenciam a recetividade à ecogmificação.

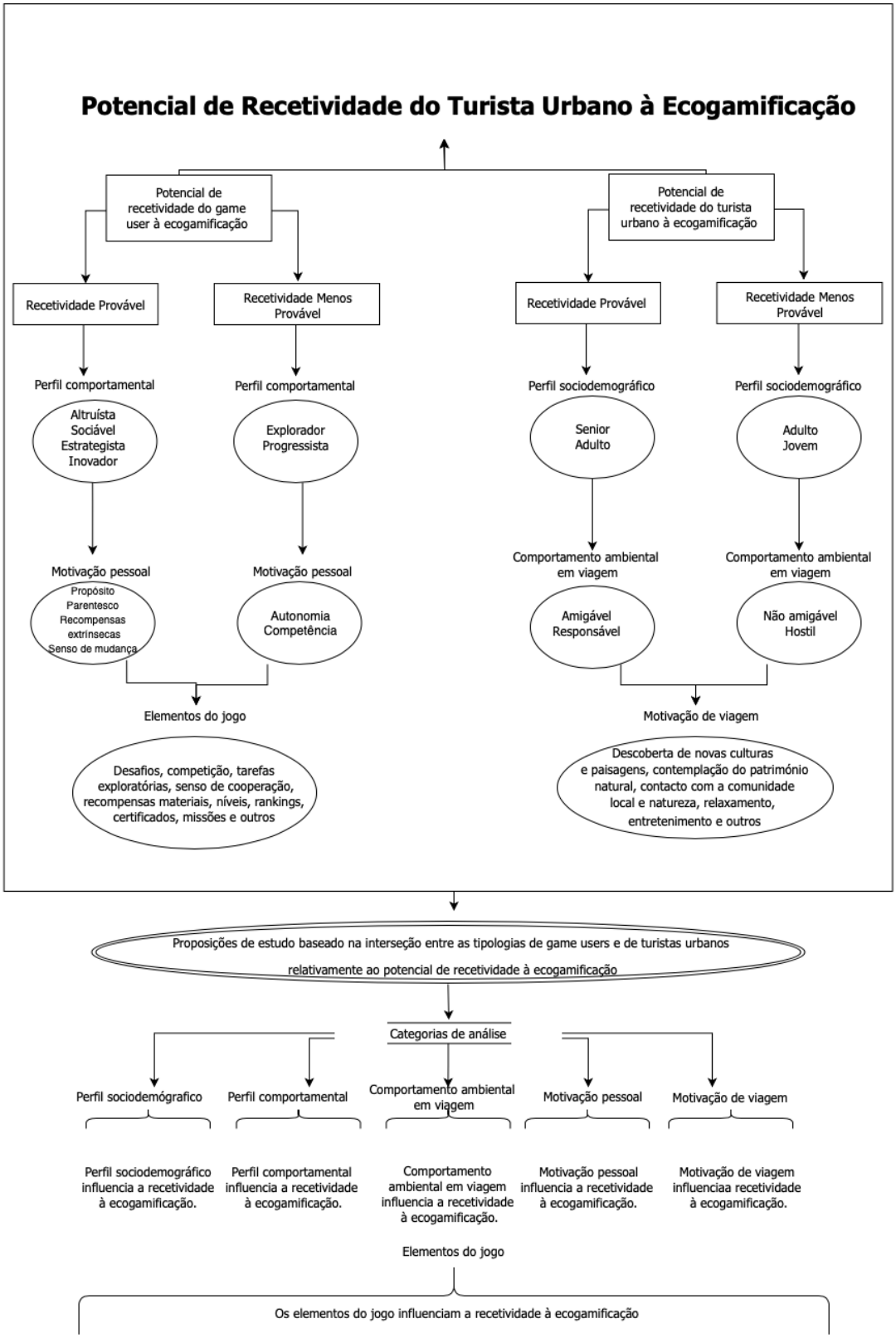

Figura 16. *Framework* do potencial de recetividade do turista urbano à ecogamificação
Fonte: autores (2019)

4.Conclusão e contribuições

Este estudo surge no contexto de uma lacuna de investigação sobre o potencial de recetividade dos turistas urbanos à ecogamificação e contribui para a identificação de fatores que influenciam essa recetividade de forma a distinguir os turistas mais e menos recetivos à ecogamificação e para tentar explicar essas diferenças. Desenvolve uma abordagem teórica assente numa análise dos pontos de contacto entre a literatura sobre segmentação e tipologias do turista face à sustentabilidade e a literatura sobre tipologias do game user. A partir dessa interseção, apresenta um *framework* e um conjunto de proposições teóricas em torno de seis categorias de análise que correspondem a fatores como o perfil sociodemógrafico, o perfil comportamental, o comportamento ambiental em viagem, a motivação pessoal, a motivação de viagem e os elementos do jogo. Estes fatores ajudarão a identificar diferenças relevantes entre turistas urbanos, contribuindo assim para o desenvolvimento de tipologias e segmentos de turistas com diferentes níveis de recetividade à ecogamificação.

Em termos de aplicabilidade e de implicações práticas, os factores identificados neste trabalho permitirão identificar diferenças relevantes entre turistas urbanos, servindo de base a futuros estudos empíricos sobre tipologias e segmentos de turistas com diferentes níveis de recetividade à ecogamificação. Por sua vez, empresas de tecnologia e compradores de serviços ecogamificados poderão utilizar essa tipologias para traduzir a heterogeneidade em estratégias diferenciadas mais eficazes e soluções mais customizadas.

Uma das limitações deste estudo é que as tipologias de game user analisadas não incorporam, por definição, aqueles que eventualmente não estão tão recetivos a jogos ou aplicações gamificadas. Assim, para estudar a recetividade à ecogamificação e numa lógica de segmentação mais rica, sugere-se que, em estudos futuros, também sejam considerados fatores como a importância e tipos de entretenimento (mais passivo ou mais ativo) e a relação com a tecnologia (mais ou menos utilitária, mais ou menos fluida, mais ou menos divertida) por parte dos turistas urbanos.

Chapter IV

Factors influencing urban tourists' receptivity to ecogamified applications: A study on transports and mobility

Factors influencing urban tourists' receptivity to ecogamified applications: A study on transports and mobility

Abstract

Purpose:

The literature on the factors that enhance ecogamification and the intention to use smart tourism applications is vast and increasing. However, most studies tend to focus on the "user", rather than the "tourist" and that gap is the trigger for the present research. The main purpose is examining how home and travel environmental behaviour, travel motivations, types of entertainment (digital and non-digital) and technology proficiency (professional vs non-professional) influence the receptivity of urban tourists to different game elements in a transport & mobility context.

Design/methodology/approach:

The study carried out a qualitative experiment with focus groups, with a total of 16 urban tourists. The software webQDA was used to systematize and categorize data and to analyse the content.

Findings:

The results suggest differences and similarities in terms of receptivity of urban tourists to ecogamification which might have implications for future studies on urban tourists' typologies and segments and, also, for providers of ecogamified services, game designers and marketers.

Originality/value:

Rather than addressing the game elements per se (which, in this research are seen as means to an end), the novelty resides in the combination of characteristics that intersect urban tourism (travel motivations), gamification (entertainment preferences and technology proficiency) and sustainability (home-travel environmental behaviour). This intersection provides a lens to interpret tourists' receptivity and interaction with different game elements (cooperation, reward, points, avatar, and ranking).

Keywords: Sustainability; Ecogamification; Tourism; Receptivity to Ecogamification

1. Introduction

Promoting habits of sustainable behaviour in relation to transport & mobility has become an increasingly urgent goal for urban cities (Kazhamiakin et al., 2015). Urban city centres have been impacted by the misuse of land resources, and immediate effects on residents' quality of life, high congestion and pollution have been recurrent and challenging for large cities (Anagnostopoulou et al., 2018).

Not only local communities, but also tourists have been the target of initiatives to promote more sustainable behaviour in transport and mobility. Tourists are the focus since there is a tendency for mass tourism in urban tourist centres. The ability to get around a destination is part of tourists' numerous routine actions during their trip, which intensifies mobility and transportation problems as congestion, noise, parking stress and environmental pollution (Dickinson & Robbins, 2008).

Simultaneously, persuasive technologies available in transport & mobility applications have the potential to impact travellers' decisions, attitudes and behaviours, as well as leading them to more sustainable route options (Anagnostopoulou et al., 2018). Persuasive technology is characterized as a technology created to change users' attitudes and behaviour through persuasion mechanisms and social support (Fogg, 2003). One of the most widely used extensions of persuasive technology is gamification, especially in the context of transport & mobility. Gamification is considered the combination of game mechanisms and design in the context of non-games (Deterding, 2011). It has been recognized as a viable and strategic way to overcome environmental problems that emerge from tourism (Souza et al., 2020). Its applicability in the context of environmental sustainability is called ecogamification, which has also been applied in the context of transport & mobility.

Despite the numerous cases of ecogamification success identified in different contexts and markets, the topic has been exposed to severe criticism by professionals and scholars (Souza & Marques, 2017). Froehlich (2015) brings a realistic and an unromanticized idea of using ecogamification to solve complex issues, as environmental problems, but questions whether gamification is the solution for them. Aguiar-Castillo et al. (2018) explain that "gamipulation" refers to the malicious use of game design elements, which aim to manipulate users' behaviour without their consent. In other words, what the researchers and game developers mean to expose by criticizing the tool is that gamification does not always use an

ethical approach, mainly due to the negligent use of its mechanics and game elements (Nicholson, 2012).

A considerable amount of literature has been published on persuasive technology and tourism (Xu et al., 2017), smart tourism, and cities (Aguiar-Castillo et al., 2018; Cardoso et al., 2019; Yoo et al.,2017), sustainability (García et al., 2015; Pan & Liu, 2018) and ecogamification/game elements (Millonig & Mitgutsch, 2014; Kazhamiakin et al. 2015; Klock et al., 2020; Xu et al., 2015). Specifically, in relation to the factors that enhance ecogamification and the intention to use smart tourism applications the body of research is vast and increasing (Cardoso et al., 2019; Yoo et al., 2017). However, most studies tend to focus on the "user", rather than the "tourist". That gap has triggered the present research, which has the purpose to study how a set of tourists´ characteristics influence their receptivity and experience with different game elements in the context of transport & mobility. Rather than focusing on game elements per se (which, in this research are addressed as means to an end), the novelty resides in the combination of characteristics that intersect urban tourism (travel motivations), gamification (entertainment preferences and technology proficiency) and sustainability (home-travel environmental behaviour). This intersection provides a lens to interpret tourists' receptivity and interaction with different game elements (cooperation, reward, points, avatar, and ranking). Through a qualitative experiment based on focus groups, this study examines how home and travel environmental behaviour, travel motivations, types of entertainment (digital and non-digital) and technology proficiency (professional vs nonprofessional) influence the receptivity of urban tourists to different game elements in a transport & mobility context.

2. Urban tourism, sustainability and ecogamification

Environmental problems arising from tourism are increasingly visible and alarming (Pan & Liu, 2018). For example, urban tourist destinations are marked by undesirable effects to the environment, including littering, large consumption of non-biodegradable materials, vandalized monuments and an excessive number of cars, and a considerable part of these degradations can be caused by tourists. Costa et al. (2015) explain this environmental degradation may happen because tourists do not have a clear conscience about their role in sustainable tourism. However, there have been changes in the behaviour of consumers, and tourists, who place additional demands on the production of more sustainable products and

services (Adongo et al., 2018). Marin et al. (2009) understand this new form of tourist behaviour as a natural trend, which may result in a progressive transformation of consumption habits.

Building on the foundational works by Dann (1977), Crompton (1979), and Iso-Ahola (1980, 1982) on tourism motivations, Snepenger et al (2006) remind us of the relevance of studying and predicting motivations for pleasure travel. As they systematize, travel motivations are major driving forces, fundamental reasons for behavior and vacation decision-making process and critical for assessing satisfaction from the experience. Some tourists look for fun, leisure, meeting other tourists and socializing. Others, to relax at a resort and to live new and memorable experiences. It is possible to identify different travel motivations among different profiles of urban tourists, as shown by Zoltan and Masiero (2012), which carried out an investigation with 586 tourists in Ticino, Switzerland. The main motivations identified were safe escape, nature and relax, novelty, excitement, togetherness, and fun. Additionally, is the study from Khuong et al. (2014) investigated 426 tourists from Ho Chi Minh City, Vietnam and found urban tourists are motivated to travel to learn something new and interesting, to visit a place they have never visited before, to fulfill their dream of visiting a foreign land / country, to meet new people and to socialise with local communities.

With a focus on the deepest layers of the tourist experience, Aebli (2019) examines tourists' underlying motivations for using gamified technologies and shows that "gamified features help tourists to achieve several superior motivational goals and foster their interactions within the vacation destination" (Aebli, 2019, p.1). The rational is that despite tourists' similar generic motivations to engage in certain activities, the underlying needs and goals of these activities can vary between tourists. Hedonic needs are very important, but meaningful tourist experiences also include a sense of achievement, positive emotions, meaning, and purpose in life. Based on these assumptions, the study empirically demonstrates that the properties of the game design, solely, don't define the motivational affordances. Rather, as argued by the author (Aebli, 2019, p.13), "the gamified features seem to act as an exogenous activator for users' interactions with the world and, consequently, their experiences."

Simultaneously, the environmental travel behaviours of tourists can have several positive implications on how they interact with tools aimed to involve tourists in

environmental behaviour at destinations. The pro-environmental behaviour of tourists on trips can directly affect a destination's sustainability, bringing short and long-term benefits to the community and attracting other "good tourists" to the destination. However, evidence shows that not all consumer profiles favour the environment while travelling (Barr et al., 2010). In urban destinations it is more common to perceive the pro-environmental behaviour of tourists in the context of recycling, reusing towels in hotels and purchasing sustainable products or services.

In that sense, significant studies that indicate how everyday pro-environmental behaviour can be extended to the context of travel (Barr et al., 2010; Dolnicar & Grun, 2009; Dolnicar & Leisch, 2008). Dolnicar and Leisch (2008) sought to understand the relationship between pro-environmental behaviour at home and on holiday. The authors show that pro-environmental behaviour at home and on holiday are strongly related. In the context of urban tourism, Miller et al. (2015) used home-travel pro-environmental behaviours as one of the factors to understand the same behaviour in urban destinations. They imply that existing habits strongly influence the involvement in pro-environmental urban behaviours. However, there have been no records of studies in gamification and tourism that use home-travel pro-environmental behaviours as an influence for the receptivity of ecogamified urban services.

The 'new tourist' seeks authentic, differentiated, and unique experiences, and they are driven by the economy of experiences and supported by technology, which has transformed many of them into someone who seeks personalization in all spheres. Especially, in a sustainable point of view, which means they drift from mass tourism (Lima & Partidário, 2002; Weaver & Oppermann, 2000). Thus, technology development has facilitated a progressive transformation in the tourist profile: from 'consumer' to 'producer', by allowing them to master the construction of travel experiences and decisions (Ramos & Fernandes, 2014).

Persuasive technology has contributed to improve tourist experiences in the urban destination, particularly in the scope of sustainability and transport & mobility as shown by relevant studies (Huber & Hilty, 2014; Jylhä et al., 2013). The idea of persuasive technology clearly extends along the concept of gamification and ecogamification (Hamari et al., 2012). When reflecting on the phenomenon of ecogamification, the tendency is to make direct reference to multiple types of games (board, physical or virtual), which is not essentially incorrect, since gamification research is largely based on game studies (Xu, 2011). However,

it is limiting, since gamification has the potential to surpass entertainment, the main objective of any game. Game is defined as a system that presents a set of motivating and significant challenges for the player such as rules, interactivity, and feedback, generating results through quantifiable and emotional products for users (De-Marcoset al., 2015; Koster, 2004). Therefore, the purpose of a game clearly benefits ecogamification, and entertainment is an important dimension that pervades its existence.

Edutainment is the name given to entertainment when combined with the purpose of educating individuals on complex topics such as sustainability (Colace et al., 2006; Topp et al., 2019). That is, the aim of edutainment is to entertain while educating, instructing, or socialising individuals. Some common forms of entertainment are perfectly applied in persuasive technology solutions when it comes to using edutainment, namely television programs, computer and video games, movies, music, websites or multimedia software and others (Colace et al., 2006). Ecogamification partially uses edutainment when seeking to promote sustainable attitudes and behaviours, since it uses playfulness and entertainment through the game elements to reinforce, stimulate and even educate individuals around a complex theme such as environmental sustainability.

The urban tourism production chain has increasingly invested in persuasive technologies such as gamification to change the tourists' behaviour and attitude (Yoo et al., 2017). Successful evidence from experiments and real applications of ecogamification in different perspectives and contexts is identified in the market and in the literature, namely Kazhamiakin et al. (2015) developed a five-week experiment with forty participants, via the Viaggia Rovereto mobile app, aiming to assess the impact of sustainable mobility recommendations and gamification incentives on the mobility behaviour of passengers who need to travel routinely to the city centre by car. The European Commission through the Horizon 2020 program founded a project called "WasteApp", which was designed especially for tourists. Ecogamification strategies were used to encourage good recycle practices.

These examples and studies demonstrate the potential of ecogamification in different contexts, mainly to motivate and involve users in more sustainable behaviours. Although these studies have obtained positive results and reactions, most studies and practices have focused their efforts on the applicability and performance of the tool, neglecting different patterns of user adoption and their perceptions while using the tool (Yoo et al., 2017). Yoo et al. (2017) developed a relevant and recent empirical study on what influences the adoption

of smart tourism apps that incorporate game elements. Fourteen variables were analysed, as intention to use, perceived usefulness, perceived ease of use, perceived enjoyment, information quality, motivations, flow, distributive justice, network effect, and privacy concerns (collection, unauthorized access, errors, and secondary use). The results support the idea that factors such as perceived usefulness and perceived enjoyment had significant effect on the intention to use gamified tourism applications, as it is a tool that promotes emotional pleasure through games elements. Although the study presents consistent results regarding smart tourism application, the research leaves aside interesting and significant factors related to types of urban tourists, their needs, values, interests, attitudes, and behaviours regarding to sustainability.

Game elements are the basis of persuasive technologies that use gamification as the motivational pillar to change user attitudes and behaviours (Deterding, 2011). In the gamification context, some models and frameworks were developed to facilitate the use of game elements in gamified and ecogamified systems. Werbach and Hunter (2012) highlight 15 game elements that have been applied in gamified tools to solve real world problems among them (avatars, challenges, progression, relationships, rewards, feedbacks, cooperation, etc.), whereas Sailer et al. (2017) indicate that list of game elements is extensive and subjective. Despite the diversity of game elements that can be studied, this study focuses on game elements that were used in studies in the context of transport & mobility (Cardoso et al., 2019; Jylhä et al., 2013; Kazhamiakin et al., 2015; Khoshkangini et al., 2017) and used specific game elements to stimulate and / or reinforce transport & mobility behaviours.

The most common game design elements identified are: (1) points, (2) avatar, (3) reward, (4) ranking and (5) cooperation.

(1) ***Points -*** It is considered an indispensable requirement in all gamified systems (Zichermann & Cunningham, 2011). The points system can be classified into 5 categories: a) experience points -, b) redeemable points -, c) skill points -, d) karma points and reputation points (Zichermann & Cunningham, 2011). Khoshkangini et al., (2017) used the point system in a sustainable mobility game, in which players / citizens progress and accumulate points, based on their daily transportation choices.

(2) ***Avatar*** – It is characterized as the personalization centre and can be implemented in several ways, the most common being profile customization, design and configurations that add value to the user experience (Zichermann & Cunningham, 2011). Buningh et al.,

(2014) aimed to reduce the energy impact of passengers and business trips through a game. In the survey, the avatar called "Mobi", acts as an endorser of feedbacks and provides tips and tricks on travelling and working in a more intelligent and sustainable way. The avatar was used to customize the profile of users according to their wishes and preferences.

(3) ***Reward*** –the rewards that are provided to users for an achieved objective (Weiser et al., 2015). Rewards are intended to generate motivation, because they do not have the power to alter the ability to perform behaviour (Weiser et al., 2015). Khoshkangini et al., (2017) presented a system of rewards based on the user transport choices. For example, if users choose to use public transport, they will be better rewarded when choosing car. The same happens if they choose zero impact transport or mobility such as cycling and walking, which reward even more. The prototype presented by our study follows this same reasoning of rewards.

(4) ***Ranking or Leaderboards*** **–** It sums up all points earned by users in their actions in the application (Smiderle et al., 2020). In the GoEco! Project, the ranking system was designed to avoid frustration among users (e.g., an individualized ranking is used according to different user profiles). It means users are only presented in rankings with people that had similar opportunities as them.

(5) ***Cooperation*** **–** The means in which users from a joint effort with several parties are directed towards achieving a common purpose (Weiser et al., 2015). "Cooperation mainly appeals to our relationship needs, but it can also satisfy the needs of affiliation and leadership / followers" (Weiser et al., 2015, p.276). Besides, cooperation can work in a variety of ways in a gamified application. Weiser et al., (2015) used a case study from the domain of sustainable mobility behaviour (the project GoEco!) and used collaboration so that groups of users could face challenges together, accumulate points and help each other.

2.1 Framework and research propositions

Based on the evidence above in the literature that crosses urban tourism, sustainability and ecogamification, the study's propositions are:

Proposition 1. Travel motivations influence receptivity to ecogamification.

Proposition 2. Home-travel environmental behaviour influences receptivity to ecogamification.

Proposition 3. Type of entertainment influences receptivity to ecogamification.

Proposition 4. Technology proficiency influences receptivity to ecogamification.

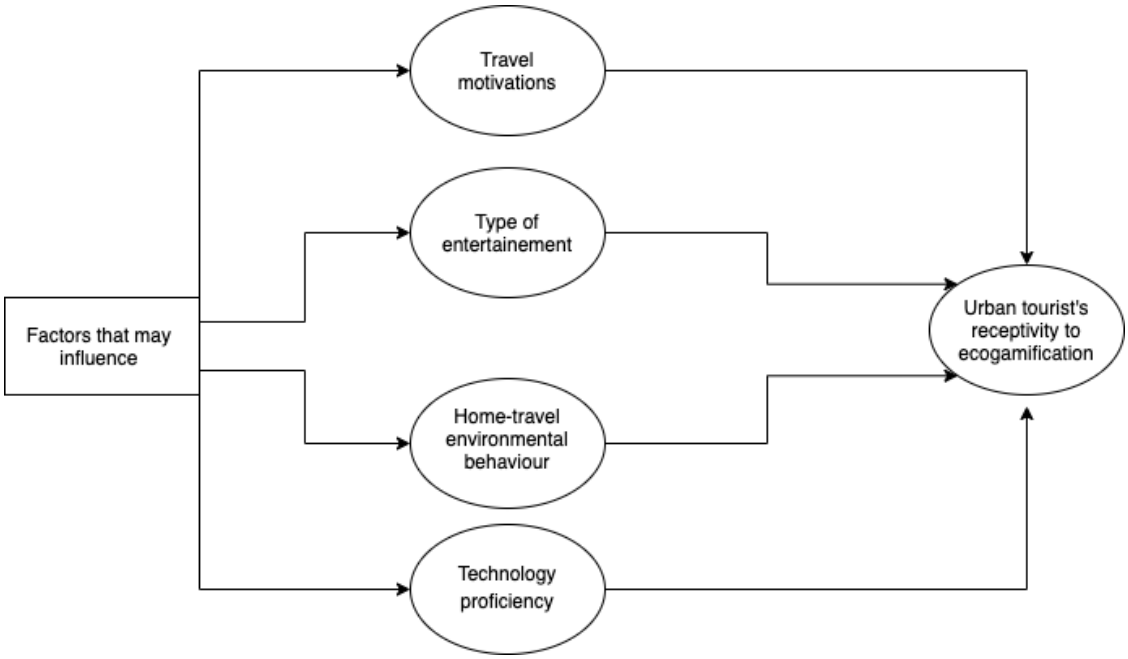

Figure 17. Study framework
Source: Authors (2021)

3. Study Design

It is an exploratory study that investigates a new and emergent area, which requires a detailed analysis, according to paradigms of qualitative research. Namely, it carried out a qualitative experiment with focus groups to identify differences and similarities in terms of receptivity of urban tourists to ecogamification.

The qualitative experiment method is defined as an 'intervention on an (social) object to research its structure, that is, the exploratory and heuristic form of the experiment' (Kleining, 1986, p. 724). The method submits participants to a certain experiment (e.g., task, prototype, game, or stimulus) to perceive attitudes, opinions, and behaviours (Kleining & Witt, 2001). It has been applied to studies in the field of social sciences to explore a certain daily life, without resorting to defined hypotheses and by using semi-delimited research questions (Kleining & Witt, 2001; Semerci et al., 2018). Moreover, it is possible to combine the qualitative experiment with other qualitative methods, which makes research studies more flexible and dynamic. Regarding focus groups, these are considered a strategic way of measuring in depth attitudes, behaviours and opinions about a problem, a product, or a service (Singh, 2006). Freitas et. al. (1998) explain that there are advantages and

disadvantages in using the technique such as spontaneity of interaction between participants and an in-depth analysis of the results.

The prototype was designed based on the method for designing gamified services of Morschheuser et. al., (2017), which is divided into seven stages: project preparation (the purpose of the prototype was defined); analysis (it consisted of identifying the successful practices of ecogamification in the context of transport & mobility, allowing the identification of potential target audiences); ideation (the creative process of generating the prototype); design (the preparation of interactive prototype through the AdobeXD tool); implementation (characterized by the pilot test of the prototype); evaluation (will be presented in the result section of this investigation), and monitoring (was not implemented in this study since we stopped at the prototyping stage). The prototype was also validated by a set of experts.

Figure 18. Login page

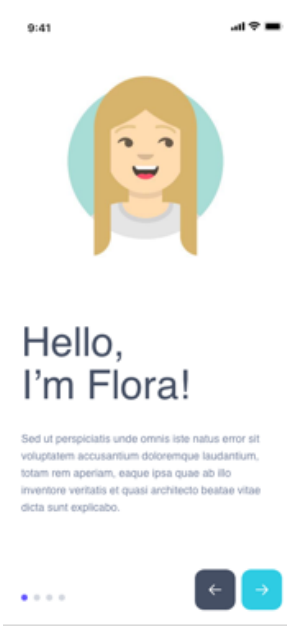

Figure 19. Avatar introduction

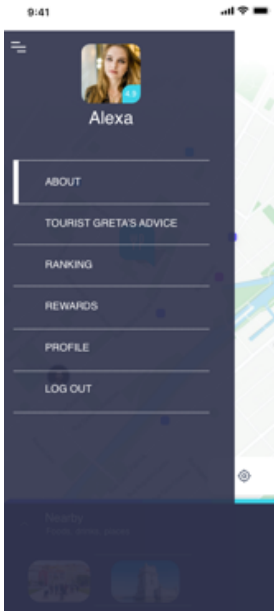

Figure 20. App menu

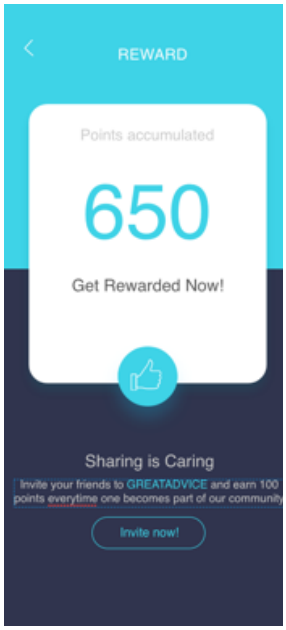

Figure 21. Reward and point systems

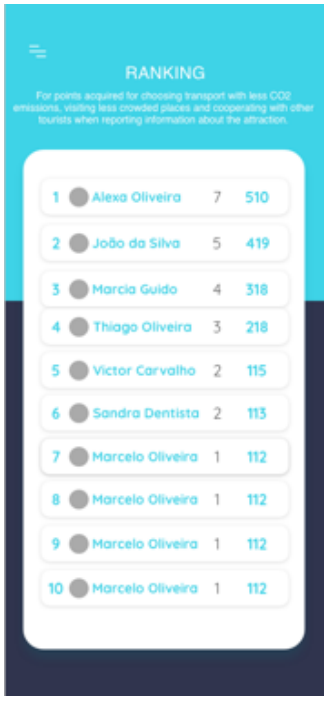

Figure 22. Ranking systems

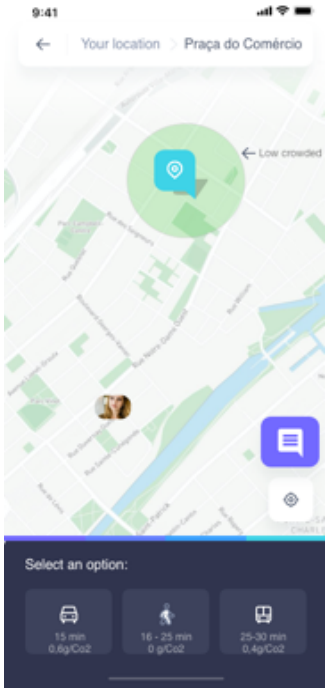

Figure 23. Route planning

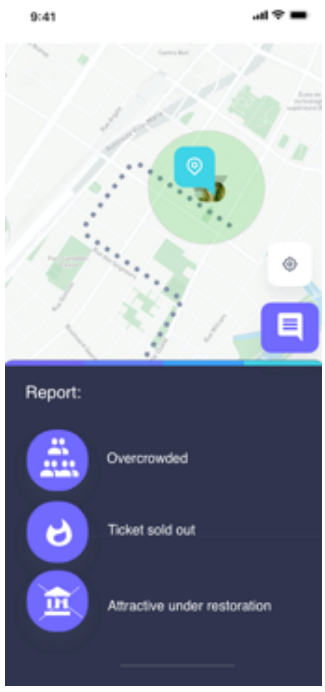

Figure 24. Route evaluation through cooperation

Regarding focus groups with urban tourists, due to the limitations related to COVID-19 issues, the face-to-face approach was replaced by online data collection strategies. The focus group was carried out in December 2020 through Google Meet. Each focus group meeting lasted between 1 and 1.5 hours and was recorded with the participants' previous permission. A pre-test was carried out with 8 participants to try the prototype and to calibrate the steps to be followed in the final focus group. They were recruited through posts in professional social media profiles and groups, as LinkedIn, for one week, following a set of criteria: 1) The participant was a user of persuasive technology and 2) The participant had taken at least one holiday trip to an urban destination in the past 3 years. In addition to these two criteria, it was also important to ensure participants had different preferences in types of entertainment (digital and non-digital) and types of technology proficiency (professional vs non-professional) (see Figure 25). Finally, 16 participants were segmented into 2 groups: A1/A2 – B1/B2. Type of entertainment and technology proficiency were used as segmentation criteria for being manageable factors to operate and divide the sample. Sustainable behaviour when travelling/home could bring bias when segmenting groups, since it is a more subjective and complex dimension to classify groups of small samples. The sample size followed the minimum and maximum sampling rules for focus group studies and its selection was based on criteria that allowed respondents to provide relevant data.

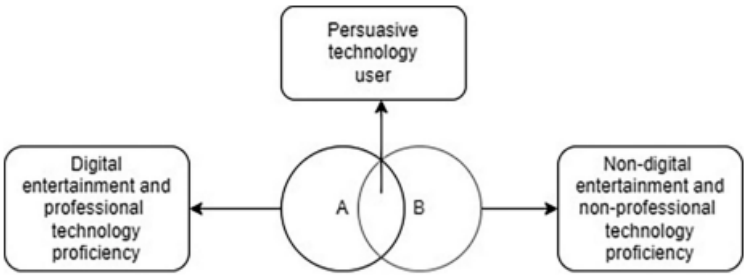

Figure 25. Urban tourists focus group segmentation
Source: the authors (2021)

During data collection, to assure validity and reliability (e.g., Brink,1993), researchers took a neutral position, maintaining the ability to take a subjective look at the focus group, without compromising the behaviour and attitude of the participants. Several strategies were also followed to increase the validity of answers: building an environment of trust, ensuring participants had a clear understanding of the research nature and the processes during the focus group, providing notes throughout the process; validating responses through confirmatory questions at different times. The mechanical recording was used to increase the accuracy of transcriptions.

The data analysis procedure was carried out using the software webQDA (Web Qualitative Data Analysis) to systematize and categorize data. The content analysis procedure was qualitative, based on the presence or absence of a characteristic or set of characteristics in the analysed messages, instead of the purely descriptive objective of quantitative techniques (Capelle et al., 2003). Researchers sought to identify elements that could express the opinions and attitudes of the participants regarding the dimensions specified in the literature review previously presented, instead of simply counting the frequency of the appearance of terms referring to these judgments. Data analysis followed the steps of coding and classification of categories.

4.Results

4.1 Participants profile

All participants have an academic degree, with most of them holding programming or leadership positions in a global company (see table 8). From the sixteen participants, nine are male and seven are female, with ages ranging from 27 to 37, featuring a mature sample to deal with the topic. All respondents have considerable knowledge of persuasive technologies and ecogamification, but they have different professional positions, countries

of origin, favourite types of entertainment, nature of expertise and opinion. Thus, regarding **technology proficiency**, the type of knowledge among group A was more direct and technical, since they are developers and work in the technology sector; the group B has a more indirect knowledge because they do not work with the technical part of the technology.

Table 8.
Participants' profile

Group	Name	Gender	Age	Education	Profession	Country of origin	Type of entertainment
A	(A1)	Male	27	Bachelor	Computer Engineer at Stark	Portugal	Digital
A	(A2)	Male	33	Bachelor	Programmer at Sky	Brazil	Digital
A	(A3)	Male	31	Bachelor	Programmer at Sky	Portugal	Digital
A	(A4)	Male	32	Bachelor	Computer Engineer at Sky	Portugal	Digital
A	(A5)	Male	36	Master	Computer Engineer at Apple	Brazil	Digital
A	(A6)	Male	33	Master	Software Engineer at ThoughtWorks	Brazil	Digital
A	(A7)	Male	30	Master	Software Engineer at ThoughtWorks	Brazil	Digital
A	(A8)	Male	34	Bachelor	Software Engineer at ThoughtWorks	Brazil	Digital
B	(B1)	Female	35	Master	Technology Manager at Scriptcase	Portugal	Non-digital
B	(B2)	Female	38	Master	Professor	Brazil	Non-digital
B	(B3)	Female	29	Bachelor	International Relation at Scriptcase	Brazil	Non-digital
B	(B4)	Male	37	Master	Advertising Person at Yumg	Brazil	Non-digital
B	(B5)	Female	33	Bachelor	Advertising Person at Stamp	Brazil	Non-digital
B	(B6)	Female	34	Bachelor	Professor	Brazil	Non-digital
B	(B7)	Female	37	Bachelor	Accountant at Start	Colombia	Non-digital
B	(B8)	Female	34	Bachelor	Relationship Account at Millennium bank	Brazil	Non-digital

Source: the authors (2021)

4.2 Urban tourists' characteristics towards sustainability, travel motivations and type of entertainment

Regarding the **type of entertainment**, participants in Group A prefer digital entertainment that involves persuasive technologies, as playing mobile games, RPG games and League of Legends on the computer or console, and reading on the iPad, watching Netflix, HBO, and Disney+, checking courses or tutorials on YouTube, travelling, and playing virtual and physical piano. Participants in Group B prefer non-digital entertainment:

going to the cinema or to the beach, cooking, meeting friends, cycling, reading physical books, travelling, and doing yoga.

“In my spare time, I like to watch Netflix, I like to play games” (A3, Group A)

“In my free time I prefer going to the beach, cinema, cooking with friends, cinema, travel” (B1, Group B)

Groups are cohesive in their preferences regarding **travel motivations**. When travelling to urban destinations they value gastronomy, relaxing, learning about local history and culture, shopping, and partying.

“When I travel for leisure, I seek to visit new places, cultures and gastronomy” (A5, Group A)

“…I prefer destinations with culture, history, gastronomy and something different from my routine” (B4, Group B)

There are differences between the groups regarding **sustainable behaviours**, especially, home – travel environmental behaviours. With **regards to day-to-day environmental behaviour**, Group A uses technology to support its environmental practices as using automated electronic systems, hybrid cars, giving preference to more sustainable transport and mobility. Group B does not use technology to support day-to-day environmental actions, but it is more concerned with the issues of conscious consumption in general and recycling. They also prefer more sustainable transport & mobility. Regarding **environmental behaviour while travelling**, group A suggested practising more trivial environmental sustainability behaviour such as using public transport or mobility on foot and saving water and energy. In Group B, participants suggested going beyond the trivial behaviour, presenting themselves as more sensitive to socio-environmental sustainability issues, namely avoiding massive destinations, choosing family accommodations over large hotels and resort chains and consuming local products.

“I travelled to several countries in the last year and I usually walk 10km / day, I worry about not leaving trash on the street, I don't rent a car and I prefer public transport” (A5, Group A)

“At home, yes, we do recycle, it is a simple concern to dispose, from an energy point of view, one of the things I also like to think that we contribute, is the automation of heating” (A1, Group A)

“I avoid hotels and resorts; I prefer family inns… I avoid less massive destinations” (B1, Group B)

“I do recycle, beware of the energy, turn the lights off when I go out, reuses glass, bags” (B5, Group B)

4.3 Interaction with ecogamified transport & mobility app prototype

Participants seemed unanimously enthusiastic when informed the app brings real information / data on CO_2 emissions, according to the sustainable transport & mobility choices made by its users. Also, participants indicated this type of information can help raise awareness and contribute to facilitating more sustainable transport & mobility choices during a trip:

“The part of the app presenting information on how to be more sustainable during the trip and presenting real data on the CO_2 emission from my displacement is something formidable that through gamification involves me even more in the topic” (A5, Group A)

“…the sustainability information part… this information about CO_2 transport emissions I don't even know how to find this information on google, so I would be happy to know that there is an app that informs me about this issue. For me, this is an unprecedented theme in an app” (B2, Group B)

4.3.1 Game elements

Cooperation

All groups mentioned this was the first time they were experiencing the possibility of helping other tourists by using a transport & mobility application in the context of tourism. Therefore, the idea of an "ecogamified app" has attracted them. They also said if the product was available in the market, they would certainly use it. Moreover, the possibility of cooperating with useful information and content in the context of transport & mobility and tourism has arisen feelings of empathy, responsibility, and altruism in the participants. Thus, there are similarities in the interaction with this game element.

"… I like to help people, I don't mind reporting, it's a well-being, it's like Waze App, if I'm doing my way and I see there's a problem, why not report the problem and helping others, in the same way that I like to report, I also like to see that people collaborate too" (A2, Group A)

"I found the part of cooperating interesting because it generates involvement among tourists, it is the main feature of the app, and it also generates rich content for other tourists." (A8, Group A)

Rewards

Group A is more concerned with the process of making rewards available on the app, as they suggest that for tourists to be rewarded, they would have to work hard, meaning tourists would have to cooperate and choose more forms of transport & mobility during the trip. This group specifically suggest different presentations or designs for the app according to different tourists' profiles. The rewards system could also vary regarding the tourist profile (e.g., concerned or not with an environmental issue).

Group B perceives rewards as a bargaining chip and suggest tourist's involvement can be increased if are aware of the application rewards. However, it is the least interesting feature for the group.

"I think there are two types of tourists that can use this app, tourists who are already aware of the environment and don't need anything to motivate. And the other one, who is unaware and would be motivated through rewards. Perhaps, present the app differently for each profile is the way..." (A5, Group A)

“I think it would have to make short-term goals shorter, with more tangible rewards, easier rewards to achieve, but also to have rewards that require more efforts, to have a certain level of difficulty, not to be offered everything…” (A3, Group A)

“I think the fact of offering rewards, increases the tourist’s involvement, but it is something that I can live without” (B1, Group B)

“…what would motivate me in this application would be to collect the points to exchange for rewards during the trip…” (B5, Group B)

Points

For Group B, the points system can stimulate involvement and can be an attraction factor for using the app. Group A discussed how the points system motivates to actions and offers the opportunity of exchanging points for real or virtual rewards, which is a positive aspect. However, Group A stresses that the scoring system must be well implemented to work well.

“Earning points and having a return on discounts or prizes, generates motivation to do action, to collaborate and to comment” (A6, Group A)

“The question of points is the most important part of the App, making tourists engage better with it” (B6, Group B)

Avatar

Both groups showed less interaction with this game element. Participants indicated that an avatar customization would be a useful feature if there were some complexity benefits included, as providing specific information about their profile and behaviour or contributing to improve their experience. Other benefits would be communication between avatars, winning prizes and having access to a clear explanation of the purpose of the data and the information collected. As it presents indirect factors of high complexity linked to the implementation of this feature in an application of transport & mobility.

“If you have the registration part I tend to skip, but if when using the app, I saw that providing specific information about my profile and behaviour would contribute to improving my experience, I would be inclined to create my avatar” (A7, Group A)

“…the problem I have is due to the way this data is treated, more and more services and applications have to have a very high degree of transparency …” (A1, Group A)

“I would be open to creating my avatar if there was a communication between the avatars, in addition to seeing the Ranking, they could communicate, among themselves” (B6, Group B)

Ranking

Both groups have less interaction with the ranking system, and present different reasons. Participants in Group B have shown less interest and exposed feelings of anxiety and indifference in seeing their names ranked. Group A specifically mentioned the feature would not be of much relevance to them, but they could be more interested if the ranking system led to higher performance and was intended to motivate tourists through payable rewards.

“Having my name in the ranking is irrelevant to me, I don't feel like a competitive person, and what matters in the end is whether that effort in using the application and earning points has been useful to earn something tangible, if I have won any prize or if that has given me any benefit, otherwise, I don't care if my name is in the ranking or not” (A2, Group A)

“I would feel anxious because I am competitive and I would always want to be at the top” (B3, Group B).

4.3.2 App prototype strengths and weaknesses

Regarding strengths and weaknesses, there are differences and similarities between groups opinions, since both Groups A and B have indicated, in different perspectives, information privacy concerns as a weakness. This was a highly mentioned topic during

meetings. Therefore, the exemplified comments suggest this is a general concern, mostly related to the possibility of allowing, or not, the use of personal information, especially one's location. It is also related to the way companies treat and make data available.

However, concerns about information privacy seem to reduce if the following questions are clear to tourists: who will manage the data (the government or a private company), its utility and the purpose of its use. Participants quote specific purposes that may make them not mind about providing data: improving their experience, supporting the community and sustainability.

Group A indicates the excessive notifications on the app as weaknesses. Group B, on the other hand, indicates the possibility of paying to use the app and low ratings or evaluations by tourists. Regarding its strengths, the groups have slightly divergent opinions, as Group A indicates benefits in terms of collaboration and ease of use, whereas Group B indicates rewards, interaction, and the existence of several useful functionalities in a single application.

"…if it were a private app, they would certainly be using my data and my information for a marketing issue, being an app from Turismo de Portugal I wouldn't mind giving my data and travel information" (B1, Group B)

"Registration part and over-notification" (A8, Group A)

"I see many benefits in terms of collaboration" (A8, Group A)

"…a single application of transport & mobility where I can access types of transport including sustainable ones…" (B8, Group B)

5. Discussion, implications, and contributions

This research has empirically examined how home-travel environmental behaviour, travel motivations, types of entertainment (digital and non-digital) and technology proficiency (professional vs non-professional) influence the receptivity of urban tourists to different game elements in a transport & mobility context. As a result, this qualitative

experiment allowed for the suggestion of relevant differences and similarities in terms of receptivity of urban tourists to ecogamification (Figure 26).

Based on results, the groups are cohesive in their travel motivations. That is, when it comes to urban tourism, participants are mainly looking for gastronomy, relaxing, learning about the history and the culture of the place, shopping, and partying. The results show evidence that participants are motivated by push motivations and are in harmony with urban tourists identified in Khuong et al (2014) and Zoltan and Masiero (2012). Thus, we can note that the tourist practices valued by respondents are typical of urban destinations and are important to understand the urban tourists' preferences and receptivity to ecogamification.

This study considers the type of entertainment as an interesting factor to understand the urban tourists' receptivity to ecogamification. Results indicate Group A as more inclined to digital entertainment (preferences for activities involving technology such as playing online games and watching YouTube) and Group B as more prone to non-digital entertainment (preferences for more traditional activities as going to the cinema and reading physical books). Thus, it would be logical to affirm that Group A might be more receptive to ecogamification than group B, since its participants are more sensitive to digital entertainment, and this is a technological tool. However, results could not evidence that. The study suggests the preference for digital and non-digital types of entertainment says exactly what tourists' value during their spare time. Knowing these preferences can be strategic and fundamental to know how to attract the attention of urban tourists in ecogamified applications.

The **technology proficiency** is a factor that may eventually lead to a false assumption that Group A (professional knowledge with technology) could have a better experience with ecogamification than Group B (non-professional knowledge with technology). However, in this study, we noticed that having technological proficiency implies differences in terms of interactions regarding the points and reward system, which Group A takes more seriously than Group B. Interactions with others game elements, technological proficiency makes no difference. Thus, both groups A and B are more concerned with the purpose and the experiences that ecogamification can provide than with reducing the tool to a mere technological apparatus, in which those who know more about the technology will have more advantages.

Behaviour differs regarding **home environmental behaviour**. While participants in Group A use technology to support their daily environmental practices (e.g., having automated lamp systems at home), the ones in Group B are more concerned with conscious consumption in general, (e.g., buying local products). Regarding **travel environmental behaviour,** Group A suggested more trivial environmental sustainability behaviours (as recycling, reusing towels) whereas Group B suggested going beyond the trivial behaviour, presenting themselves as more sensitive to socio-environmental sustainability issues (e.g., avoiding large hotels and massive tourist destinations). Although groups differ on how to practise daily and travel environmental behaviour, they both suggest that environmental behaviours practised at home are extended when travelling, which has been extensively debated in the literature (Dolnicar & Leisch, 2008; Dolnicar & Grun, 2009; Miller et al., 2015). Therefore, in the context of transport and mobility, the factors home-travel environmental behaviour can be considered as influencing urban tourists' receptivity to ecogamification, as they are directly related to the core of ecogamification, which is promoting environmentally sustainable behaviours, applied in this research to the context of transport and mobility.

Concerning how urban tourists interact with different game elements, this study suggests that the differences and similarities of interactions does not depend solely on the type of game element implemented in the tool. In fact, it is important for participants to understand the purpose of game elements and its coherence to their preferences, needs and wishes.

Both groups presented similarities regarding their interaction with the game element **cooperation**. Urban tourists realised that to cooperate with other tourists, they would need to collectively work with other users towards a common purpose (Weiser et al., 2015). Regarding **Rewards,** there is a slight difference in the interaction, which seems to be explained by a more professional knowledge of technology in participants of Group A, who take the reward factor more seriously. For them, rewards are required elements in ecogamified applications, and they must be presented in the app in accordance with different tourist profiles, regardless of their concerning with sustainability issues. Group B recognizes its importance, but they interact less with this game element in the app. Similarly, urban tourists' technical knowledge may have affected the interaction with **Points**. Participants of Group A have more technical knowledge on developing persuasive mobile applications,

which means they know how complex it is to implement a points system that is fair and efficient, and that embraces all types of tourist profiles. Regarding Avatar both groups showed less interaction with this game element. Besides their relative indifference to it, participants suggested conditions to its potential use, namely communication between avatars, winning prizes and having access to clear explanation on the purpose of the data and the information collected. Finally, both groups also showed less interaction with the **Ranking** element, manifesting feelings of anxiety and indifference in seeing their names ranked. It may be a concern since not all ranking systems are developed to avoid tourists' frustrations. Therefore, to increase the interaction to this element, a classification system should enhance its levels of complexity and subjectivity, as it would need to be elaborated through tourists' profiles and preferences.

The research findings indicate several app strengths and weaknesses. The latter differ between groups A and B. Five key app strengths were identified collaboration, ease of use, reward, interaction, and many functionalities in a single app. As for ap weakness, the main four were excessive notifications, paying to use the app, low ratings, or evaluations by tourists and, information privacy concerns. For example, for Groups A and B, there are important issues to consider, such as data protection and the excess of notifications in the application, which can inhibit the interaction to the ecogamified tool. That result reinforces the importance and need to understand what urban tourists really like or dislike in relation to ecogamification applied to transport & mobility services. It will only be possible to design services that attract attention and engage tourists in the long term though such type of information.

In terms of contribution, applicability and practical implications, the factors analysed in this study lead to relevant differences and similarities among urban tourists' receptivity to ecogamification. These results could be useful for future empirical studies regarding tourists' typologies and segments with different levels of receptivity to ecogamification. Marketers, tech companies, game developers and providers of ecogamified services could also benefit from such typology/segmentation to work on more efficient strategies and customized solutions.

These potential contributions are in line with the conclusions of Pasca et al (2021) who, based on a systematic literature review, underline that despite the potential of gamification to support the co-creation of meaningful and customized experiences, a more

user-centric strategy is needed. Moreover, they are also aligned with the concept of human-centric design (Aebli, 2019) as a powerful means to engage tourists at deeper levels and more meaningful ways.

Due to the Covid-19 pandemic, there were limitations related to the collection and analysis of data since it was not possible to conduct face-to-face data collections. Another obstacle was the time demanded for data transcription and analysis, as focus groups produce a lot of content, which translates into extra attention to avoid missing important content. Another limitation relates to the study results that should not be generalized, because obtained opinions from a very small (16 participants) and very specific urban tourists' group (high profile IT related, teaching and advertising jobs, from three countries - Brazil, Columbia, and Portugal). Finally, considering the potential for urban tourists' receptivity to ecogamification, particularly in the context of transport & mobility in this study, future research on the topic is recommended. More robust research with quantitative approaches to segment the profile of tourist's receptiveness to ecogamification would also be interesting, and it could be based on factors as technology acceptance (perceived of ease of use, perceived of enjoyment, and perceived of usefulness), entertainment (active and passive) and expectations about rewards.

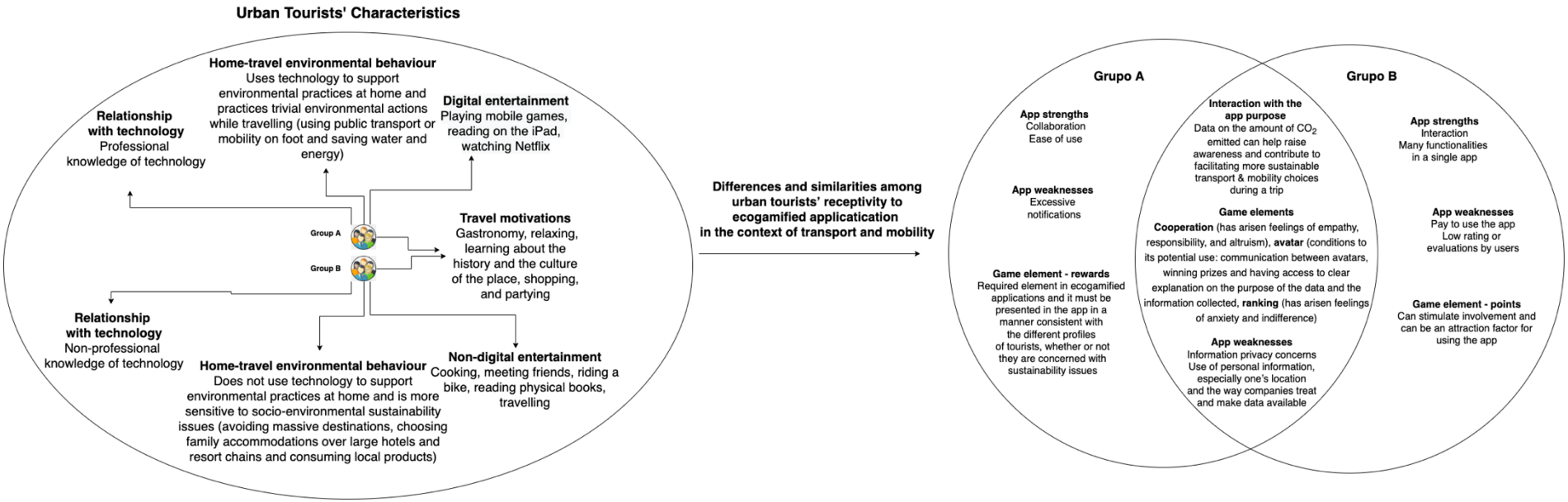

Figure 26. Differences and similarities among urban tourists' receptivity to
Source: the authors (2021)

Chapter V

Potential receptivity to ecogamification in mobility & transport: A typology of urban tourists based on relationship with technology, environment, and entertainment

Potential receptivity to ecogamification in mobility & transport: A typology of urban tourists based on their relationship with technology, environment, and entertainment

Abstract

Purpose:

This exploratory study aims to perceive different types of urban tourists' receptivity to ecogamification, considering their perceptions towards mobility & transport applications, environmental behaviour on holiday, and types/need for entertainment.

Design/methodology/approach:

This exploratory study follows a segmentation approach, using a self-administered online questionnaire. The data derived from 572 respondents who were over 18 years old and have travelled to urban destinations in the past 3 years and were analysed through a combination of non-hierarchical and hierarchical cluster analyses.

Findings:

The results reveal four clusters of urban tourists with different types of potential receptivity to ecogamification: "Mobi Wholeheartedly"; "Mobi Whatever"; "Mobi Profiter"; and "Mobi Utilitarian".

Originality/value:

This approach brings novelty to gamification literature because it not only addresses the degree of receptivity to (eco)gamified apps, but also how that disposition might occur. The implications provide tailored managerial strategies to reach and deliver value to different types of urban tourists and might also contribute to addresses the lack of understanding about the segments of tourists who prefer/not prefer smart tourism, suggesting that understanding different types and levels of receptivity to ecogamification can help to understand different types and levels of receptivity to smart tourism. Simultaneously, the segmentation and typology based on the intersection between entertainment, technology and sustainability presented in this study may be interesting for smart tourism in general, with the potential to contribute to the solution of various problems related to sustainable behaviors that go beyond mobility & transport.

Keywords: Smart tourism, Ecogamification, Sustainability, Mobility, Transport, Clusters

1. Introduction

Tourism destinations, and especially urban destinations, are facing sustainability challenges, so they have resorted to smart tourism as an ally for their sustainable development (Yoo et al., 2017). The development of a smart tourism destination based on information and communications technology (ICT), a good physical infrastructure and an intelligent business ecosystem can provide efficient results, especially on sustainability (Yoo et al., 2017; Gretzel et al., 2015). Connecting emerging persuasive technologies and ICTs can contribute to reduce the damage caused by tourism and maximize its positive effects (Yoo et al., 2017; Touray & Jung, 2010), which can be identified by managing urban tourists and tourist attractions, helping to limit the number of visitors to certain attractions, managing the flow to protect sensitive areas (Ribes & Baidal, 2018). Urban mobility is considered one of the main problems for large cities (Kazhamiakin et al., 2015). It is simultaneously a very important asset for smart cities, but also onerous, making it difficult to implement innovative policies and solutions that encourage sustainable behaviour by citizens (Kazhamiakin et al., 2015). Despite the existing challenges regarding mobility and transport in large cities, interesting initiatives that aim to promote smart and sustainable mobility in urban destinations are identified, as car and bike sharing. Many apps use persuasive technology to attract and engage tourists. However, since the post-modern tourist has contradictory values and behaviours, it is difficult to characterize tourists' needs and preferences (D'Urso et al., 2016) which, consequently, hinders the process of developing suitable tools for specific tourists and their needs.

Literature on smart urban tourism (e.g., Mehraliyev et al., 2020, Femenia-Serra & Neuhofer, 2019, Encalada, 2017, Yoo et al., 2017), and ecogamification (e.g., Aguiar-Castillo et al., 2019, Negruşa et al., 2015) has gained considerable attention from scholars and practitioners. Research studies on these fields have made important advances in the last years, but there are still several gaps to be addressed. In the context of smart tourism literature, Mehraliyev et al. (2020) point out a lack of comprehension about the following questions: Which tourism segments prefer / do not prefer smart tourism? What do they prefer and to what degree? Which aspects of smart tourism are most / less preferred? Through an examination of the types of tourists who are more and less receptive to ecogamified apps, this study contributes with some answers, suggesting that understanding different types and levels of receptivity to ecogamification can help understanding different types and levels of

receptivity to smart tourism. There are few studies that focus on meaningful (eco)gamification (e.g., Aebli, 2019, Xu et al., 2017), an important perspective for a deeper understanding of individuals' values and needs, which is anchored in the fundamentals of human-centric design, as detailed by Aebli (2019). Most studies focus on the "user" and the "gamer", however, to explain the receptivity to ecogamification in travel contexts, a broader approach is needed, one that focus on the "tourist", whether he/she is a gamer or not (Souza & Marques, in press). Following this rationale, the research purpose is understanding the relationship with technology, entertainment, and environment to perceive different types of urban tourists' receptivity to ecogamification. Rather than focusing on the "user" or on the "gamer", a broader approach is applied, one that focus on the "tourist", whether he/she is a gamer or not. Thus, the aim is to perceive different types of urban tourists' receptivity to ecogamification, considering their perceptions towards mobility & transport apps, environmental behaviour on holidays and type and need for entertainment. This approach brings novelty to gamification literature because it not only addresses the degree of receptivity to gamification apps, but also how that receptivity might occur.

2. Smart urban tourism, sustainability, and ecogamification

A number of studies has addressed the topic of sustainability and tourism for different contexts, especially mobility and transport. It has been addressed by some grey literature, and by many scientific papers. The themes in evidence have been tourism, information technologies and sustainability (Gössling, 2017); ICT developments and the SDGs in tourism (Gössling & Hall, 2019); Climate change impacts and tourism mobility (Cavallaro et al., 2021) and impacts of mass-tourism mobility on the transport system (Cavallaro et al., 2017). Optimistically, some studies have pointed to positive impacts regarding the use of more sustainable transport in tourism and suggest that by 2035 CO_2 emissions from tourist transport may have a reduction of 550.57 tCO_2 to 216.91 tCO_2 if tourists opt for more sustainable transport in destinations (Cavallaro et al., 2021). Such results have motivated the tourism sector to continue efforts towards sustainability, combining information technologies to strengthen and support more sustainable tourism (Gössling, 2017).

Smart tourism destinations present developed technological infrastructure, and are capable of generating sustainable development in tourist areas, through the interaction between visitors, promoting integration with the environment, improving tourists'

experience, making tourists aware of local services and products and promoting residents' quality of life (López de Ávila, 2015). These factors can promote competitiveness of urban destinations and tourists' satisfaction, fully focusing on long-term sustainability (Buhalis & Amaranggana, 2013).

Although these destinations offer countless opportunities, there is still some disbelief in how they can contribute to achieve sustainability (Yoo et al., 2017), which is a complex mission with obstacles and little practical progress, since tourism is in continuous expansion (Ribes & Baidal , 2018). Such skepticism regarding the effectiveness of smart tourism destinations comes from theoretical and practical responses in terms of sustainable development, which do not necessarily emerge from serious management processes, but from a simplification of how technology can be applied. These responses are also called "technological solutionism" (Ribes & Baidal, 2018), which can create more challenges than opportunities to achieve true sustainable development in destinations.

In the context of smart urban tourism, the gamification - use of game design elements in non-game context (Deterding et al., 2011) - can be identified in different tourism experiences (e.g., overtourism - Play London with Mr. Bean and recycling - WasteApp). In the context of sustainability, gamification can be extended to ecogamification, considering the purpose of solving environmental problems, e.g., mobility and green transport. The (eco)gamification is directly associated to digital technologies, specially, mobile applications (Yen et al., 2019). Although mobile apps are the means for ecogamification to take place, "there is no theoretical underpinning for making this a necessary condition" (Yen et al., 2019, p.140). Compared with other sectors, the use of ecogamification in the transport sector is in progress and has shown successful results when compared to applications that have not used the tool (Yen et al., 2019). For instance, the ecogamified mobility and transport apps, beside its functional purpose, also intend to increase the user motivation, improve the experience, engagement, reinforce or change behaviour and persuade. Distinguishes itself from the classical non-ecogamified apps because the focus is not only on the functional features of the app, which the user may use to go from a place to another, for example, but beyond that the use of this kind of apps for different context such as use sustainable transport modes to work trips (Buningh et al., 2014); increasing the awareness of citizens, and promoting their mobility and transport behaviour change (Kessler et al., 2015); automatically tracking the transportation modes and CO_2 emissions of the trips of the user

(Jylhä et al., 2013); bike commuting challenge among companies (Millonig et al., 2016); use of public transportation by tourists (Cardoso et al., 2019); indoor and outdoor mobility (Costa et al., 2019); urban accessibility mapping system (Prandi et al., 2015).

Torres-Toukoumidis et al (2022) in their study on gamification in Ecology-oriented mobile apps provides answers to some questions less explored in the current literature on ecogamification, namely: 1) What are the purposes of gamified mobile apps in environmental sustainability? 2) Which game elements combine gamified mobile apps and environmental sustainability? 3) What are the common patterns among gamified mobile apps in the environmental context? 4) Do gamified mobile apps use traditional game elements or are they innovating? To answer these questions, the authors systematized a review of the 10 most downloaded mobile apps in this context and identified that most ecogamified apps, instead of bringing a more educational approach, bring an informative approach and address environmental sustainability in a more general way. Regarding the environment-oriented elements of games, ecogamified applications are not focused on the points system, but on levels, achievements, and missions. Regarding common patterns, the authors identify that the mechanics used are related to challenges, progression, and feedback. Finally, the authors note that ecogamification presents itself differently from traditional gamification, since the basis of the experience is not anchored in the extrinsic motivations of gamification, on the contrary, it is anchored in intrinsic motivations that allow increasing involvement through fun. Simultaneously, ecogamified applications innovate by using game dynamics directed at emotions and narratives.

Cellina et al., (2019) anchored in the recommendations of Froehlich (2015) and Anagnostopoulou et al. (2016) for persuasive gamified systems, provide practical suggestions for effective persuasive applications on the context of sustainable mobility. This type of apps should contain automated information on the routes traveled and modes of transport. Also, it should provide opportunities for setting goals, facilitating the customization and dynamism by the user of the application. In addition, the feedback system is needed to make the application visually more intuitive and easier to use. Finally, there is a coherent system of rewards or punishments in which tangible rewards can be contemplated both at the individual and community level.

Some persuasion mechanisms, such as rewards, are considered the basis for developing ecogamified technologies (Hamari et al., 2012). The game elements reinforce

individuals' motivation, creating competition between players (Aguiar-Castillo et al., 2019). Thus, users' extrinsic motivations appear if there are rewards. Regarding intrinsic motivations, the user is motivated to carry out the activity itself, regardless of earning rewards or reaching goals. Some studies suggest that the secret to successful gamification lies in the thoughtful use of both types of motivation. Zichermann (2011) affirms that the use of tangible and intangible incentives is also relevant and appropriate, while others (Bock & Kim, 2002) identify rewards as having a negative effect on users' performance by generating a subjective punishing effect, considering the user is only rewarded after achieving a certain performance. Simultaneously, some argue that users pay more attention to activities with points, rewards and status, and that these incentives generate an atmosphere of action, where competition and rewarding maintain people interested and addicted (Law et al., 2011).Yen et al. (2019) suggest that in the context of transport and mobility ecogamified services should consider transport as a derived demand, that is, it can be oriented towards end destination activities (e.g., commuting in the city), transport need (e.g., commuting, walking) and conventional goods and services (e.g., club service). The authors highlight that (eco)gamification applied in the transport context must be different, especially because the act of transiting at the destination is an experience in which individuals will physically interact, completely altering their personal travel experiences.

Tondello et al. (2017) explain the importance of the conceptual structure of game design elements which are built specifically for gamification contexts and consider users' real preferences. Their structure of game elements is based on different categories: 1) individual motivations: users are interested in their own experience with gamification. These are grouped into components (immersion and progression), with suggested game elements (mystery box, easter eggs, theme, narrative/story, levels/progression, meaning/purpose, progress feedback, learning); 2) external motivations: individuals interested in gaining extrinsic and tailored incentives. These are grouped into components (risk/reward, customization and incentive) with the following game elements (access, lotteries, boss battles, challenges, avatars, points, virtual economy, badges/achievements, certificates, collections, rewards/prizes) and 3) social motivations: individuals interested in relatedness and social interactions, grouped into components (socialization, assistance and altruism) and game elements (social comparison, leaderboards, social competition, social networks, glowing choice, beginner's luck, signposting, anchor juxtaposition, knowledge sharing,

gifting, innovation platforms, development tools). The authors' framework can be applied based on individuals' profile, through behaviour observations or questions about their preferences.

Moreover, Aebli (2019) explored tourists' motivations for engaging with gamified technology on holidays, showing tourists get involved with gamified technology due to the connection that is made between game design and thow individuals attribute meaning to it. The author concludes that "in holiday context, the gamified technology works well because the holiday context holds similar characteristics of "play" and social dynamics as games in general, which can be stimulated with gamified technology" (2019, p. 13). Thus, this study is framed within the principles of significant ecogamification, which is important to differentiate it from most studies focused on the "user" rather than on the "tourist" (Souza & Marques, in press). This broader tourist-focused approach contributes to explain the potential of receptivity to ecogamification while travelling, as it seeks for tourists' characteristics, preferences and needs not only in terms of technology, but also in terms of entertainment and environmental behaviour. Moreover, this research takes into consideration that post-modern tourists have contradictory behaviours (e.g., people who consume both McDonald's at the airport and vegan food while staying at an eco-hotel at the destination) (D'Urso et al., 2016) These contrasts between behaviour and values bring complexity and raise segmentation challenges.

Several studies have either developed typologies or segmented urban tourists and game users, reflecting the need to understand their behaviours, preferences, and attitudes. Travel motivations, sociodemographic aspects, trip planning, loyalty and satisfaction (Pulido-Fernández et al., 2017; Valls Giménez et al., 2019; Moeller et al., 2011; Bergin-seers & Mair, 2009) commonly guide the segmentation of urban tourists. Regarding the segmentation/typology of game users, the criteria are related to motivation factors and type of gamification elements such as points, rewards, challenges ranking, player personality types and traits, game elements, game culture and game mentality heuristic (Marczewski, 2016; Ferro et al., 2013; Kallio et al., 2011). Literature on game user typologies is vast, but the literature focuses by definition on gamers. However, there may be non gamers who may be receptive to ecogamified apps. Tondello et al. (2017, p. 129) reinforce that "it is not clear if users experience game elements embedded in apps similarly to how players experience them in games". This study takes these gaps into account.

2.2 Receptivity to ecogamification: Potential criteria

Travel environmental behaviours

According to literature, everyday environmental behaviour can be extended to the travel context (Dolnicar & Grun, 2009; Dolnicar & Leisch, 2008; Barr et al., 2010). Dolnicar and Leisch (2008) studied the relation between environmental behaviour at home and on holiday, concluding that both are related. Additionally, Dolnicar & Grun (2009) suggest that the relation between context/environment does not change the environmental behaviour of certain groups of tourists. However, other groups present lower involvement in environmental behaviour while on holidays, suggesting tourists' behaviour is not standard when dealing with complex issues such as sustainability. In urban tourism, Miller et al. (2015) consider five categories: habitual behaviour, environmental attitudes, facilities available, the need to take a break from environmental duties, and the sense of social responsibility. The authors examine tourists' pro-environmental behaviours and demonstrate that existing habits influence environmental urban behaviours. This study considers this criterion to examine the receptivity of urban tourists to ecogamification in the context of transport & mobility.

Perceptions towards transport & mobility apps

The Technology Acceptance Model (TAM) indicates a set of determinants for technology acceptance that explain users' behaviour (Davis et al., 1989). Davis (1985, p. 26) conceptualizes these criteria as followed:

- Perceived usefulness: 'the degree to which an individual believes that using a particular system will increase their use-performance relationship';
- Perceived ease of use: 'the degree to which an individual believes that using a particular system would be free of physical and mental effort';
- Perceived enjoyment: 'the extent to which the activity of using the computer is perceived to be enjoyable, apart from any performance consequences that may be anticipated' (Davis et al. 1992, p. 1113).

Aguiar-Castillo et al. (2019) examine whether an ecogamified app can be successful to promote recycling in urban tourist destinations and argue that tourists can be receptive to a type of technology if they notice its perceived usefulness and ease of use. Another example of a relevant empirical study in the field is that of Yoo et al. (2017). The authors analyzed

what influences the adoption of smart tourism apps, and concluded the perceived enjoyment has a significant influence on the intention to use gamified services. Their study presents consistent results for the context of gamified smart tourism apps. However, it disregards urban tourists' different characteristics, needs, values, interests, attitudes, and behaviours towards sustainability (Souza & Marques, in press). Chung and Koo (2015) studied the use of social media in the search for travel information, showing users of new digital media, who are potentially interested in travel information, are directly influenced by enjoyment while using social media during the trip.

Behaviour and attitude towards entertainment

Entertainment can be defined as situations or activities where the individual feels in a state of contentment (Zillmann & Bryant, 1994). It can be achieved by different types of entertainment (watching TV/movies, and playing sports) (Brock & Livingston, 2004). As Pine and Gilmore (1999) explain, some types of entertainment are more passive, meaning the individual is further away from the experience (watching a movie), whereas others are more active (rafting or playing in a casino), that is, the individual is attracted to the experience (Mehmetoglu & Engen, 2011). Although different individuals are attracted to different types of entertainment, it remains unclear whether people who enjoy technology-based entertainment (e.g., in a home context) will have similar preferences while travelling (Hughes & Benn, 1997). It would be interesting to know to which type of entertainment the individual is more inclined in their routine, as their behavior can or cannot be extended to their travel entertainment preferences.

The media, the internet, and video games can be enjoyed anywhere (Luo et al., 2020), and they are capable of providing behavioral changes through playful experiences (Aebli, 2019). Therefore, tourism has used these apparatus to its advantage (Yoo et al., 2017). In that context, Cardoso et al. (2019) aimed to engage users and persuade them to use (more) sustainable means of transport in destinations by using a playful mobile app with environment-related content and games scenarios for tourists who often prefer to rent a car or use private transportation. The results show it can motivate tourists to use greener forms of mobility in destinations.

Brock and Livingston (2004) explicitly addressed the importance of entertainment. Considering that the need for entertainment is particular and changes according to each

person, they developed a study to understand the individual need for entertainment, based on 3 factors: entertainment drive (motivation toward entertainment), entertainment utility (attitudes toward the general utility of entertainment) and entertainment passivity (preference for passivity in entertainment). Their conclusion is that "not only individuals may differ in their need for entertainment, but that measurement of such differences will provide a more nuanced and more correct understanding of the implications of this need" (Brock & Livingston, 2004, p. 272).

Despite the centrality of entertainment to society, Bates and Ferri (2010, p.1) underline that, "(…) academia has treated the subject in a disjointed, scattershot, sometimes condescending fashion, for a variety of reasons". Similarly, studies on tourists' need for entertainment are surprisingly absent in the tourism context. Although entertainment, enjoyment, and playfulness are much present in tourism and gamification literature, their role is mostly implicit, diluted, or secondary. To understand the potential receptivity of urban tourists to ecogamification, this study brings entertainment, and the need of entertainment (Brock & Livingston, 2004), into light.

Travel motivations

Tourists visit cities for many purposes as escaping, self-exploration, relaxation, prestige, regression, visiting family and friends, social interaction and two cultural reasons (novelty and education) (Crompton, 1979). Knowing tourists' travel motivations is the first step in understanding tourists' individual feelings about their experiences in the destination, "since motivations are generally considered a force that precedes behaviour. It is central to better understanding their experiences" (Aebli, 2019, p. 2). Travel motivations are major driving forces for tourist' behaviour, for their decision-making processes while travelling, and for assessing satisfaction with the experience (Snepenger et al., 2006). Some tourists look for fun, leisure, meeting other tourists and socializing, while others want to relax at a resort and live new, memorable experiences. Different travel motivations are identified among different profiles of urban tourists, as shown by Dean and Suhartanto (2019) in a study with 369 visiting tourists from five creative tourist attractions in Indonesia. It examined the behavioural intention to reexperience, perceived value, satisfaction, and push and pull motivations. Results show that push and pull motivations affect visitors' intentions to retry a certain tourist attraction, and push motivations intensified the intention when there

is perceived value and quality in the experience. To explain variances in motivation, Shawn, and Wu (2006) delineated the travel motivations of Taiwanese seniors and identified important variables, from which five are push motivations: 'ego-enhancement', 'self-esteem', 'knowledge-seeking', 'relaxation', and 'socialization'. For more mature audiences, 'knowledge-seeking' was considered the most important factor.

However, given the importance of travel motivations to understand tourists' preferences, there are not enough studies on smart tourism that link travel motivations to gamification. Aebli (2019) explored tourists' motives for engaging with gamified technology during a pleasure holiday and discovered that using gamification as a resource contributes to achieve motivational goals and to promote interaction while travelling. This rationale might be useful to understand the potential receptivity of urban tourists to ecogamification.

3. Methods

Online questionnaires were applied to perceive different types of urban tourists' potential receptivity to ecogamification and were designed to be shared with different types of urban tourists' profiles. This study proceeded with the non-probability sampling, in which individuals do not have the same chances of being selected within the sample (Smith & Albaum, 2012). The convenience sampling technique was used, allowing the researcher to control the representativeness of the sample, which is common in exploratory studies (Greener, 2008; Smith & Albaum, 2012). Since there was a vast universe of respondents, specific criteria were applied to the target audience: urban tourists over 18 who travelled to urban destinations in the past 3 years. Researchers used different social media channels and groups (e.g., gamers and online travellers), to diversify respondents' profiles. The data collection process went through two calibration phases: an informal pre-test was carried out, to which respondents suggested some adjustments, to improve the questionnaire language and eradicate potential errors. Later, its final version was subjected to a formal pre-test with 15 real urban tourists to ensure the language was accessible and understandable. Data collection was held from December to February 2021, and 572 responses were considered for this study.

The questionnaire was divided into six sections (Appendix A). Session I include the **travel motivations** criterion and its variables. Questions were based on Shawn and Wu

(2006),where respondents are asked about- ego-enhancement, self-esteem, knowledge-seeking, relaxation and socialization. The 21 push items of travel motivation were rated on a 5-point-Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Session II includes **travel environmental behaviours**. Questions were based on Miller et al. (2015), where respondents were asked about: environmental actions, holiday break from environmental duties and tourist social responsibility. The travel environmental behaviour items were structured using 5-point Likert scales: 1 indicates (strongly disagree) and 5 (strongly agree). Session III includes **perceptions towards transport & mobility apps,** focused on **Technology Acceptance Model** and its respective variables. Questions were based on Chung and Koo (2015) and Davis and Venkatesh (1996), where respondents were asked about: perceived usefulness, perceived ease of use and perceived enjoyment, and indicated, on a Likert-type scale from 1 (strongly disagree) to 5 (strongly agree). Session IV includes **use and non-use of green mobility & transport apps and types of rewards** (intrinsic and extrinsic). Questions captured information through selection and multiple-choice levels. The items regarding travellers' preferences for green mobility & transport app were based on Anagnostopoulou et al. (2018), which some of the apps (e.g, Viaggia Roveretgoto, EcoTrips, Green Commuter) have ecogamification features and are considered mobility & transport ecogamified apps, and items regarding types of rewards on Kisurina (2017). Session V includes **behaviour for different types of entertainment and attitude/need of entertainment.** Respondents indicated, on a Likert-type scale from 1 (never) to 5 (always) how they use different forms of entertainment and the need for entertainment. Regarding the attitude/need of entertainment, five questions from Brock and Livingston (2004) were used for the purposes of this study. Regarding the behaviour for different types of entertainment, questions were mostly adapted and built on grey literature to reflect different sources of entertainment and active and passive forms of entertainment. Session VI includes a **sociodemographic profile**. Respondents were asked about gender, education, nationality, employment status, professional activity, and age. See the complete questionnaire in the appendices 1, 2 and 3 or online through the link https://url.gratis/sPwOCP.

Dolnicar's (2008, 2020) suggestions are followed to conduct an efficient segmentation. Data analysis used the Scientific Package for Social Scientist (SPSS 20.0), so data were subjected to different analyses and methods, namely: descriptive analyses,

ANOVA, Hierarchical and Non-Hierarchical Cluster Analysis and K-means Cluster Analysis. The score of the previous dimensions, for each case of the sample, was performed by calculating the average of the items that constitute them.

4. Results

The total sample was 572. 59.3% of the sample are female and 40.2% are male. 49.1% of respondents are between 26 and 35 years, with relatively educated urban tourists. 45,1% have an undergraduate degree, and 25.2% have a master's degree. 55.4% are from Brazil and 22.9% from Portugal. 65,4% are employed and 15,7% self-employed. 24,5% are technology professionals, 15.7% service personnel and salespeople and 10.1% specialists (intellectual and scientific professions). 62,6% never used any green mobility/transport app and 37,5% used some global or local green mobility & transport app. 51.9% are interested in extrinsic rewards (vouchers, gifts, discounts) and 48.1% in intrinsic (acknowledgement, social recognition) (Appendix B).

4.1 Clusters' identification

To help understanding and distinguishing the variables used in the clustering and profiling processes, this study adopted the standard terms used by segmentation studies (see Table 9).

Table 9.
Standard terms used to understand and distinguish the variables

Terms	Meaning
Segmentation variables	Responsible for grouping tourists into segments
Background variables	Profile clusters regarding types of rewards (intrinsic/extrinsic) and use/non-use of green mobility & transport app
Sociodemographic variables	Profile clusters regarding gender, age, employment status, level of education and professional occupation

Source: Adapted from Juvan et al. (2016)

Concerning segmentation variables, the following were part of the exploratory clustering process:

- 1: Travel motivations
  a. TM_ego_enhancement
  b. TM_self_esteem

c. TM_knowledge_seeking

d. TM_relaxation

e. TM_socialization

- 2: Environmental behaviour on holiday

  a. TEB_environmental_actions

  b. TEB_ holiday_break_from_environmental_duties

  c. TEB_tourist_social_responsibility

- 3: Perceptions towards transport & mobility apps

  a. TAM_usefullness

  b. TAM_ease_of_use

  c. TAM_enjoyment

- 4: **Behaviour for different types of entertainment and attitude/need of entertainment**

  a. CAE_type_of_entertainment

  b. CAE_need_for_entertainment

During the exploratory process of identifying the clusters, the *f* value of ANOVA was 55,703, 160,424, 309,688 and 152,055 for the four criteria, i.e., travel motivation, environmental behaviour on holiday, perceptions towards mobility & transport app and attitude and behaviour towards entertainment, respectively. Thus, the perceptions towards mobility & transport app criterion play a more important role in identifying the final clusters compared to others. Travel motivation did not prove to be a relevant criterion, so it was removed from the cluster analysis. Despite this removal, this criterion was considered as a background variable to profile clusters.

There are some extreme outliers (asterisks) and several moderate outliers (circles). These univariate outliers are potential candidates to be excluded from the analysis as they weaken the robust identification of the number of clusters. However, the existence of multivariate outliers is confirmed by calculating the distance of Mahalanobis (Stevens, 2002; Tabachnick & Fidell, 2007). The Mahalanobis distance for each case in the sample referenced by the ID variable with the respective upper tail probability in the *chi-square* distribution with 8 degrees of freedom. Thus, multivariate outliers are observed in the first 7 lines, using the usual criterion of identifying outliers for probabilities below 0.001 and these cases will be excluded in the cluster analysis.

After preparing the database from previous sections, the sample segments were identified and defined through Cluster Analysis (statistical technique). Two exploratory clustering techniques were used in SPSS. First, a hierarchical grouping of cases was performed using the "*Hierarchical Cluster Analysis*", where each observation belonging to a particular cluster is similar to all observations in that cluster, but different from observations in others (Köhn & Hubert, 2015; Maroco, 2007). Its groups cases that are closer within the observed criteria, while trying to move cases that are further from each other to different clusters. The number of clusters is not predetermined, since the method must be free from initial assumptions. To identify the number of clusters, the *Ward's* method was used (Mojena, 2014) to minimize the variance within the created groups and using the "*Euclidean distance square*" measure to determine the distances between cases. Several configurations and methods available in the SPSS software were explored and used to obtain the optimal number of clusters (between-groups linkage, within-groups linkage, nearest neighbour, furthest neighbour, centroid clustering, median clustering, and *Ward's* method). The following dendrograms were obtained. In Figure 27, the dendrogram obtained points to a structure of 4 clusters.

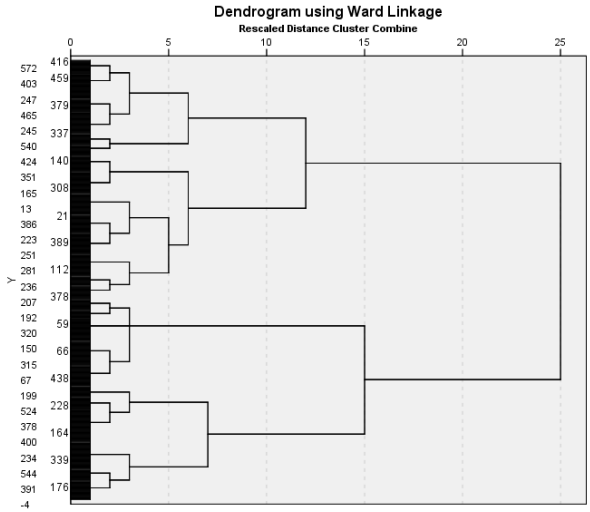

Figure 27. Dendrogram using Ward Linkage

Although subjective, the evaluation of the number of clusters to be retained must consider the distance obtained between clusters and the R-squared criterion for calculating the proportion of variance explained by the model (Pestana & Gageiro, 2014). Figure 22 shows these indices calculated for the various solutions with the number of clusters from 2 to 8. The value of the R-squared increases with the number of clusters, as expected, but it significantly decreases at a certain point (ΔR-squared) (Figure 28).

Nº of clusters	R-squared	ΔR-squared	Distance between Clusters
2	21%		615.629
3	33%	12%	475.264
4	42%	9%	408.954
5	48%	6%	347.550
6	53%	5%	312.595
7	56%	3%	287.895
8	58%	2%	268.887

Figure 28. Distance between Clusters and R-squared

Figure 29 presents these values. The increase in R-squared decreases from 4 clusters. Using this criterion, 4 clusters were retained as a final solution.

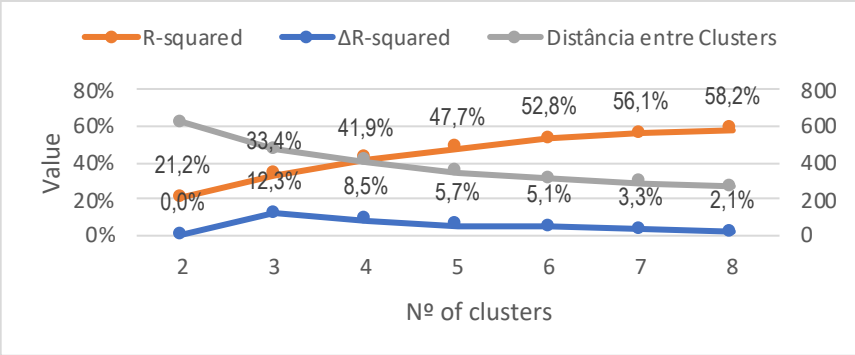

Figure 29. Graphic: distance between clusters and R-squared

After choosing the 4 clusters solutions, the "*K-means Cluster Analysis*" method was used to classify the cases observed in the respective clusters and analyse how significant the difference between the clusters was (Wishart, 2014). Figure 30 shows the results:

ANOVA

	Cluster		Error			
	Mean Square	df	Mean Square	df	F	Sig.
TEB21_environmental_actions	26,624	3	0,321	561	82,972	0,000
TEB22_vacation_break_from_environmental_duties	49,061	3	0,546	561	89,784	0,000
TEB23_tourist_social_responsibility	95,127	3	0,366	561	259,869	0,000
TAM31_usefullness	28,539	3	0,272	561	104,765	0,000
TAM32_ease_of_use	43,829	3	0,476	561	92,128	0,000
TAM33_enjoyment	57,484	3	0,475	561	120,950	0,000
CAE41_type_of_entertainment	5,944	3	0,293	561	20,253	0,000
CAE42_need_for_entertainment	37,136	3	0,469	561	79,217	0,000

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Figure 30. ANOVA (F-value)

11 iterations were enough to find the final centres of the clusters in each criterion. From the ANOVA and final centres of the clusters, the variable that contributes the most to the definition of clusters is TEB23_tourist_social_responsibility (greatest F-value) and the

one that contributes the least is CAE41_type_of_entertainment. Although the segmentation variable CAE41_type_of_entertainment has a low (*F-value*), its value remains statistically significant ($p<0.001$). The variable was verified in detail with the *Kruskal-Wallis* test to confirm differences among clusters by items. Result shows that even with a lower *p value* in some items, the significance is evident in all items (see Table 10).

Table 10.
Kruskal-Wallis test to confirm differences among clusters by items

	Amostra total	**Cluster 1**	**Cluster 2**	**Cluster 3**	**Cluster 4**		
Segmentation variables	N=565	N=177	N=105	N=144	N=139	Kruskal-Wallis	p value
Environmental actions							
Switch lights off when not in use	4,62	4,94	4,43	4,75	4,21	86 576	<0.001
Use air conditioners moderately rather than to extreme temperatures	4,22	4,53	4,13	4,40	3,71	55 520	<0.001
Save water	4,29	4,65	4,08	4,56	3,72	99 791	<0.001
Recycle paper products	3,55	3,90	3,48	4,03	2,64	91 803	<0.001
Recycle plastic, glass	3,57	3,86	3,55	4,03	2,71	76 932	<0.001
Buy organic food products	2,74	2,82	2,80	3,15	2,17	48 663	<0.001
Manage selection, quantity & timing of food purchases to reduce waste	4,22	4,56	4,05	4,37	3,78	62 350	<0.001
Walk and/or cycle where possible	3,53	3,80	3,32	3,85	3,03	38 503	<0.001
Use public transport where possible	3,62	3,79	3,31	3,94	3,32	22 491	<0.001
Encourage (or support) others to be environmentally friendly	3,77	4,14	3,56	4,28	2,94	116 638	<0.001
Vacation break from environmental duties							
The facilities and infrastructure make it difficult to act in an environmentally responsible way	3,19	2,67	3,34	3,71	3,20	68 214	<0.001
It is difficult for a visitor to behave in an environmentally responsible way	2,73	1,86	3,29	3,10	3,04	121 319	<0.001
When I am on holidays, I give myself a break from being strictly careful about the environmental effects of my activities	2,23	1,35	2,54	2,39	2,95	161 325	<0.001
Tourist social responsibility							
I am responsible for my environmental behaviour even if my choices are limited as a tourist	4,16	4,68	4,03	4,53	3,23	196 803	<0.001
I continue to be very vigilant about the impact of my behaviour on the environment even when visiting another city	3,84	4,58	3,48	4,47	2,54	299 188	<0.001
Usefulness							
Using transport and mobility applications facilitates my mobility while traveling	4,60	4,84	3,79	4,83	4,67	127 827	<0.001

Using the transport and mobility applications allows me to get to know more places in the city I am visiting	4,52	4,69	3,63	4,81	4,68	141 858	<0.001
The use of transport and mobility applications increases the effectiveness of finding tourist attractions	4,55	4,71	3,83	4,78	4,66	108 834	<0.001
Transport and mobility applications are useful when traveling	4,64	4,84	3,84	4,87	4,76	147 828	<0.001
Ease of use							
Using transport and mobility applications doesn't require much mental effort	4,01	4,05	3,03	4,44	4,24	118 068	<0.001
Transport and mobility applications are easy to use	4,14	4,26	3,15	4,58	4,28	155 084	<0.001
The transport and mobility applications are intuitive and allow me to use them however I want	3,88	3,84	2,99	4,40	4,09	134 917	<0.001
Enjoyment							
It is an interesting experience to have several transport and mobility options in applications while traveling	4,47	4,64	3,63	4,80	4,57	134 374	<0.001
I have fun using transport and mobility apps	3,33	3,14	2,34	4,21	3,41	159 506	<0.001
It’s interesting to search for new transport and mobility applications when I’m traveling	3,53	3,49	2,46	4,47	3,42	162 495	<0.001
It is worth the effort to search for new transport and mobility applications when I'm traveling	3,76	3,66	2,94	4,62	3,63	153 077	<0.001
Type of entertainment							
I use the Internet for social or personal interests	4,67	4,78	4,38	4,77	4,64	30 915	<.001
I watch television (TV, computer, mobile phone)	4,04	4,08	3,65	4,32	4,01	18 807	<.001
I read newspapers (printed, online)	3,42	3,37	3,37	3,71	3,22	11 413	,010
I listen to music (Computer, mobile phone, Ipod, Ipad)	4,38	4,38	4,19	4,63	4,27	19 225	<.001
I read books (physical books, online e-book)	3,71	3,64	3,70	4,06	3,43	21 987	<.001
I read magazines (printed, online)	2,76	2,60	2,61	3,30	2,51	31 861	<.001
I go to the movies	3,27	3,15	3,13	3,65	3,16	18 547	<.001
I play video games (PC, console, cellphone, online)	2,51	2,25	2,24	2,87	2,68	17 177	<.001
I listen to the radio	2,98	2,99	2,96	3,24	2,72	10 149	,017
I practice sports	3,20	3,19	3,25	3,47	2,91	14 278	,003
I watch series and movies (TV, Computer, cellphone, Ipad)	4,24	4,32	3,97	4,42	4,14	11 153	,011

N**eed for entertainment**							
When traveling, I get very bored unless there is something entertaining to do	2,09	1,58	1,90	2,80	2,17	69 787	<0.001
I need some entertainment time each and every day	3,28	2,84	2,81	4,03	3,41	87 574	<0.001
I am always on the lookout for new forms of entertainment	3,47	3,04	2,90	4,24	3,65	106 546	<0.001
I like to take an active role in my entertainment activities	3,64	3,31	3,20	4,25	3,74	84 765	<0.001
I am very selective about how I spend my free time	3,63	3,41	3,30	4,21	3,54	53 416	<0.001

Measured using a Likert-type scale from 1 to 5.

To assess whether the differences between cluster centres in each criterion are significant, the *post hoc de Tukey* test was used (Table 11). The differences were significant in all variables. In some, the averages are positioned in different columns (subsets), indicating that the average differences are significant.

Table 11.
Significance degree of segmentation variables

Segmentation variable	*Cluster*	*Number of cases N*	*Subset for alfa = 0,5*		
			1	*2*	*3*
Perceived usefulness	2	105	3,7714		
	4	139		4,6924	
	1	177		4,7712	
	3	144		4,8264	
	Sig.		1,000	0,148	
Perceived ease of use	2	105	3,0571		
	1	177		4,0508	
	4	139		4,2014	
	3	144			4,4722
	Sig.		1,000	0,273	1,000
Perceived enjoyment	2	105	2,8429		
	1	177		3,7316	
	4	139		3,7590	
	3	144			4,5243
	Sig.		1,000	0,988	1,000
Environmental actions	4	139	3,2230		
	2	105		3,6714	
	1	177			4,0977
	3	144			4,1361
	Sig.		1,000	1,000	0,944
Vacation break from environmental duties	1	177	1,9623		
	2	105		3,0571	
	4	139		3,0624	
	3	144		3,0671	
	Sig.		1,000	1,000	
Tourists' social responsibility	4	139	2,6649		
	2	105		3,7524	
	3	144			4,5035
	1	177			4,5271
	Sig.		1,000	1,000	0,331
Type of entertainment	2	105	3,4043		
	4	139	3,4277		
	1	177	3,5234		
	3	144		3,8561	
	Sig.		1,267	1,000	

Need for entertainment	2	105	2,8229		
	1	177	2,8350		
	4	139		3,3022	
	3	144			3,9056
	Sig.		0,999	1,000	1,000

Means for group in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 136,462

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed

Regarding the perceptions towards mobility & transport apps there are differences and similarities between clusters. In the perceived usefulness of mobility & transport app in Clusters 1, 3 and 4, there are notable levels of agreement (above 4.69 in all items in a Likert-type scale from 1 'strongly disagree' to 5 'strongly agree'). Cluster 2 was more neutral (3.77). Regarding the perceived ease of use when using mobility & transport app, Clusters 3 presents higher values (4.47). Clusters 1 and 4 are grouped with very similar values (4.20) and Cluster 2 is more neutral (3.05). Regarding perceived enjoyment while using mobility & transport app, Cluster 2 presents low (2.84) perceived enjoyment, whereas Cluster 3 presents high (4.52). Clusters 1 and 4 present a neutral (3.75) perceived enjoyment in using mobility & transport app.

Regarding environmental behaviour while travelling and its respective variables, the differences between the clusters are apparent in the environmental actions and tourists' social responsibility variables. Cluster 4 differs from Cluster 2 and Clusters 1 and 3, which are similar. Clusters 1 and 3 have similar scores on environmental actions, but on holiday break from environmental duties, only Cluster 1 differs from Clusters 2, 3 and 4. Thus, respondents from Cluster 1 encompass more urban tourists who practice environmental actions on holiday (e.g., recycling, using public transport, saving water and energy) and do not change behaviour when travelling. However, Clusters 2 and 4 are more neutral in terms of travel environmental behaviours. In tourist social responsibility, respondents from Clusters 3 agree with Cluster 1, who tend to be responsible for their environmental behaviour even with limited options at the destination, remaining strict about the impact of their environmental behaviour. Discrepantly, Cluster 4 has a moderately low score (2.88) when compared to other clusters. Cluster 2 is neutral.

In what concerns behaviour for different types of entertainment and attitude/need of entertainment, there are differences between the clusters, in which Cluster 4 differs from Cluster 3 and Clusters 1 and 2 (similar scores). In type of entertainment, Cluster 3 differs

from 1, 2 and 4 (similar scores). Clusters 1, 2 and 4 have similar averages (3.42) in terms of type of entertainment (e.g., using the internet for social/personal interests, listening to music, reading books, watching series /movies). Regarding the attitude/need for entertainment, Clusters 1 and 2 have lower scores (2.83): some respondents disagree to feel bored when travelling (they wouldn't always seek new forms of entertainment). In relation to other clusters, Cluster 4 is more neutral, and Cluster 3 has the moderately high score (3.90) with more need for entertainment then other clusters.

Based on the results, the clusters were summarized (see table 11):

Cluster 1: Mobi Wholeheartedly (31,3%), given their full commitment to environmental travel behavior

Largest cluster. High perceived value in terms of utility and moderately high perceived value in terms of mobility & transport app ease of use, finding them easy to use (for not requiring much mental effort) and useful, (allow to know more places in the city while travelling). Given its perceived value in relation to enjoyment in mobility & transport app, this cluster presents neutral scores, that is, they are neither low nor high regarding the 'fun' elements in this type of app.

More concerned with environmental sustainability when travelling considering its high level of tourist social responsibility. While travelling, respondents continue to be very vigilant about the impact of their behaviour towards the environment. Presents the second-high level of environmental actions by using public transport, recycling, walking, saving energy and water. This is the only group to not take a break from strict carefulness towards the environmental effects of their activities on holiday.

Type of entertainment: these urban tourists are interested in using the internet for social/personal interests, watching television, series/movies, and listening to music in different devices (TV, computer, iPad, and mobile phone). Despite showing interest in entertainment with digital devices, respondents do not show much interest in playing video games, nor listening to the radio and reading magazines, and seem to enjoy reading newspapers and books, going to the movies, and practicing sports. Need for entertainment: the cluster presents moderately low scores in relation to the need for entertainment, that is, they do not feel bored during the trip, even without entertainment. Also, express moderately

low need to find new forms of entertainment. Lack of selectiveness on how to spend free time.

Cluster 2: Mobi Whatever (18,5%), considering their neutral responses regarding most of the measures

Smallest cluster. It presents a neutral perceived value in terms of utility and ease of use for mobility & transport app. In other words, this cluster does not show much expression for the fact that this type of app is easy to use and facilitates mobility while travelling. Moderately low levels of perceived enjoyment value, (tend not to appreciate 'enjoyment' mechanisms in this type of app).

On holiday: neutral towards environmental issues (respondents do not express interest in engaging in environmental actions while traveling, e.g., using public transport, recycling, walking, saving energy and water). Also, they are neutral concerning the impact of their behaviour on the environment, being occasionally concerned about the environmental effects of their activities on holiday.

Type of entertainment: the cluster prefers using the internet for social/ personal interests and listening to music in different devices (computer, iPad, and mobile phone), with low interest in playing video games, listening to the radio, and reading magazines (they occasionally watch television, series/movies, read books, go to the movies, and practice sports). Similar to cluster 1: moderately low need for entertainment while travelling, seeking new forms of entertainment and selectivity about how to spend free time.

Cluster 3: Mobi Profiter (25,4%) given their openness to explore and enjoy all the experiences around them.

High level of perceived value in terms of usefulness, ease of use and enjoyment for mobility & transport app, finding this kind of app easy, useful, and fun for its easiness to use, allowing to know more places in the city while visiting.

Environmental behaviour: similar to cluster 1 (environmental actions and tourists' social responsibility, using public transport, recycling, walking, saving energy and water). On holiday: despite realizing their responsibility and the impact of their behavior on the environment, however, sometimes when travelling they take a break from their behaviour. So, their behaviour is not so consistent as cluster 1.

Tourists prefer a greater number of types of entertainment (e.g., using the internet for social/personal interests, listening to music, watching television, series/movies and reading books) comparing to other clusters. Similar to Clusters 1 and 2: disinterest in playing video games (occasionally: listening to the radio, reading magazines/newspaper, going to the movies, and practicing sports). Concerning the need for entertainment, this cluster gets very bored unless there is something entertaining to do on holiday (need for finding new forms of entertainment and more selectiveness about how to spend free time).

Cluster 4: Mobi Utilitarian (24,6%) given their high score in the perceived usefulness variable and low and neutral scores in others

Perceptions towards mobility & transport app: similar to Cluster 1 (high perceived value in terms of utility and moderately high perceived value in app's ease of use). Tourists find this kind of app useful and easy to use (it allows them to know more places while visiting cities) and neither like nor dislike fun mechanisms (enjoyment in mobility & transport app).

From the 4 clusters, this cluster presents less concern with environment sustainability. The scores regarding their answers concerning environmental action, social responsibility and consistency between home/travel behaviour are low/neutral.

Entertainment: the cluster prefers using the internet for social/personal interests, listening to music, watching television, series/movies, showing lesser interest in listening to the radio, reading magazines, practicing sports, and playing video games. Presents a neutralneed for entertainment (neither bored nor happy without entertainment during the trip. Also, has a neutral behave when looking for new forms of entertainment and selecting how to spend free time). Figure 12 summarizes the clusters, which are detailed in this section.

4.1.1 Clusters profiling

Background variables (use and non-use of green transport & mobility apps, types of rewards and travel motivations) and sociodemographic variables (gender, age, level of education, professional occupation, and employment status) were used to identify differences and similarities between groups (see Appendix D).

37.7% use green mobility & transport app (most respondents do not, 62.3%). However, Clusters differ as followed: In Cluster 3: respondents are divided equally between those who use and do not use green mobility & transport app. Cluster 2: highest number of non-users

of apps (68,6%). Cluster 4: second highest number of users (34,5%) followed by Cluster 1 (33,9%).

Regarding types of rewards for using green mobility & transport app on holiday, 51,7% prefer extrinsic rewards (e.g., vouchers, discount, gifts) and (48,3%) intrinsic (e.g., acknowledgements and social recognition). Clusters differ as followed: Cluster 4 has the largest interest in extrinsic rewards (57.6%) followed by Cluster 2 (50,5%). In Cluster 1, tourists prefer intrinsic rewards (50.8%) and in Cluster 3 they are equally divided.

Regarding travel motivation (see Appendix E) to visit urban destinations, ego enhancement and knowledge seeking present high scores, averages (> 4). All clusters enjoy talking about their experience after travelling, being important to experience different cultures and lifestyles. However, relaxation assumes the lowest averages (< 3). In urban tourism context, tourists do not appreciate slowing down or doing nothing. Compared to the others, Cluster 1 and 3, averages (> 3), are more motivated by socialisation than Clusters 2 and 4, averages (< 3). Clusters 1 and 3 that enjoy socialising aim to meeting new people and spending time with family and friends on a trip. Regarding self-esteem, all clusters have neutral means (intervals from [3.14 to 3.66]). When choosing destination to travel, the tourists are indifferent towards luxury, good food, or a comfortable or fashionable place to stay.

All clusters present a higher percentage of female respondents. Cluster 2 has the highest (66%). Respondents from all clusters have good educational levels, but Cluster 3 has more graduates (47.2%), Cluster 4 master's (31.7%) and Cluster 2 PhD's (14.3%). Cluster 3 presented a higher percentage of Brazilians (62,5%). Cluster 4 included more Portuguese (24,5%). Regarding employment status, Cluster 1 has a high number of employed respondents (61%). Cluster 2 shows the largest number of entrepreneurs (19.2%). Cluster 4 had more tech sector workers (39.3%). Cluster 2 has specialists from intellectual and scientific professions (21.4%). Clusters are composed of adults: Cluster 4 has the highest percentage of people between 26-35 (54.7%) and Cluster 2 between 36-45 (32.4%).

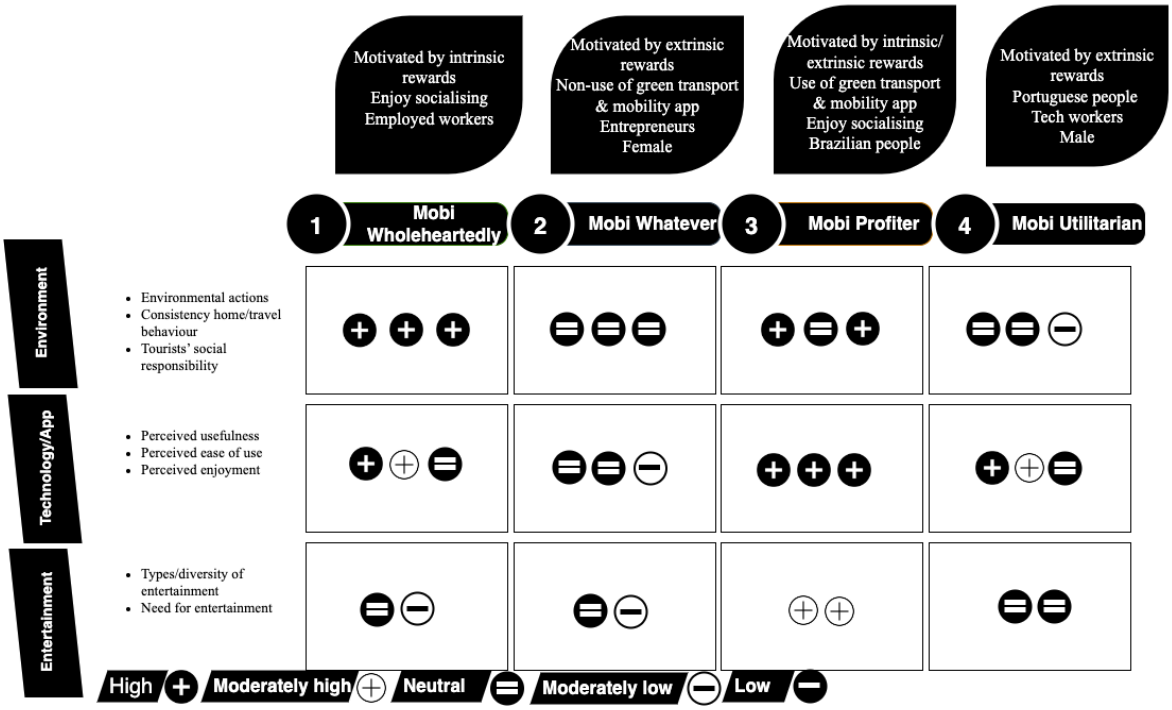

Figure 31. Distinctive features of each cluster

5. Discussion and implications

Clustering urban tourists in segments contributed to understanding different types of receptivity to ecogamified mobility & transport app since it helps buyers and providers of ecogamification services, like public sector tourism organizations and institutions (e.g., governmental agencies, local authorities, visitor information centres), Destination Marketing Organizations (DMOs), private sector tourism organizations (e.g., hospitality, mobility and transport services, tour operators) and tech and gamification companies especialised in develop effective and customized strategies to attract and engage urban tourists.

Mobi Wholeheartedly: considers that mobility & transport app is easy to use and useful to find places while travelling. However, this cluster does not mind about elements of enjoyment in this type of app, meaning providers of ecogamification services should focus on intuitive app flow, offering more forms of mobility & transport to different tourist attractions, not overly emphasising on enjoyment elements. This group is concerned about their environmental actions on holiday, so DMO's should consider mechanisms that promote and reinforce their sustainable behaviour (e.g., suggesting green transport options at the destination, presenting tourist attractions based on the tourist's current location to reduce long journeys, suggesting the amount of Co_2 emissions that can be reduced by opting for greener transport). All these examples can be implemented in ecogamified applications with

the transformative engagement through ludic learning system (edutainment) approach to promote sustainable attitudes and behaviors, the idea is entertaining while educating. The results showed their interest in using the internet for social / personal interests, watching television, watching series/movies, and listening to music, with a low need to seek new forms of entertainment on holiday. Although this cluster is not too inclined to pursue new forms of entertainment while travelling, strategies that involve dynamic game elements related to emotions and narratives might attract this kind of tourist (e.g, elements to evoke tourists' emotions through narratives, whether through sounds or visual resources, e.g., videos with high-impact storytelling about the experience of using mini electric cars in the historic centre of the city with different stages to create a sense of curiosity in the tourist). It expresses interests in use green mobility & transport apps, sensitiveness to such type of app, potentially getting easily involved with this kind of tool on holiday. DMO's can focus on marketing efforts to reach this audience with ecogamified apps to mobility and transport. These tourists are motivated by intrinsic rewards for green transport & mobility choices (intrinsic rewards as a simple "thank you" or social recognition). Also, altruism mechanisms should be considered in ecogamified apps (Tondello et al, 2017) (e.g., knowledge sharing, voting mechanisms, exploratory tasks, creativity tools, meaningful choices) to help them to effectively engage with apps. "Word-of-mouth" is present in this cluster: tourists share experiences lived in destinations, which is relevant for tourism agents who can produce impactful experiences through ecogamified apps to be shared with other travellers. They also want to socialise, and do not rest while on holiday (game elements that focus on social mechanisms should be considered for ecogamified apps, e.g., social comparison or pressure, leaderboards, social competition, social networks, social status, guilds or teams, inviting friend and social discovery as suggested by Tondello et al (2017).

Mobi Whatever is neutral towards "easy to use and utility of mobility & transport apps" and does not seem to really care about elements of enjoyment in apps. Providers of ecogamification services should find a balance when presenting elements of usefulness, fluidity, and fun in ecogamified mobility & transport apps to avoid excessive or insufficient features. These tourists do not care much about environmental actions on holiday, which indicates the importance of bringing awareness towards greener mobility & transport apps behaviours. Respecting their behaviour may be a smart strategy, not forcing sudden changes. Instead, sociodemographic specificities can be used to guide subtle engagement. Most

people in the cluster are female and entrepreneur's ecogamification strategies that push for entrepreneurial skills such as creativity and determination (e.g, achieve goals by using sustainable transport and creating alternative routes to less explored tourist attractions in destinations). Moreover, a simple, objective, and low-interactivity app can be effective to engage them. The tourists are interested in using the internet for social /personal interests and listening to music. It has a low need to find new forms of entertainment on holiday, does not seem to really care about new forms of entertainment while travelling. However, it is attracted to technological entertainment. Buyers and providers of ecogamification services can focus on mobility & transport apps with social media to share their achievements. Tourists did not use green mobility & transport apps. However, if using such service, they are motivated by extrinsic rewards for green transport & mobility choices, as gift, discounts, and vouchers. Although it has more non-use of green apps, in-app rewards may be attractive, so DMO's should focus on structured reward mechanisms based on the use of green transport & mobility (e.g., the more they use transport with less co_2 emissions, and if they travel more on foot, the more discounts in accommodations or restaurants). This tourists do not seem to really interessed in socialize while travelling, meaning tourism institutions and tech providers might need to emphasize individual motivations to attract them through immersion and progression, in which game elements are prioritized (e.g., mystery box, easter eggs, theme, narrative or story, levels or progression, meaning or purpose, progress feedback and learning) (Tondello et al, 2017).

Mobi Profiter considers mobility & transport apps easy to use and useful to help finding places to visit, perceiving a lot of enjoyment in such apps. DMO's should emphasize these features in ecogamified mobility & transport apps, focusing on excellent fluidity, usefulness during the trip and increased playfulness mechanisms. Despite favorable environmental behaviours, these tourists sometimes take a break from being strictly careful with the effects of their activities, suggesting that the travel contexts may distract this audience from their environmental responsibilities at the destination. DMO's should focus on constantly reminding them about environmental responsibilities on destination. Moreover, ecogamification applied to mobility & transport apps can be a good ally in this process by using push notification engines. However, boring messages must be avoided (e.g., generic and non personalized message). Push notifications are welcome, specially because can stimulate the tourist's engagement through ecogamification (e.g., the city is being raided

by Mobi Profits. Choose the tourist attraction closest to you and earn 10 coins to save 1% of planet Co_2). The cluster demonstrates a preference for a wide variety of entertainment and has a moderately high need for entertainment while traveling. This result suggests that this cluster is very joyful, and this may reflect this cluster being composed by Brazilians who are culturally a joyful and fun-loving people. Therefore, it makes sense that gamification providers consider in mobility & transport apps the game elements that combine external and social motivations to promote new and fun experiences (e.g., challenges, avatars, points, virtual economy, badges/achievements, certificates, collections, rewards/prizes, social comparison, leaderboards, social competition, social networks (Tondello et al., 2017)). These tourists are equally divided between those who use or do not use green mobility & transport apps, and their preference for intrinsic and extrinsic rewards. DMO's must follow mixed strategies to implement rewards and various attraction mechanisms to use mobility & transport apps (e.g., providing vouchers while also displaying a big thank you note for choosing greener transport options). Respondents promote "word-of-mouth", want to socialise, and do not want to rest while on holiday, so the same strategies suggested to *Mobi Wholeheartedly* should be considered in this case.

Mobi Utilitarian considers that mobility & transport apps are easy to use and useful to help finding places while travelling. However, this cluster does not care about elements of enjoyment in these apps, similarly to *Mobi Wholeheartedly*, (the same strategy could be applied for both groups). It does not show concerns with environmental actions on holidays, which means DMO's should emphasize on strategies based on their sociodemographic profile (highest percentage of Portuguese, more people in the technology sector, and the large percentage of male). To reach this audience, ecogamified apps need to offer elaborated technological apparatus that crosses augmented reality, artificial intelligence, and gamification. Also, the appropriate game elements would have to be quite well-developed (the group presents technical knowledge about the tool). Tourists are interested in 1) using the internet for social / personal interests, watching television, watching series/movies, and listening to music, having a neutral need for entertainment (they are neither bored nor happy without it during the trip). This interest is almost the same in the cluster Mobi Wholeheartedly, so the same strategy could be applied to both 2) using green mobility & transport app and 3) extrinsic rewards for green transport & mobility choices as gifts, discounts, and vouchers 4) potential interest in ecogamified apps in the context of transport

& mobility (thus, buyers and providers of ecogamification services can invest in game elements focused on external motivations) (Tondello et. al, 2017), namely incentive (badges or achievements, certificates, collection, rewards, or prizes, unlockable or rare content and quests), and risk/reward (access, lotteries or games of chance, boss battles and challenges) aiming at engaging them. This cluster is not motivated by socialization nor rest while on holiday. Tourism institutions and tech providers can focus on individual motivations (immersion and progression) that prioritize game elements (e.g., mystery box, easter eggs, theme, narrative or story, levels or progression, meaning or purpose, progress feedback and learning) (Tondello et al,2017).

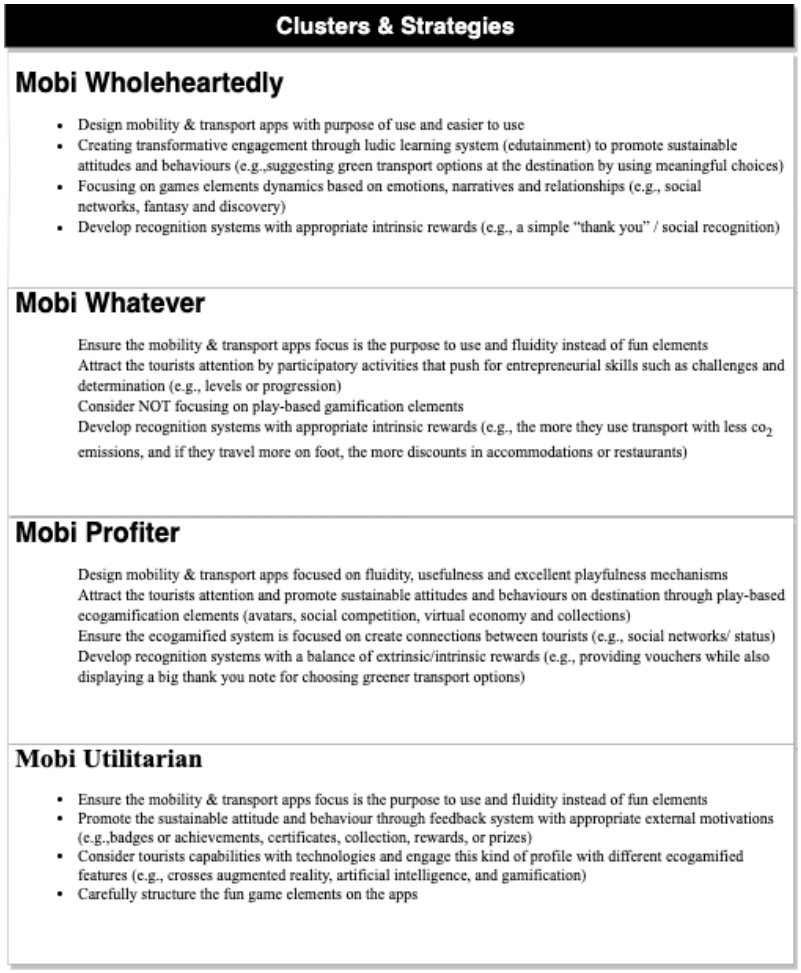

Figure 32. Summary: clusters and strategies

6. Conclusions and future research

Understanding what makes urban tourists receptive to ecogamification in the context of transport & mobility applications is not only practically interesting but also theoretically relevant. This study brings novelty to gamification literature. It goes beyond just presenting levels of receptivity to ecogamified apps and presents how this receptivity happens. Besides, it explains how the personal factors and ecogamified features work together to exert this propensity for using and want to use "ecogamified" services while on holiday and travelling.

In contrast to previous research, which addresses the technology acceptance model (TAM) to study the intention to use smart tourism applications, this study innovates by combining the TAM with entertainment and environmental awareness. In doing this intersection, we shed light on a different approach to understand tourists' receptivity to ecogamification, which consequently contributes to elucidate different types, levels, and aspects of smart tourism that certain tourist segments might prefer.

Another contribution is related to travel motivations, which are considered, in previous studies, as an impactful variable to understand tourists' individual feelings and preferences about their experiences in the destination. However, our study shows it did not prove to be significant for receptivity to ecogamification apps. Probably, if the study is extended beyond urban tourists, results will be different.

From a practical contribution, the results suggest public sector tourism organizations, institutions and DMOs should focus on strategies which generate value and improve the tourist experience at the destination. The findings suggest that ecogamified mobility & transport apps are not just a generalist technological device. On the contrary, these applications might build on customized strategies for different segments of urban tourists. Simultaneously, we take the argument of D'Urso et al (2016, p.297) very seriously: "in postmodern tourism, the experiences of each tourist could not be summarized only through a unique perspective, but multiple and disjointed perspectives are necessary". In line of this argument, we are not suggesting that there are clear boundaries between the four clusters, we reject deterministic classifications, and we are totally aware of the vagueness and fragmentation of postmodern tourists (D'Urso et al, 2016). Therefore, to provide realistic and useful managerial recommendations, it is important to interpret them as a multidimensional and holistic picture, with overlaps and contradictions.

The limitations of this study suggest future research directions. To overcome the ambiguity and subjectivity of Likert type scales, *fuzzy segmentation*, through a combination of fuzzy numbers and fuzzy clustering algorithms, might provide more comprehensive implications (D'Urso, 2007; D'Urso et. Al, 2016).

Concerning the sampling strategy, future investigations could use probabilistic sampling. Also, the sample centered essentially on two countries, which potentially limits its applicability into other realities. Researchers are encouraged to use cross-cultural samples to compare typologies. Regarding data collection methods, future studies may contribute by using gamified questionnaire (focused on real ecogamified prototypes to capture live impressions from tourists) instead of the static online questionnaire.

While the results of this study may provide insights into which game elements might work better with different types of tourists, it is still unclear how ecogamification can be effectively used in the context of mobility & transport applications. Therefore, we suggest

that future studies consider delving deeper into the concept of ecogamification and its applicability to the context of mobility & transport applications in tourism.

From this study, profiles with a playful vein emerged, such as the Profiter cluster, which coincidentally has a high number of Brazilians in which it is recognized as a hedonic people. Therefore, we suggest that future research consider elements of culturality such as customs and traditions to better understand the preferences and behaviors of tourists. Finally, future research may extend this approach by examining other criteria that improve this typology, including types of game elements, psychographic (personality traits and lifestyle) and types of ecogamified mobility & transport apps and the use purpose (e.g., avoid traffic, replace private transport with public, identify more sustainable forms of travel) to provide a more detailed profile of the tourist preferences and behavior about gamification during travel.

Table 12.
Sample Characteristics

Variable	*Frequency(N)*	*Percent (%)*
Gender (n = 572)		
Female	339	59,3
Male	230	40,2
Other	3	0,5
Age (n = 572)		
18-25	63	11,0
	281	49,1
	153	26,7
	52	9,1
	23	4,0
Level of education (n = 572)		
Elementary school	7	1,2
High school	92	16,1
Undergraduate	258	45,1
Postgraduate	24	4,2
Master's degree	144	25,2
P.h.D/Post P.h.D	47	8,2
Nationality (n = 572)		
Brazil	317	55,4
Portugal	131	22,9
Spain	42	7,3
England	28	4,9
Chile	7	1,2
United States	7	1,2
Cuba	4	0,7
Italy	4	0,7
Other countries	32	5,6
Professional occupation (n = 572)		
Technological professionals	140	24,5
Service personnel and sellers	90	15,7
Specialists in intellectual and scientific professions	58	10,1
Technicians and intermediate level professionals	55	9,6
Senior managers and managers	36	6,3
Administrative staff and similar	33	5,8
Entrepreneurial professionals	17	3,0
Others	19	3,4
Missing	124	21,7
Employment status (n = 572)		
Employed	374	65,4
Selfemployed	90	15,7
Student	74	12,9
Unemployed	27	4,7
Retired	6	1,0
Missing	1	0,2
Use and non-use of greentransport & mobility applications (n = 572)		
Use of green transport & mobility app	224	37,5

Never used any green mobility & transport app	358	62,6
Types of rewards (n = 572)		
Extrinsic reward (e.g., vouchers, gifts, discounts)	297	51,9
Intrinsic rewards (e.g., thanks, social recognition)	275	48,1

Table 13.
Crosstabulation of the background and sociodemographic variables

Use and non-use of green transport & mobility applications		**Cluster 1**	**Cluster 2**	**Cluster 3**	**Cluster 4**	**Total**
	Non-use of green transport & mobility applications	117 (66.1%)	72 (68.6%)	72 (50%)	91 (65.5%)	352 (62.3%)
	Use green transport & mobility applications	60 (33.9%)	33 (31.4%)	72 (50%)	48 (34.5%)	213 (37.7%)
	Total	177 (100%)	105 (100%)	144 (100%)	139 (100%)	565 (100%)
Types of rewards		**Cluster 1**	**Cluster 2**	**Cluster 3**	**Cluster 4**	**Total**
	Extrinsic rewards (vouchers, gifts, discounts)	87 (49.2%)	53 (50.5%)	72 (50%)	80 (57.6%)	292 (51.7%)
	Intrinsic rewards (thanks and social recognition)	90 (50.8%)	52 (49.5%)	72 (50%)	59 (42.4%)	273 (48.3%)
	Total	177 (100%)	105 (100%)	144 (100%)	139 (100%)	565 (100%)
Gender		**Cluster 1**	**Cluster 2**	**Cluster 3**	**Cluster 4**	**Total**
	Female	115 (65%)	68 (66%)	82 (56.9%)	71 (51.4%)	336 (59.8%)
	Male	62 (35%)	35 (34%)	62 (43.1%)	67 (48.6%)	226 (42.2%)
	Total	177 (100%)	103 (100%)	144 (100%)	138 (100%)	562 (100%)
Level of education		**Cluster 1**	**Cluster 2**	**Cluster 3**	**Cluster 4**	**Total**
	Elementary school	2 (1.1%)	2 (1.9)	3 (2.1)	0 (0%)	7 (1.2%)
	High school	25 (14.1%)	13 (12.4%)	35 (24.3%)	19 (13.7)	92 (16.3%)

	Undergraduate	76 (42.9%)	48 (45.7%)	68 (47.2%)	61 (43.9%)	253 (44.8%)
	Post-graduated	12 (6.8%)	2 (1.9%)	5 (3.5%)	5 (3.6%)	24 (4.2%)
	Master's degree	50 (28.2%)	25 (23.8%)	24 (16.7%)	44 (31.7)	143 (25.3%)
	P.h.D/Post P.h.D	12 (6.8%)	15 (14.3%)	9 (6.3%)	10 (7.2%)	46 (8.1%)
Employment status		**Cluster 1**	**Cluster 2**	**Cluster 3**	**Cluster 4**	**Total**
	Unemployed	12 (6.8%)	3 (2.9%)	8 (5.6%)	3 (2.2%)	26 (4.6%)
	Student	28 (15.8%)	11 (10.6%)	20 (13.9%)	13 (9.4%)	72 (12.8%)
	Retired	1 (0.6%)	3 (2.9%)	2 (1.4%)	0 (0.0%)	6 (1.1%)
	Employed	108 (61%)	67 (64.4%)	92 (63.9%)	103 (74.1%)	370 (65.6%)
	Selfemployed	28 (15.8%)	20 (19.2%)	22 (15.3%)	20 (14.4%)	90 (16%)
	Total	177 (100%)	104 (100%)	144 (100%)	139 (100%)	564 (100%)
Professional occupation		**Cluster 1**	**Cluster 2**	**Cluster 3**	**Cluster 4**	**Total**
	Farmers and workers in agriculture and fisheries	0 (0.0%)	1 (1.2%)	0 (0.0%)	0 (0.0%)	1 (0.2%)
	Specialists in intellectual and scientific professions	15 (10.7%)	18 (21.4%)	8 (7.8%)	16 (13.7%)	57 (12.8%)
	Facility and machinery workers	1 (0.7%)	1 (1.2%)	0 (0.0%)	2 (1.7%)	4 (0.9%)
	Administrative staff	13 (9.3%)	6 (7.1%)	7 (6.8%)	7 (6.0%)	33 (7.4%)
	Service personnel and sellers	33 (23.6%)	17 (20.2%)	24 (23.3%)	16 (13.7%)	90 (20.3%)
	Technological professionals	36 (25.7%)	22 (26.2%)	35 (34%)	46 (39.3%)	139 (31.3%)
	Entrepreneurial professionals	3 (2.1%)	1 (1.2%)	7 (6.8%)	6 (5.1%)	17 (3.8%)
	Senior managers and managers	15 (10.7%)	4 (4.8%)	6 (5.8%)	10 (8.5%)	35 (7.9%)
	Intermediate level technicians	21 (15%)	11 (13.1%)	11 (10.7%)	12 (10.3%)	55 (12.4%)

and professionals					
Unskilled workers	3 (2.1%)	3 (3.6%)	5 (4.9%)	2 (1.7%)	13 (2.9%)
Total	140 (100%)	84 (100%)	103 (100%)	177 (100%)	444 (100%)

Age	**Cluster 1**	**Cluster 2**	**Cluster 3**	**Cluster 4**	**Total**
18-25	17 (9.6%)	6 (5.7%)	21 (14.6%)	17 (12.2%)	61 (10.8%)
26-35	89 (50.3%)	54 (51.4%)	60 (41.7%)	76 (54.7%)	279 (49.4%)
36-45	42 (23.7%)	34 (32.4%)	43 (29.9%)	33 (23.7%)	152 (26.9%)
46-55	19 (10.7%)	7 (6.7%)	15 (10.4%)	10 (7.2%)	51 (9%)
56-75	10 (5.6%)	4 (3.8%)	5 (3.5%)	3 (2.2%)	22 (3.9%)
Total	177 (100%)	105 (100%)	144 (100%)	139 (100%)	565 (100%)

Table 14.

Travel motivations background variables

Descriptive Statistics

		Cluster Number of Case			
		1	2	3	4
TM11_ego_enhancement	N	177	105	144	139
	Minimum	2,50	2,00	3,00	2,50
	Maximum	5,00	5,00	5,00	5,00
	Mean	4,5381	4,1881	4,6267	4,4245
	Std. Deviation	0,52049	0,66124	0,44936	0,54727
TM12_self_steem	N	177	105	144	139
	Minimum	1,00	1,75	2,00	1,50
	Maximum	5,00	4,50	5,00	5,00
	Mean	3,2571	3,1405	3,6684	3,3417
	Std. Deviation	0,71976	0,70534	0,72651	0,71926
TM13_knowledge_seeking	N	177	105	144	139
	Minimum	3,00	2,83	2,33	2,50
	Maximum	5,00	5,00	5,00	5,00
	Mean	4,5612	4,3825	4,6100	4,3345
	Std. Deviation	0,44720	0,59688	0,45255	0,53255
TM14_relaxation	N	177	105	144	139
	Minimum	1,00	1,00	1,00	1,00
	Maximum	5,00	4,50	5,00	5,00
	Mean	2,4463	2,6762	2,9826	2,6691
	Std. Deviation	0,84230	0,72218	1,02787	0,95136
TM15_socialization	N	177	105	144	139
	Minimum	1,33	1,00	1,00	1,00
	Maximum	5,00	5,00	5,00	5,00
	Mean	3,0829	2,9778	3,6389	2,9856
	Std. Deviation	0,71291	0,75711	0,77600	0,73652
Valid N (listwise)	N	177	105	144	139

Chapter VI
Conclusions and implications

6.1 Discussion and results

To achieve the aim of the research which is to explore the potentials of ecogamification to promote sustainable urban tourism destinations on different stakeholders' perspectives, four specific objectives were outlined. The fulfillment of the specific objectives was obtained through the articles presented in chapters II, III, IV and V, in which the literature reviews, methodology and findings reflect the nature of each study.

The first article is focused on examines specific stakeholders - those positioned at the upstream side of the gamification process - and their perspectives concerning not only the benefits, but also the challenges of gamification. The qualitative-exploratory approach brought out interesting results in which some of the benefits ecogamification can bring, as well as the challenges both buyers and providers face to apply it in the tourism sector. On the one hand, the interviewees pointed out: (i) the lack of investment, (ii) the resistance to new technologies/ideas, (iii) the low eco-consciousness levels of tourists and (iv) the distraction from issues that matter are the main barriers they face when planning to sell or adopt ecogamified tools. On the other hand, six opportunities were identified, namely, the fact that it can be used to: (i) promote 'green' behavior and sustainable tourism, (ii) transmit complex information more easily through entertainment, (iii) reward users for good practices, (iv) improve engagement and the tourism experience, (v) reach new target groups and (vi) help avoid overtourism.

After identifying the benefits and challenges of gamification faced by buyers and providers, the relevance of investigating the segment the profile of tourism-related players that fit in as potential users of ecogamified services, aiming at bringing results that show, both providers and buyers, their own true needs, and interests. We started the investigation in this perspective through a theoretical study, in which the second article presented in this thesis focused on theoretically investigating the points of contact between the literature on tourist segmentation and typologies facing sustainability and the literature on game user typologies. From this intersection, it was possible to speculate levels of probability of receptivity to gamification by tourist typology in terms of sustainability and game user typology. Also, a framework and a set of theoretical propositions are built around six categories of analysis that correspond to factors such as sociodemographic profile, behavioral profile, environmental travel behavior, personal motivation, travel motivation and game elements.

The output of the previous study inspired the next empirical investigation, which focused on examining how home and travel environmental behaviour, travel motivations, types of entertainment (digital and non-digital) and technology proficiency (professional vs non-professional) influence the receptivity of urban tourists to different game elements in a transport & mobility context. The study carried out a qualitative experiment with focus groups, with a total of 16 urban tourists. The software webQDA was used to systematize and categorize data and to analyse the content. Overall, the study suggest that the groups are cohesive in their travel motivations. That is, when it comes to urban tourism, participants are mainly looking for gastronomy, relaxing, learning about the history and the culture of the place, shopping, and partying. Thus, we can note that the tourist practices valued by respondents are typical of urban destinations and are important to understand the urban tourists' preferences and receptivity to ecogamification apps.

Regarding the factor type of entertainment, the study suggests that some tourists have preference for digital (playing online games and watching YouTube) and non-digital (going to the cinema and reading physical books) types of entertainment says exactly what tourists' value during their spare time. Knowing these preferences can be strategic and fundamental to know how to attract the attention of urban tourists in ecogamified applications.

The technology proficiency factor, we noticed that having technological proficiency implies differences in terms of interactions regarding the points and reward system, which some respondents takes more seriously than others. Interactions with others game elements, technological proficiency makes no difference. Regarding the factor home environmental behaviour some respondents use technology to support their daily environmental practices (e.g., having automated lamp systems at home), others are more concerned with conscious consumption in general, (e.g., buying local products).

Concerning travel environmental behaviour, some respondents suggested more trivial environmental sustainability behaviours (as recycling, reusing towels) whereas others suggested going beyond the trivial behaviour, presenting themselves as more sensitive to socio-environmental sustainability issues (e.g., avoiding large hotels and massive tourist destinations). Therefore, in the context of transport and mobility, the factors home-travel environmental behaviour can be considered as influencing urban tourists' receptivity to ecogamification apps, as they are directly related to the core of ecogamification, which is promoting environmentally sustainable behaviours, applied in this research to the context of transport and mobility.

Concerning how urban tourists interact with different game elements, this study suggests that the differences and similarities of interactions does not depend solely on the type of game element implemented in the tool. In fact, it is important for participants to understand the purpose of game elements and its coherence to their preferences, needs and wishes. Finally, the study indicates several app strengths and weaknesses. Five key app strengths were identified collaboration, ease of use, reward, interaction, and many functionalities in a single app. As for app weakness, the main four were excessive notifications, paying to use the app, low ratings, or evaluations by tourists and, information privacy concerns. That result reinforces the importance and need to understand what urban tourists really like or dislike in relation to ecogamification applied to transport & mobility services. It will only be possible to design services that attract attention and engage tourists in the long term through such type of information.

Finally, the last exploratory empirical study aims to perceive different types of urban tourists' receptivity to ecogamification, considering their perceptions towards mobility & transport applications, environmental behaviour on holiday, and types/need for entertainment. It follows a segmentation approach, using a self-administered online questionnaire. The data derived from 572 respondents who were over 18 years old and have travelled to urban destinations in the past 3 years and were analysed through a combination of non-hierarchical and hierarchical cluster analyses. From the analysis, four clusters of urban tourists with different types of receptivity to ecogamification was identified.

Cluster 1 (Mobi Wholeheartedly) revealed full commitment to environmental travel behaviour. Cluster 2 Mobi Whatever demonstrates neutral responses on some of the clustering measures as perceived of utility and ease of use for mobility & transport app, neutral towards environmental issues and similar to cluster 1, presents low need for entertainment while travelling. Cluster 3 Mobi Profiter, is openness to explore and enjoy all the experiences around them. Revealed highest level of perceived value in terms of usefulness, ease of use and enjoyment for mobility & transport app. On holiday, tourists despite favorable environmental behaviours, sometimes take a break from being strictly careful with the effects of their activities, suggesting that the travel contexts may distract this audience from their environmental responsibilities at the destination. They get very bored unless there is something entertaining to do on holiday (need for finding new forms of entertainment). Cluster 4 Mobi Utilitarian, revealed high score in the perceived usefulness and ease of use mobility & transport apps and low and neutral scores in other

factors as types/diversity of entertainment, need for entertainment and tourists' social responsibility.

This analysis contributed to understanding different types of receptivity to ecogamified mobility & transport apps since it helps tourism institutions and agents, namely destination marketing organizations (DMOs) and providers of ecogamified services to develop effective and customized strategies to attract and engage urban tourists. This study provides a framework of potential strategies to be targeted by tourism institutions and agents with the ecogamified mobility & transport app.

Following are the main strategies: Mobi Wholeheartedly - design mobility & transport apps with purpose of use and easier to use, creating transformative engagement through ludic learning system (edutainment) to promote sustainable attitudes and behaviours (e.g., suggesting green transport options at the destination by using meaningful choices), focusing on games elements dynamics based on emotions, narratives and relationships (e.g., social networks, fantasy and discovery) and develop recognition systems with appropriate intrinsic rewards (e.g., a simple "thank you" / social recognition). Mobi Whatever - ensure the mobility & transport apps focus is the purpose to use and fluidity instead of fun elements, attract the tourist's attention by participatory activities that push for entrepreneurial skills such as challenges and determination (e.g., levels or progression), consider not focusing on play-based gamification elements and develop recognition systems with appropriate intrinsic rewards (e.g., the more they use transport with less Co2 emissions, and if they travel more on foot, the more discounts in accommodations or restaurants). Mobi Profiter - design mobility & transport apps focused on fluidity, usefulness and excellent playfulness mechanisms, attract the tourists attention and promote sustainable attitudes and behaviours on destination through play-based ecogamification elements (avatars, social competition, virtual economy and collections), ensure the ecogamified system is focused on create connections between tourists (e.g., social networks/ status) and develop recognition systems with a balance of extrinsic/intrinsic rewards (e.g., providing vouchers while also displaying a big thank you note for choosing greener transport options). Mobi Utilitarian - ensure the mobility & transport apps focus is the purpose to use and fluidity instead of fun elements, promote the sustainable attitude and behaviour through feedback system with appropriate external motivations (e.g., badges or achievements, certificates, collection, rewards, or prizes), consider tourists capabilities with technologies and engage this kind of profile with

different ecogamified features (e.g., crosses augmented reality, artificial intelligence, and gamification) and carefully structure the fun game elements on the apps.

6.2. Contributions and implications of the study

Through a diversity of methodological approaches and crossing the perspective of different actors, this study contributes to a holistic view of the ecogamification process. At the same time, it presents new theoretical lenses and empirical evidence that open avenues for research on smart tourism, namely in terms of receptivity, preferences, and tourist segmentation.

This study has relevant theoretical implications, especially because it reaches answers to the gaps identified in the study, enriches existing frameworks in the literature, innovates by studying factors less explored in the literature that cross gamification, tourism, and sustainability and, explores hybrid research strategy with elements of experimental design. In addition to its theoretical relevance, this study offers different practical or empirical contributions. It is evident from the results of this study, a holistic view of ecogamification applied in the context of tourism, which integrates stakeholders further upstream and downstream. The access to the big picture of ecogamification process allows public sector tourism organizations, institutions, DMOs, private sector tourism organizations and tech and gamification companies specialised in develop effective and customized strategies to attract and engage urban tourists in sustainable behaviour on destionation.

In the pursuit of an integrative view of gamification for sustainable tourism, the study enriches the interpretative framework of Negrusa et al. (2015), by bringing an exploratory and empirical view about ecogamification in tourism in a more holistic way, by interpreting on one side through the eyes of the upstream stakeholders (buyers like touristic attraction, touristic accommodation, tourism, and government agency and providers like tech start-up and tech-company). And, on the other side, going through the eyes of the downstream stakeholders (like players/ urban tourists gamers and non-gamers, users and non-users of mobility & transport apps, with different levels of digital and non-digital entertainment and professional and non-professional technology proficiency). The major thesis' contribution is providing insights concerning the pratical role of these specific stakeholders in using ecogamification in a tourism context, adding an updated utility to the Negrusa et al. (2015) framework (see the image 14).

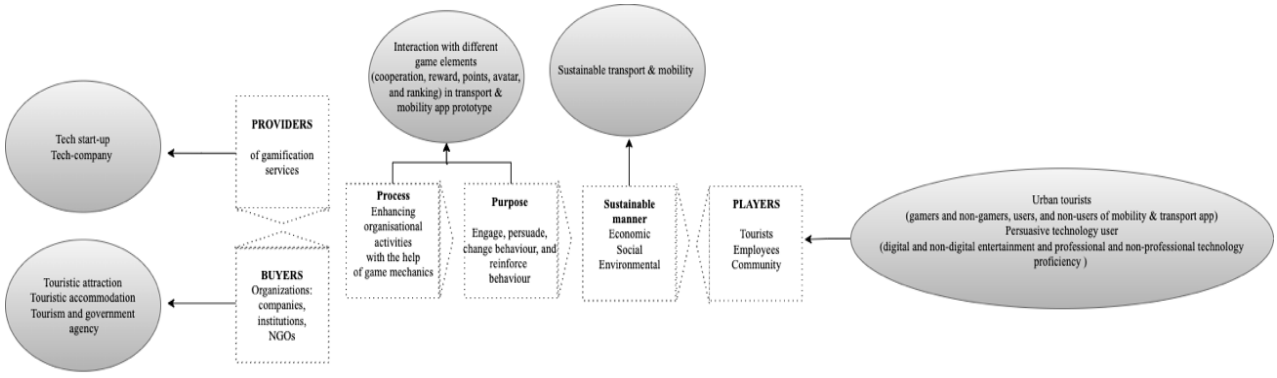

Figure 33. The mind map of a sustainable gamification process in tourism on upstream and downstream stakeholders
Sourse: Adapted from Negruşa et al., (2015)

Also, the finds of the study are in line with the conclusions of Pasca et al (2021) who, based on a systematic literature review, underline that despite the potential of gamification to support the co-creation of meaningful and customized experiences, a more user-centric strategy is needed. Besides, they are also aligned with the concept of human-centric design (Aebli, 2019) as a powerful means to engage tourists at deeper levels and more meaningful ways. Moreover, this study identifies a research gap on the potential for receptivity of urban tourists to ecogamification and contributes to the identification of factors that influence this receptiveness in order to distinguish tourists who are more and less receptive to ecogamified apps and to try to explain these differences. Furthermore, in contrast to previous research, which addresses the technology acceptance model (TAM) to study the intention to use smart tourism applications, this study innovates by combining the TAM with entertainment and environmental awareness. In doing this intersection, we shed light on a different approach to understand tourists' receptivity to ecogamification, which consequently contributes to elucidate different types, levels, and aspects of smart tourism that certain tourist segments might prefer.

Another theoretical contribution is related to travel motivations, which are considered, in previous studies, as an impactful variable to understand tourists' individual feelings and preferences about their experiences in the destination. However, our study shows it did not prove to be significant for receptivity to ecogamification. Probably, if the study is extended beyond urban tourists, results will be different. Finally, this study goes beyond just presenting levels of receptivity to ecogamification and presents how this receptivity happens. Besides, it explains how the personal factors and ecogamified

features work together to exert this propensity for using and want to use “ecogamified” products while on holiday and travelling. This set of theoretical contributions bring novelty to gamification literature.

This thesis presents contributions to the development of methodological strategies in the field of tourism. In this study, we explored hybrid research strategy with elements of experimental design based on qualitative and quantitative techniques. The study uses traditional data collection techniques such as interviews and questionnaires, but goes further, opting for the use of an online focus group with the use of a prototype of an ecogamified app in the context of mobility and transport, simultaneously showing how much fruitful can be the online field for tourism research and how enriching the use of prototypes in tourism research can be.

At the tourist level, this study addresses the lack of understanding about the segments of tourists who prefer/not prefer smart tourism, suggesting that understanding different types and levels of receptivity to ecogamification can help to understand different types and levels of receptivity to smart tourism. At the same time, the segmentation and typology based on the intersection between entertainment, technology and sustainability presented in this study may be interesting for smart tourism in general, with the potential to contribute to the solution of various problems related to sustainable behaviors that go beyond mobility & transport.

The finds also present practical implications for tourism destinations, gamification companies, tourism organizations and the local community. This study explores the benefits of ecogamification, but goes further and beyond, through an explicit focus on challenges. In short, it contributes towards a better understanding of ecogamification in tourism, through the eyes of buyers and providers, also providing insights regarding the role of these specific stakeholders and the relationship between them. Also, a deeper understanding of the challenges and benefits projected by developers and buyers can help design tailor-made ecogamified tools for destinations, increasing the likelihood of use by different audiences of environmental actions.

In addition, the factors analysed in this study lead to relevant differences and similarities among urban tourists’ receptivity to ecogamification. Marketers, tech companies, game developers and providers of ecogamified services could also benefit from such typology/segmentation to work on more efficient strategies and customized solutions. Finally, tourism institutions and agents should focus on strategies which generate value and improve the tourist experience at the destination.

The findings suggest that ecogamified mobility & transport apps are not just a generalist technological device. On the contrary, these applications might build on customized strategies for different segments of urban tourists. Simultaneously, we take the argument of D'Urso et al (2016, p.297) very seriously: "in postmodern tourism, the experiences of each tourist could not be summarized only through a unique perspective, but multiple and disjointed perspectives are necessary". In line of this argument, we are not suggesting that there are clear boundaries between the four clusters identified in this research, we reject deterministic classifications, and we are totally aware of the vagueness and fragmentation of postmodern tourists (D'Urso et al, 2016). Therefore, to provide realistic and useful managerial recommendations, it is important to interpret them as a multidimensional and holistic picture, with overlaps and contradictions.

The practical and theoretical implications resulting from this study clearly point to a practical application of ecogamification in the technological sector allied to the tourism industry, as well as in a higher-level domain of marketing. Thus, the study contributes by revealing examples of good ecogamification practices in promoting more sustainable tourism; the challenges and opportunities of (eco)gamification both buyers and providers face in order to apply it in the tourism sector; the factors that are crucial to influence the receptivity of urban tourists to different game elements in a transport & mobility context; finally, the profile of urban tourists with different types of potential receptivity to ecogamification.

With this set of information derived from the results of this study, both the technology and tourism sectors can identify the weaknesses of the current ecogamified services they offer and try to improve them, with the aim of being aligned with the real expectations of both the customer who enjoys this type of service as well as with those it has the potential to use. In addition, by better understanding the profile, motivations, and interactions of urban tourists with ecogamified services in the context of mobility & transport, tourism agents can demand from companies that develop ecogamification applications more strategic solutions related to their targets to achieve tools made the way.

Another important sectorial implication concerns the high propensity of tourists to use an ecogamified service in the context of mobility & transport on holidays, justifying that they are willing to interact in a different way, especially through persuasive applications of high performance and added value. Reaffirming that the offer needs to be fully synchronized with the desires and expectations of this tourist who is looking for

experiences that are not merely fun, but that are aggregating and valuable. As most of the buyers and providers investigated in this study are Small and Medium Enterprises (SMEs), implications can also be considered for this very valuable market share for the tourism industry, in which they can extract from the results of this study relevant insights on how the ecogamification has been used in the mobility & transport sector and transfer these ideas to other sectors such as restaurant and hospitality.

6.3 Limitations of the study

Although this thesis brings contributions in different perspectives, the results reported herein should be considered in the light of some limitations. The limitations of the study will be addressed considering the articles presented.

First limitation regarding the article that explored the opportunities and challenges of ecogamification in tourism, considering the perceptions of buyers from tourism-related institutions and technology providers, is theoretical limitation. The lack of literature on stakeholders positioned upstream in the gamification process, despite serving as an opportunity to identify new gaps in the literature, made it difficult to establish a holistic basis for understanding the research problem, making a comparative analysis with previous studies impossible, for example. The other limitation is methodological. As it is an exploratory study, the most appropriate strategy for this research was the qualitative one, as it allows for greater versatility and subjective speculation of the data, however, restricting to the qualitative research impacted the sample size and, consequently, does not allow this study to generalize its results.

Concerning the article that develop a theoretical approach based on an analysis of the points of contact between the literature on tourist segmentation and typologies facing sustainability and the literature on game user typologies, one of the limitations is that the analyzed game user typologies do not incorporate, by definition, those who are eventually not so receptive to gamified games or applications.

In relation to the article that examines how home and travel environmental behaviour, travel motivations, types of entertainment (digital and non-digital) and technology proficiency (professional vs non-professional) influence the receptivity of urban tourists to different game elements in a transport & mobility context, there were limitations related to the the time demanded for data transcription and analysis, as focus groups produce a lot of content, which translates into extra attention to avoid missing important content. Another limitation relates to the study results that should not be

generalized, because obtained opinions from a very small (16 participants) and very specific urban tourists' group (high profile IT related, teaching and advertising jobs, from three countries - Brazil, Columbia, and Portugal).

Finally, the study that perceive different types of urban tourists' receptivity to ecogamification, considering their perceptions towards transport & mobility applications, environmental behaviour on holiday, and types/need for entertainment, present limitations concerning the sampling strategy, future investigations could use probabilistic sampling. Also, the sample centered essentially on two countries, which potentially limits its applicability into other realities.

6.4 Suggestions for future research

Considering the limitations explained in the previous topic and to make the findings of this study reproducible in other realities, additional research is welcome.

Considering the potential and challenges explored in this study on ecogamification, future research is necessary in this area and should refine and operationalize tangible and expressive results in the field of ecogamification in the promotion of sustainable behaviour. Also, it might be interesting to undertake relevant research to segment the profile of tourism-related players that fit in as potential users of ecogamified services, aiming at bringing results that show, both providers and buyers, their own true needs, and interests.

While the results of this study may provide insights into which game elements might work better with different types of tourists, it is still unclear how ecogamification can be effectively used in the context of mobility & transport applications. Therefore, we suggest that future studies consider delving deeper into the concept of ecogamification and its applicability to the context of mobility & transport applications in tourism.

Future studies may contribute by using gamified questionnaire (focused on real ecogamified prototypes to capture live impressions from tourists) instead of the static online questionnaire. Also, future research may extend this approach by examining other criteria that improve this typology, including types of game elements and psychographic (personality traits and lifestyle) to provide a more detailed profile of the tourist preferences and behavior about gamification during travel.

Future studies can replicate the results identified in this thesis not only in the context of urban tourism, but in other contexts such as rural tourism. In which, they can potentially achieve results quite different from those identified in this study. Finally, this study was

based on Negruşa et al. (2015) mind map of a sustainable gamification process in tourism, in which despite this thesis having developed a prototype, the study was more focused on providers, buyers and players and less on the process, purpose and sustainable manner of gamification, so complementary studies should be centered in this part to understand better the types of ecogamification services, how the gamification services has been used to engage? Persuade? Change behaviour or reinforce behaviour? Understanding how deeply the ecogamification process has been applied in the context of tourism, can help to understand in deep different levels and ways of receptivity to ecogamified apps in the context of transport & mobility in tourism.

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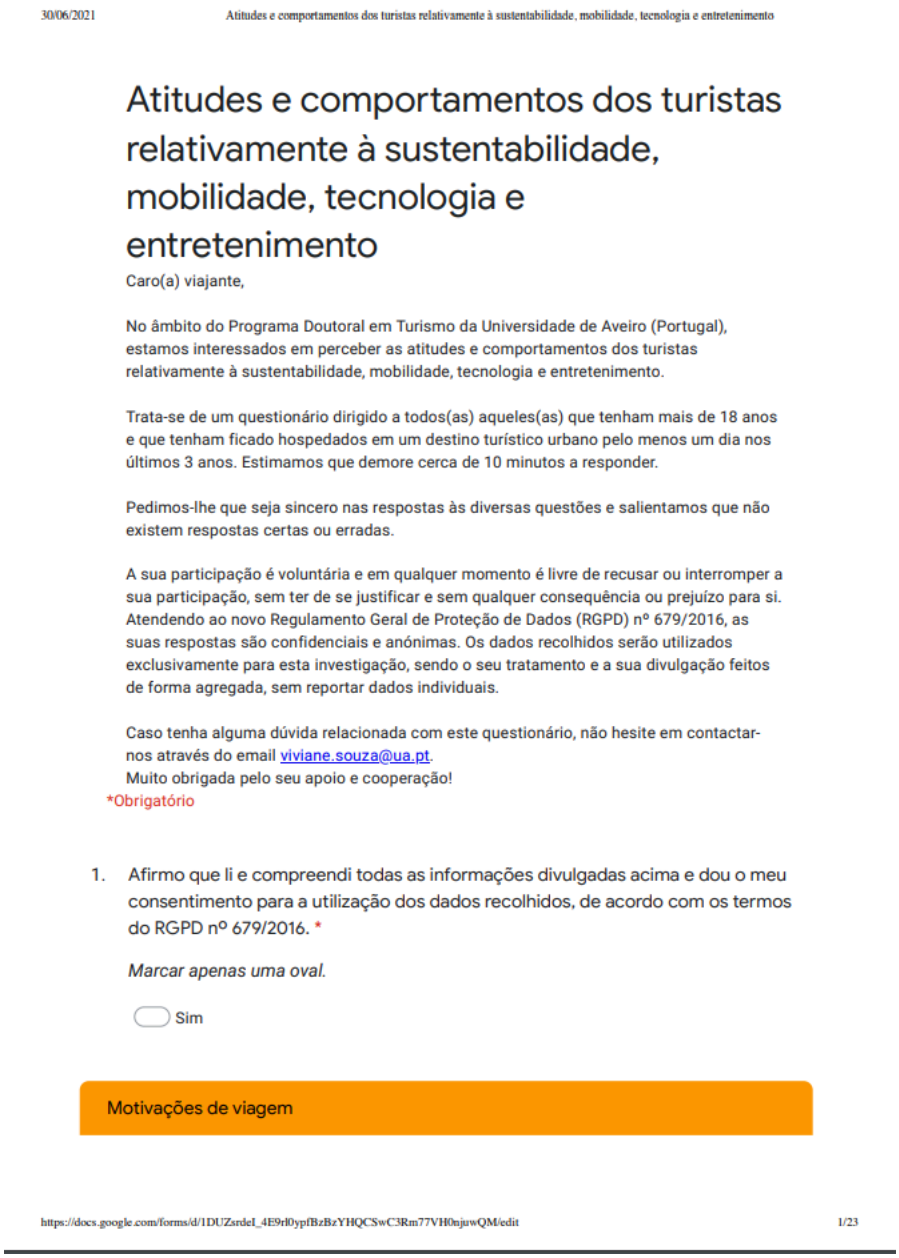
Appendices

Appendix 1

Questionário online com turistas urbanos, no contexto de um projeto de pesquisa de doutorado sobre: "Potencial receptividade à ecogamificação em mobilidade e transporte: uma tipologia de turistas urbanos baseada em sua relação com tecnologia, meio ambiente e entretenimento"
Universidade de Aveiro



30/06/2021 Atitudes e comportamentos dos turistas relativamente à sustentabilidade, mobilidade, tecnologia e entretenimento

Atitudes e comportamentos dos turistas relativamente à sustentabilidade, mobilidade, tecnologia e entretenimento

Caro(a) viajante,

No âmbito do Programa Doutoral em Turismo da Universidade de Aveiro (Portugal), estamos interessados em perceber as atitudes e comportamentos dos turistas relativamente à sustentabilidade, mobilidade, tecnologia e entretenimento.

Trata-se de um questionário dirigido a todos(as) aqueles(as) que tenham mais de 18 anos e que tenham ficado hospedados em um destino turístico urbano pelo menos um dia nos últimos 3 anos. Estimamos que demore cerca de 10 minutos a responder.

Pedimos-lhe que seja sincero nas respostas às diversas questões e salientamos que não existem respostas certas ou erradas.

A sua participação é voluntária e em qualquer momento é livre de recusar ou interromper a sua participação, sem ter de se justificar e sem qualquer consequência ou prejuízo para si. Atendendo ao novo Regulamento Geral de Proteção de Dados (RGPD) nº 679/2016, as suas respostas são confidenciais e anónimas. Os dados recolhidos serão utilizados exclusivamente para esta investigação, sendo o seu tratamento e a sua divulgação feitos de forma agregada, sem reportar dados individuais.

Caso tenha alguma dúvida relacionada com este questionário, não hesite em contactar-nos através do email viviane.souza@ua.pt.
Muito obrigada pelo seu apoio e cooperação!

*Obrigatório

1. Afirmo que li e compreendi todas as informações divulgadas acima e dou o meu consentimento para a utilização dos dados recolhidos, de acordo com os termos do RGPD nº 679/2016. *

Marcar apenas uma oval.

Sim

Motivações de viagem

https://docs.google.com/forms/d/1DUZsrdeI_4E9rl0ypfBzBzYHQCSwC3Rm77VH0njuwQM/edit 1/23

Por favor, leia cada uma das afirmações seguintes e responda de acordo com as suas preferências e motivações de viagem considerando a seguinte escala: 1- discordo totalmente a 5 – concordo totalmente.

2. 1. Quando regresso a casa, converso com outras pessoas sobre a minha viagem *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

3. 2. Gosto de falar sobre a minha viagem quando chego a casa *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

4. 3. Gosto de falar sobre os lugares que visitei e o que vi na viagem *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

5. 4. Durante a viagem assisto a eventos culturais aos quais não tenho acesso em casa *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

6. 5. A existência de bons restaurantes com comida de qualidade é um aspeto importante na escolha de um local de viagem *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

7. 6. Durante a viagem quero luxo, boa comida e um lugar confortável para ficar *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

8. 7. Quando viajo, penso que o tipo de alojamento a utilizar é realmente importante *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

9. 8. Quando viajo, é importante para mim ir a um lugar que esteja na "moda" *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

10. 9. Gosto de conhecer novas culturas *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

11. 10. É importante para mim conhecer diferentes culturas e diferentes modos de vida *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

12. 11. Gosto de ver como as outras pessoas vivem *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

13. 12. Quero descobrir lugares e atrações diferentes do lugar onde resido *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

14. 13. Há alguns lugares que sempre quis visitar *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

15. 14. Em viagem, gosto de experimentar a mesma vida/rotina que as pessoas locais *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

16. 15. Viajo só para descansar *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

17. 16. Uma viagem significa permitir-me não fazer nada *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

18. 17. Descansar e relaxar são suficientes numa viagem para mim *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

19. 18. Não defino previamente horários durante a minha viagem *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

20. 19. Uma viagem significa visitar os lugares de origem da minha família *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

21. 20. Durante a viagem quero conhecer novas pessoas e socializar *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

22. 21. É importante para mim passar tempo com a família e com os amigos durante a viagem *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

Comportamento ambiental em viagem

Por favor, leia cada uma das afirmações seguintes e reflita sobre as práticas ambientais que costuma adotar em viagem considerando a seguinte escala: 1- discordo totalmente a 5 – concordo totalmente.

23. 22. Apago as luzes quando não preciso delas *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

24. 23. Utilizo ar condicionado moderadamente e não a temperaturas extremas *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

25. 24. Não desperdiço água *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

26. 25. Reciclo produtos em papel (por exemplo, jornais, folhetos, revistas e cartão) *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

27. 26. Reciclo plástico e vidro *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

28. 27. Compro alimentos de origem biológica *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

29. 28. Compro alimentos em quantidade suficiente para consumir e evito o desperdício *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

30. 29. Ando a pé e / ou utilizo bicicleta como transporte sempre que possível *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

31. 30. Utilizo transportes públicos sempre que possível *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

32. 31. Encorajo outras pessoas a serem amigas do ambiente *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

33. 32. Os serviços e as infraestruturas das cidades para onde viajo dificultam a minha atuação de responsabilidade ambiental *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

34. 33. É difícil um visitante comportar-se de uma maneira ambientalmente responsável *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

35. 34. Quando estou de férias, não me preocupo tanto com os efeitos das minhas atividades no meio ambiente *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

36. 35. Sou responsável pelo meu comportamento ambiental mesmo quando as opções são limitadas *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

36. Mesmo quando visito outras cidades, continuo muito rigoroso(a) quanto ao impacto do meu comportamento no meio ambiente *

	1	2	3	4	5	
Discordo totalmente	○	○	○	○	○	Concordo totalmente

Após a secção 3 Continuar para a secção seguinte

Secção 4 de 7

Aplicações de transporte e mobilidade

Descrição (opcional)

Título d...

Por favor, leia cada uma das afirmações seguintes e reflita sobre a utilização de aplicações móveis de transportes e mobilidade considerando a seguinte escala: 1- discordo totalmente a 5 – concordo totalmente.

Descrição (opcional)

39. 38. Utilizar as aplicações de transportes e mobilidade permite-me conhecer mais locais da cidade que estou a visitar *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

40. 39. A utilização de aplicações de transportes e mobilidade aumentam a eficácia para encontrar atrações turísticas *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

41. 40. As aplicações de transportes e mobilidade são úteis quando viajo *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

42. 41. Utilizar as aplicações de transportes e mobilidade não me exige muito esforço mental *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

43. 42. As aplicações de transportes e mobilidade são fáceis de utilizar *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

44. 43. As aplicações de transportes e mobilidade são intuitivas e permitem-me utilizá-las como eu quiser *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

45. 44. É uma experiência interessante ter várias opções de transportes e mobilidade em aplicações durante a viagem *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

46. 45. Divirto-me ao utilizar aplicações de transportes e mobilidade *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

47. 46. É interessante procurar novas aplicações de transportes e mobilidade quando estou a viajar *

Marcar apenas uma oval.

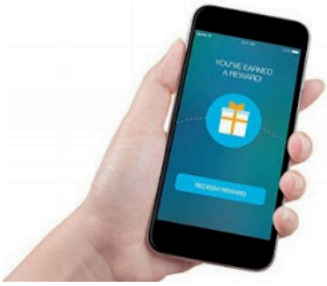
	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

48. 47. Compensa procurar novas aplicações de transportes e mobilidade quando estou a viajar *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

Preferências sobre aplicações de transporte sustentáveis e recompensas



49. 48. Quais das seguintes aplicações de mobilidade/transporte sustentável utiliza ou já utilizou? (Pode selecionar até 2 opções) *

Marcar tudo o que for aplicável.

- [ ] iTour
- [ ] Viaggia Roveretgoto
- [ ] EcoTrips
- [ ] Green Commuter
- [ ] AYR
- [ ] GIRA
- [ ] Uber green
- [ ] Ecooltra
- [ ] Acciona
- [ ] Nunca utilizei nenhuma aplicação de mobilidade/transporte sustentável

Outra: [ ] _____

50. 49. Que recompensa seria mais adequada para quem utiliza transportes/mobilidade sustentáveis durante a viagem? *

Marcar apenas uma oval.

- ◯ Um simples agradecimento já é suficiente
- ◯ Ganhar brindes e/ou souveniers
- ◯ Vouchers e descontos para futuras viagens (ex. hotéis, bilhetes aéreos, etc.)
- ◯ Vouchers e descontos para utilizar no destino (ex. museus, restaurantes, etc)
- ◯ Recompensa monetária
- ◯ Reconhecimento social
- ◯ Não penso que deva haver recompensa. Saber que contribuí para a sustentabilidade é suficiente.
- ◯ Outra: _____

Comportamento e atitude em relação ao entretenimento

Por favor, leia cada uma das afirmações seguintes e reflita sobre a frequência com que utiliza as formas de entretenimento descritas abaixo considerando a seguinte escala: 1- Nunca a 5 – Sempre.

51. 50. Utilizo a Internet para interesses sociais ou pessoais *

Marcar apenas uma oval.

	1	2	3	4	5	
Nunca	◯	◯	◯	◯	◯	Sempre

52. 51. Vejo televisão (TV, Computador, telemóvel) *

Marcar apenas uma oval.

	1	2	3	4	5	
Nunca	◯	◯	◯	◯	◯	Sempre

53. 52. Leio jornais (impressos, online) *

Marcar apenas uma oval.

	1	2	3	4	5	
Nunca	◯	◯	◯	◯	◯	Sempre

54. 53. Oiço música (Computador, telemóvel, Ipod, Ipad) *

Marcar apenas uma oval.

	1	2	3	4	5	
Nunca	◯	◯	◯	◯	◯	Sempre

55. 54. Leio livros (livros físicos, leitor de e-book online) *

Marcar apenas uma oval.

	1	2	3	4	5	
Nunca	◯	◯	◯	◯	◯	Sempre

56. 55. Leio revistas (impressas, online) *

Marcar apenas uma oval.

	1	2	3	4	5	
Nunca	◯	◯	◯	◯	◯	Sempre

57. 56. Vou ao cinema *

Marcar apenas uma oval.

	1	2	3	4	5	
Nunca	◯	◯	◯	◯	◯	Sempre

58. 57. Jogo videogames (PC, consola, telemóvel, online) *

Marcar apenas uma oval.

	1	2	3	4	5	
Nunca	◯	◯	◯	◯	◯	Sempre

59. 58. Oiço rádio *

Marcar apenas uma oval.

	1	2	3	4	5	
Nunca	◯	◯	◯	◯	◯	Sempre

60. 59. Pratico desporto *

Marcar apenas uma oval.

	1	2	3	4	5	
Nunca	◯	◯	◯	◯	◯	Sempre

61. 60. Vejo séries e filmes (TV, Computador, telemóvel, Ipad) *

Marcar apenas uma oval.

	1	2	3	4	5	
Nunca	◯	◯	◯	◯	◯	Sempre

Por favor, leia cada uma das afirmações seguintes e reflita sobre a sua relação com o entretenimento considerando a seguinte escala: 1- discordo totalmente a 5 – concordo totalmente.

62. 61. Quando viajo, fico muito entediado, a menos que haja algo divertido para fazer *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

63. 62. Eu preciso de algum tempo de entretenimento todos os dias *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

64. 63. Estou sempre em busca de novas formas de entretenimento *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

65. 64. Gosto de ter um papel ativo nas minhas atividades de entretenimento *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

66. 65. Sou muito seletivo quanto à forma como ocupo o meu tempo livre *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo totalmente	◯	◯	◯	◯	◯	Concordo totalmente

Perfil sociodemográfico

67. 66. Género *

Marcar apenas uma oval.

- ◯ Feminino
- ◯ Masculino
- ◯ Outro

68. 67. Indique o seu nível de escolaridade *

Marcar apenas uma oval.

- ◯ Ensino básico
- ◯ Ensino secundário
- ◯ Licenciatura
- ◯ Mestrado
- ◯ Doutoramento/Pós doc.
- ◯ Outra: _____

69. 68. Qual é a sua nacionalidade? *

_____

_____

_____

_____

_____

70. 69. Profissão *

Marcar apenas uma oval.

- ◯ Trabalhador conta de outrem
- ◯ Trabalhador conta própria
- ◯ Desempregado
- ◯ Reformado
- ◯ Estudante
- ◯ Outra: _____

71. 70. Atividade Profissional

72. 71. Idade *

Marcar apenas uma oval.

- 18 – 25
- 26 – 35
- 36 – 45
- 46 – 55
- 56 – 75
- + 75

73. Comentários:

Appendix 2

Questionnaire for urban tourists, within the context of a PhD research project regarding: "Potential receptivity to ecogamification in mobility & transport: A typology of urban tourists based on their relationship with technology, environment, and entertainment" University of Aveiro

Attitudes and behaviours of tourists towards sustainability, mobility, technology and entertainment

Dear traveler,

As part of the Doctoral Program in Tourism at the University of Aveiro (Portugal), we are interested in understanding the attitudes and behaviours of tourists regarding sustainability, mobility, technology and entertainment.

It is a questionnaire addressed to all those who are over 18 years old and who have stayed in an urban tourist destination for at least one day in the last 3 years. We estimate it takes about 10 minutes to fully answer it.

We ask you to be sincere in answering the various questions and we also point out that there are no right or wrong answers.

Your participation is voluntary and at any time you are free to refuse or interrupt your participation, without having to justify yourself and without any consequence or damage to you. In compliance with the new General Data Protection Regulation (GDPR) No. 679/2016, your responses are confidential and anonymous. The data collected will be used exclusively for this investigation, and its treatment and dissemination will be done in an aggregate manner, without reporting individual data.

If you have any questions related to this questionnaire, do not hesitate to contact us via email viviane.souza@ua.pt.

Thank you so much for your support and cooperation!

*Obrigatório

1. I affirm that I have read and understood all the information disclosed above and given my consent for the use of the data collected, in accordance with the terms of the RGPD No. 679/2016. *

Marcar apenas uma oval.

◯ Yes

Travel motivations

Please read each of the following statements and respond according to your travel preferences and motivations considering the following scale: 1- strongly disagree 5 - strongly agree

2. 1. When I go home, I talk to people about my trip *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

3. 2. I like to talk about my trip when I get home *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

4. 3. I like to talk about the places I've visited and the things I've seen on the trip *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

5. 4. While on trip, I attend cultural events that I don't have access to at home *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

6. 5. The availability of good restaurant and good food are important features when choosing a trip spot *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

7. 6. While on trip, I want luxury, nice food, and a comfortable place to stay *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

8. 7. I think the kind of accommodations you stay at on trip are really important *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

9. 8. It's important for me to go someplace fashionable on trip *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

10. 9. I like to visit foreign cultures *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

11. 10. It's important for me to experience different cultures and different ways of life *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

12. 11. I like to see how other people live *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

13. 12. I want to see the things that I don't normally see *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

14. 13. There are some places I have always wanted to visit *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

15. 14. On trip, I like to try the same routine/life locals have *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

16. 15. A trip means being able to not be doing anything *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

17. 16. The main thing for me on trip is just to slow down *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

18. 17. There should be no deadlines while on trip *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

19. 18. Just resting and relaxing is enough for me on trip *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

20. 19. A trip means visiting places where my family came from *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

21. 20. While on trip, I want to meet new people and socialize *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

22. 21. It is important for me to spend time with family and friends on trip *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

Environmental behaviour while traveling

Please read each of the following statements and reflect on the environmental practices you usually adopt while traveling, considering the following scale: 1- strongly disagree 5 - strongly agree

23. 22. Switch lights off when not in use *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

24. 23. Use air conditioners moderately rather than to extreme temperatures *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

25. 24. Save water *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

26. 25. Recycle paper products *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

27. 26. Recycle plastic, glass *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

28. 27. Buy organic food products *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

29. 28. Manage selection, quantity & timing of food purchases to reduce waste *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

30. 29. Walk and/or cycle where possible *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

31. 30. Use public transport where possible *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

32. 31. Encourage (or support) others to be environmentally friendly *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

33. 32. The facilities and infrastructure make it difficult to act in an environmentally responsible way *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

34. 33. It is difficult for a visitor to behave in an environmentally responsible way *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

35. 34. When I am on holidays I give myself a break from being strictly careful about the environmental effects of my activities *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

36. 35. I am responsible for my environmental behaviour even if my choices are limited as a tourist *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

36. I continue to be very vigilant about the impact of my behaviour on the environment even when visiting another city *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Após a secção 3 Continuar para a secção seguinte

Secção 4 de 7

Transport and mobility applications

Descrição (opcional)

Título d...

Please read each of the following statements and reflect on the use of mobile transport and mobility applications considering the following scale: 1- strongly disagree 5 - strongly agree

Descrição (opcional)

37. Using transport and mobility applications facilitates my mobility while traveling *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

39. 38. Using the transport and mobility applications allows me to get to know more places in the city I am visiting *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

40. 39. The use of transport and mobility applications increases the effectiveness of finding tourist attractions *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

41. 40. Transport and mobility applications are useful when traveling *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

42. 41. Using transport and mobility applications doesn't require much mental effort *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

43. 42. Transport and mobility applications are easy to use *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

44. 43. The transport and mobility applications are intuitive and allow me to use them however I want *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

45. 44. It is an interesting experience to have several transport and mobility options in applications while traveling *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

46. 45. I have fun using transport and mobility apps *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

47. 46. It's interesting to search for new transport and mobility applications when I'm traveling *

Marcar apenas uma oval.

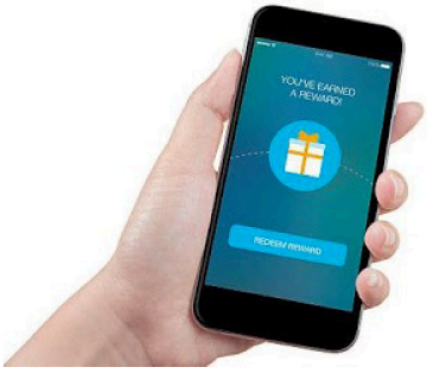
	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

48. 47. It is worth the effort to search for new transport and mobility applications when I'm traveling *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

Preferences for sustainable transportation applications and rewards



49. 48. Which of the following sustainable mobility / transport applications do you use or have used? (You can select up to 2 options) *

Marcar tudo o que for aplicável.

- [ ] iTour
- [ ] Viaggia Roveretgoto
- [ ] EcoTrips
- [ ] Green Commuter
- [ ] AYR
- [ ] GIRA
- [ ] Uber green
- [ ] Ecooltra
- [ ] Acciona
- [ ] I have never used any sustainable mobility / transport app

Outra: [ ] _____

50. 49. What kind of reward would be most suitable for those who use sustainable transport / mobility while traveling? *

Marcar apenas uma oval.

- ( ) A simple thanks is enough
- ( ) Gifts and / or souvenirs
- ( ) Vouchers and discounts for future trips (eg hotels, airline tickets, etc.)
- ( ) Vouchers and discounts to use at the destination (eg museums, restaurants, etc.)
- ( ) Monetary reward
- ( ) Social recognition
- ( ) I don't think there should be a reward. Knowing that I contributed to sustainability is enough.
- ( ) Outra: _____

Behaviour and attitude towards entertainment

Please read each of the following statements and reflect on the frequency with which you use the kinds of entertainment described below considering the following scale: 1- never 5 - always

51. 50. I use the Internet for social or personal interests *

Marcar apenas uma oval.

	1	2	3	4	5	
Never	◯	◯	◯	◯	◯	Always

52. 51. I watch television (TV, computer, mobile phone) *

Marcar apenas uma oval.

	1	2	3	4	5	
Never	◯	◯	◯	◯	◯	Always

53. 52. I read newspapers (printed, online) *

Marcar apenas uma oval.

	1	2	3	4	5	
Never	◯	◯	◯	◯	◯	Always

54. 53. I listen to music (Computer, mobile phone, Ipod, Ipad) *

Marcar apenas uma oval.

	1	2	3	4	5	
Never	◯	◯	◯	◯	◯	Always

55. 54. I read books (physical books, online e-book) *

Marcar apenas uma oval.

	1	2	3	4	5	
Never	◯	◯	◯	◯	◯	Always

56. 55. I read magazines (printed, online) *

Marcar apenas uma oval.

	1	2	3	4	5	
Never	◯	◯	◯	◯	◯	Always

57. 56. I go to the movies *

Marcar apenas uma oval.

	1	2	3	4	5	
Never	◯	◯	◯	◯	◯	Always

58. 57. I play video games (PC, console, cellphone, online) *

Marcar apenas uma oval.

	1	2	3	4	5	
Never	◯	◯	◯	◯	◯	Always

59. 58. I listen to the radio *

Marcar apenas uma oval.

	1	2	3	4	5	
Never	◯	◯	◯	◯	◯	Always

60. 59. I practice sports *

Marcar apenas uma oval.

	1	2	3	4	5	
Never	◯	◯	◯	◯	◯	Always

61. 60. I watch series and movies (TV, Computer, cellphone, Ipad) *

Marcar apenas uma oval.

	1	2	3	4	5	
Never	◯	◯	◯	◯	◯	Always

Please read each of the following statements and reflect on your relationship with entertainment considering the following scale: 1- strongly disagree 5 - strongly agree.

62. 61. When traveling, I get very bored unless there is something entertaining to do *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

63. 62. I need some entertainment time each and every day *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

64. 63. I am always on the lookout for new forms of entertainment *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

65. 64. I like to take an active role in my entertainment activities *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

66. 65. I am very selective about how I spend my free time *

Marcar apenas uma oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

Sociodemographic profile

67. 66. Gender *

Marcar apenas uma oval.

- ◯ Female
- ◯ Male
- ◯ Other

68. 67. What is your level of education? *

Marcar apenas uma oval.

- ◯ Elementary school
- ◯ High school
- ◯ Undergraduate
- ◯ Master's degree
- ◯ P.h.D/Post P.h.D
- ◯ Outra: _____

69. 68. What's your nationality? *

_____

_____

_____

_____

_____

70. 69. What is your employment status? *

Marcar apenas uma oval.

- ◯ Employed
- ◯ Selfemployed
- ◯ Unemployed
- ◯ Retired
- ◯ Student
- ◯ Outra: _____

71. 70. What's your professional activity?

72. 71. Age *

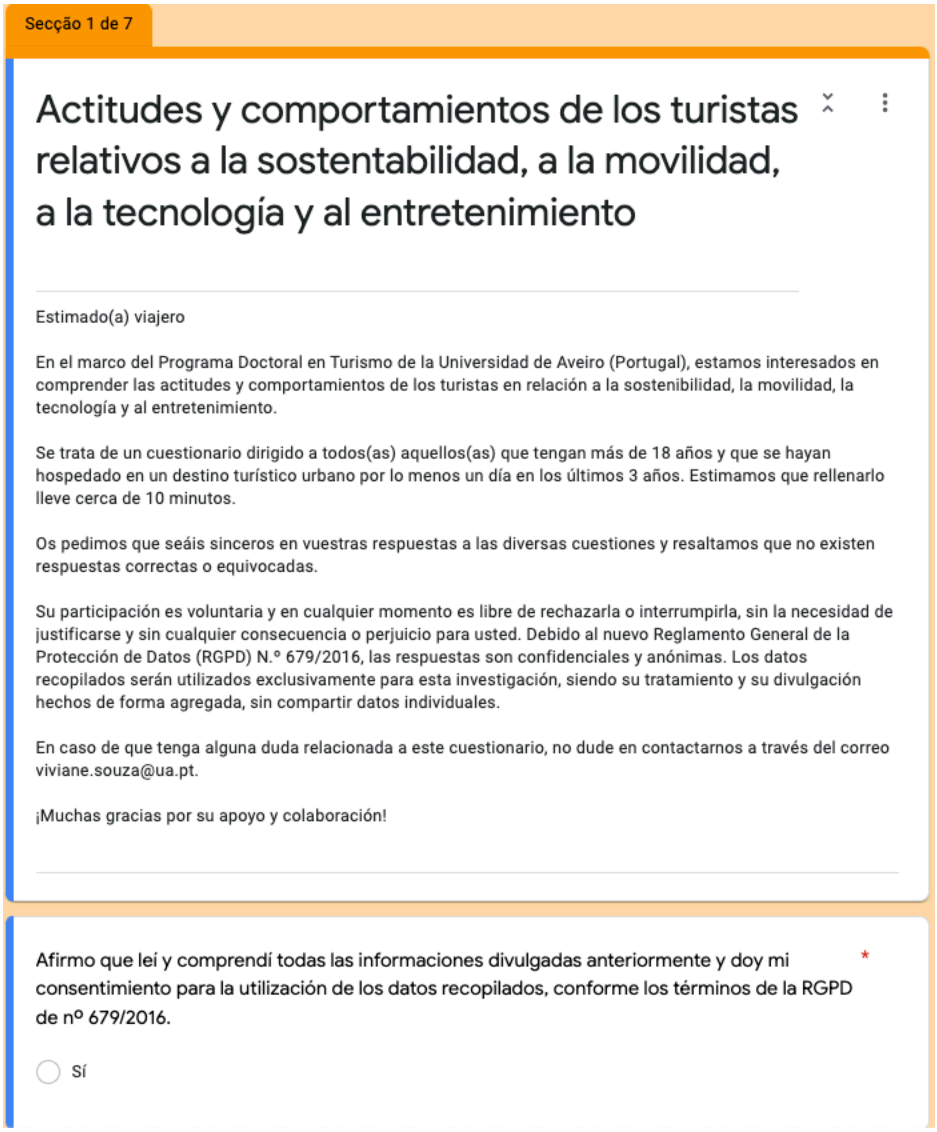
Marcar apenas uma oval.

- 18 – 25
- 26 – 35
- 36 – 45
- 46 – 55
- 56 – 75
- + 75

73. Comments:

Appendix 3

Cuestionario en línea con turistas urbanos, en el contexto de un proyecto de investigación de doctorado sobre: “Receptividad potencial a la ecogamificación en movilidad y transporte: una tipología de turistas urbanos basada en su relación con la tecnología, el medio ambiente y el entretenimiento”
Universidad de Aveiro



Secção 1 de 7

Actitudes y comportamientos de los turistas relativos a la sostentabilidad, a la movilidad, a la tecnología y al entretenimiento

Estimado(a) viajero

En el marco del Programa Doctoral en Turismo de la Universidad de Aveiro (Portugal), estamos interesados en comprender las actitudes y comportamientos de los turistas en relación a la sostenibilidad, la movilidad, la tecnología y al entretenimiento.

Se trata de un cuestionario dirigido a todos(as) aquellos(as) que tengan más de 18 años y que se hayan hospedado en un destino turístico urbano por lo menos un día en los últimos 3 años. Estimamos que rellenarlo lleve cerca de 10 minutos.

Os pedimos que seáis sinceros en vuestras respuestas a las diversas cuestiones y resaltamos que no existen respuestas correctas o equivocadas.

Su participación es voluntaria y en cualquier momento es libre de rechazarla o interrumpirla, sin la necesidad de justificarse y sin cualquier consecuencia o perjuicio para usted. Debido al nuevo Reglamento General de la Protección de Datos (RGPD) N.º 679/2016, las respuestas son confidenciales y anónimas. Los datos recopilados serán utilizados exclusivamente para esta investigación, siendo su tratamiento y su divulgación hechos de forma agregada, sin compartir datos individuales.

En caso de que tenga alguna duda relacionada a este cuestionario, no dude en contactarnos a través del correo viviane.souza@ua.pt.

¡Muchas gracias por su apoyo y colaboración!

Afirmo que leí y comprendí todas las informaciones divulgadas anteriormente y doy mi consentimiento para la utilización de los datos recopilados, conforme los términos de la RGPD de nº 679/2016. *

Sí

Motivaciones para el viaje

Por favor, lea cada una de las afirmaciones siguientes y conteste de acuerdo con sus preferencias y motivaciones del viaje teniendo en cuenta la siguiente escala: 1 - Totalmente en desacuerdo a 5- Totalmente de acuerdo.

1. Cuando vuelvo a casa, hablo/converso con otras personas sobre mi viaje *

	1	2	3	4	5	
Totalmente en desacuerdo	◯	◯	◯	◯	◯	Totalmente de acuerdo

2. Me gusta hablar sobre mi viaje cuando llego a casa *

	1	2	3	4	5	
Totalmente en desacuerdo	◯	◯	◯	◯	◯	Totalmente de acuerdo

3. Me gusta hablar sobre los lugares que he visitado y lo que vi en el viaje *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

4. Durante el viaje asisto a eventos culturales a los cuales no tengo acceso en casa *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

5. La existencia de buenos restaurantes con comida de calidad es un aspecto importante a la hora de elegir un destino de viaje *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

6. Durante el viaje quiero lujo, buena comida y un lugar cómodo para alojarme *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

7. Cuando viajo, pienso que el tipo de alojamiento que voy a utilizar es realmente importante *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

8. Cuando viajo, es importante para mi ir a un lugar que esté de "moda" *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

9. Me gusta conocer nuevas culturas *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

10. Para mi es importante conocer diferentes culturas y diferentes estilos de vida *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

11. Me gusta ver como viven otras personas *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

12. Quiero descubrir lugares y atractivos diferentes del lugar donde resido *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

13. Hay algunos lugares que siempre quise visitar *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

14. De viaje, me gusta experimentar la misma rutina que las personas locales *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

15. Viajo solamente para descansar *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

16. Un viaje significa permitirme no hacer nada *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

17. Para mi, descansar y relajarme son suficientes en un viaje *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

18. No defino previamente horarios durante mi viaje *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

18. Un viaje significa visitar los lugares de origen de mi familia *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

20. Durante el viaje quiero conocer nuevas personas y socializar *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

21. Para mi es importante pasar tiempo con la familia y con los amigos durante el viaje *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

Anterior Seguinte Limpar formulário

Comportamiento ambiental de viaje

Por favor, lea cada una de las afirmaciones siguientes y reflexione sobre las prácticas ambientales que suele adoptar de viaje considerando la siguiente escala: 1- Totalmente en desacuerdo a 5- Totalmente de acuerdo

22. Apago las luces cuando no las necesito *

	1	2	3	4	5	
Totalmente en desacuerdo	◯	◯	◯	◯	◯	Totalmente de acuerdo

23. Utilizo el aire acondicionado moderadamente y no a temperaturas exageradas *

	1	2	3	4	5	
Totalmente en desacuerdo	◯	◯	◯	◯	◯	Totalmente de acuerdo

24. No desperdicio agua *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

25. Reciclo productos de papel (por ejemplo, periódicos, folletos, revistas y cartón) *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

26. Reciclo plástico y vidrio *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

27. Compro alimentos de origen biológico *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

28. Compro alimentos en la cantidad justa que voy a consumir y evito el desperdicio *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

29. Voy caminando y/o utilizo la bicicleta como medio de transporte siempre que es posible *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

30. Utilizo el transporte público siempre que es posible *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

31. Animo a otras personas a ser responsables con el medioambiente *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

32. Los servicios y las infraestructuras de las ciudades a donde viajo dificultan mi actuación responsable con el medioambiente *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

33. Es difícil para un turista comportarse de una manera medioambientalmente responsable *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

34. Cuando estoy de vacaciones, no me preocupo tanto con los efectos de mis actividades en el medio ambiente *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

35. Soy responsable con mi comportamiento ambiental incluso cuando las opciones son limitadas *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

36. Incluso cuando visito otras ciudades, sigo siendo muy riguroso con respecto al impacto de mi comportamiento en el medioambiente *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

Anterior Seguinte Limpar formulário

Aplicaciones de transporte y movilidad

Descrição (opcional)

Título d...

Por favor, lea cada una de las afirmaciones siguientes y reflexione sobre la utilización de aplicaciones móviles de transporte y movilidad considerando la siguiente escala: 1- Totalmente en desacuerdo a 5- Totalmente de acuerdo

Descrição (opcional)

37. La utilización de las aplicaciones de transporte y movilidad facilitan mi movilidad durante el viaje *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

38. Utilizar las aplicaciones de transporte y movilidad me permite conocer más lugares de la ciudad que estoy visitando *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

39. La utilización de aplicaciones de transporte y movilidad aumentan la eficacia para encontrar atracciones turísticas *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

40. Las aplicaciones de transporte y movilidad son útiles cuando viajo *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

41. Utilizar las aplicaciones de transporte y movilidad no me exige mucho esfuerzo mental *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

42. Las aplicaciones de transporte y movilidad son fáciles de utilizar *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

43. Las aplicaciones de transporte y movilidad son intuitivas y me permiten utilizarlas como yo quiero *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

44. Es una experiencia interesante tener varias opciones de transporte y movilidad en aplicaciones durante el viaje *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

45. Me divierto utilizando aplicaciones de transporte y movilidad *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

46. Es interesante buscar nuevas aplicaciones de transportes y movilidad cuando estoy viajando *

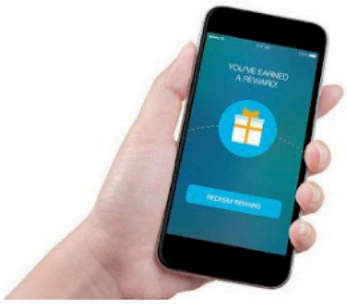
	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

47. Compensa buscar nuevas aplicaciones de transporte y movilidad cuando estoy viajando *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

Anterior Seguinte Limpar formulário

Preferencias sobre aplicaciones de transporte sostenibles y recompensas



48. ¿Cuál de las siguientes aplicaciones de movilidad/transporte sostenibles utilizas o has utilizado? (Puede seleccionar hasta 2 opciones) *

- [ ] iTour
- [ ] Viaggia Roveretgoto
- [ ] EcoTrips
- [ ] Green Commuter
- [ ] AYR
- [ ] GIRA
- [ ] Uber green
- [ ] Ecooltra
- [ ] Acciona
- [ ] Nunca he utilizado ninguna aplicación de movilidad/transporte sostenible
- [ ] Outra: _____

49. ¿Qué recompensa sería más adecuada para quién utiliza transporte/movilidad sostenibles durante el viaje? *

- ( ) Un simple agradecimiento ya es suficiente
- ( ) Ganar regalos y/o souveniers
- ( ) Vales y descuentos para futuros viajes (ej. hoteles, billetes, aéreos, etc)
- ( ) Vales y descuentos para utilizar en el destino (ej. museos, restaurantes, etc)
- ( ) Recompensa monetaria
- ( ) Reconocimiento social
- ( ) No creo que deba haber recompensa. Saber que he contribuido para la sostenilidad es suficiente
- ( ) Outra: _____

Anterior Seguinte Limpar formulário

Comportamiento y actitud en relación al entretenimiento

Por favor, lea cada una de las afirmaciones siguientes y reflexione sobre la frecuencia con que utilizadas las formas de entretenimiento descritas abajo considerando escala: 1- Nunca a 5- Siempre

50. Utilizo Internet para intereses sociales o personales *

	1	2	3	4	5	
Nunca	○	○	○	○	○	Siempre

51. Veo la televisión (TV, Ordenador, móvil) *

	1	2	3	4	5	
Nunca	○	○	○	○	○	Siempre

52. Leo periódicos (impresos, en línea) *

	1	2	3	4	5	
Nunca	○	○	○	○	○	Siempre

53. Escucho música (Ordenador, móvil, Ipod, Ipad) *

	1	2	3	4	5	
Nunca	○	○	○	○	○	Siempre

54. Leo libros (libros físicos, e-book en línea) *

	1	2	3	4	5	
Nunca	○	○	○	○	○	Siempre

55. Leo revistas (impresas, en línea) *

	1	2	3	4	5	
Nunca	○	○	○	○	○	Siempre

56. Voy al cine *

	1	2	3	4	5	
Nunca	○	○	○	○	○	Siempre

57. Juego a videojuegos (PC, consola, móvil, en línea) *

	1	2	3	4	5	
Nunca	◯	◯	◯	◯	◯	Siempre

58. Escucho la radio *

	1	2	3	4	5	
Nunca	◯	◯	◯	◯	◯	Siempre

59. Practico deporte *

	1	2	3	4	5	
Nunca	◯	◯	◯	◯	◯	Siempre

60. Veo series y películas (TV, Ordenador, móvil, Ipad) *

	1	2	3	4	5	
Nunca	◯	◯	◯	◯	◯	Siempre

Por favor, lea cada una de las afirmaciones siguientes y reflexione sobre su relación con el entretenimiento considerando la siguiente escala: 1- Totalmente en desacuerdo a 5- Totalmente de acuerdo

61. Cuando viajo, me aburro mucho, a menos que haya algo divertido que hacer *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

62. Yo necesito algo tiempo de entretenimiento todos los días *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

63. Estoy siempre buscando nuevas formas de entretenimiento *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

64. Me gusta tener un papel activo en mis actividades de entretenimiento *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

65. Soy muy selectivo con respeto a la forma en que ocupo mi tiempo libre *

1	2	3	4	5

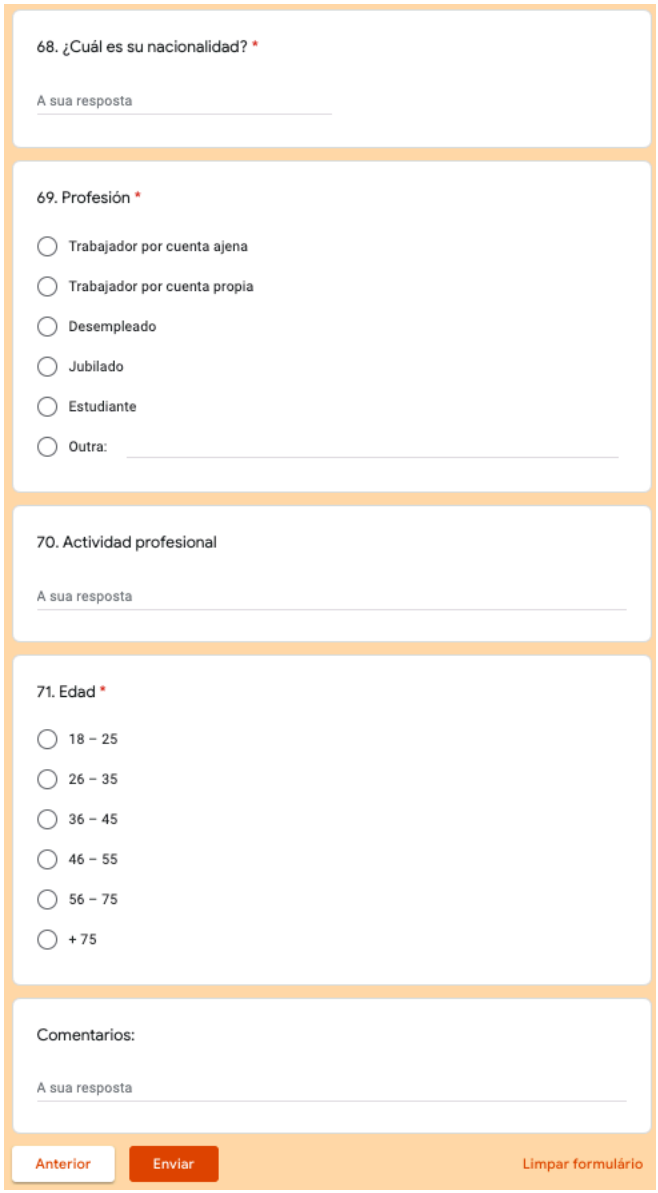
Perfil sociodemografico

66. Género *

- ◯ Femenino
- ◯ Masculino
- ◯ Otro

67. Indique su nivel de escolaridad *

- ◯ Enseñanza basica
- ◯ Enseñanza secundaria
- ◯ Licenciatura/Graduación
- ◯ Máster
- ◯ Doctorado/Pos doc.
- ◯ Outra: _____


68. ¿Cuál es su nacionalidad? *
A sua resposta
69. Profesión *
Trabajador por cuenta ajena
Trabajador por cuenta propia
Desempleado
Jubilado
Estudiante
Outra:
70. Actividad profesional
A sua resposta
71. Edad *
18 – 25
26 – 35
36 – 45
46 – 55
56 – 75
+ 75
Comentarios:
A sua resposta
Anterior
Enviar
Limpar formulário

Appendix 4

Interview guide with tourism buyers and technology providers, in the context of a PhD research project on: "How can gamification contribute to achieve SDGs? Exploring the opportunities and challenges of ecogamification for Tourism" Aveiro University

1- Qual o papel da empresa / instituição pública no que diz respeito aos mercados de turismo e / ou tecnologia?

2- Quais os tipos de serviços ecogamificados que os entrevistados fornecem ou precisam / compram?

3- Quais os principais benefícios e desafios no desenvolvimento / implementação de serviços ecogamificados?

4- Características sociodemográficas dos entrevistados

Appendix 5

Focus group guide with urban tourists, in the context of a PhD research project on: "Factors influencing urban tourists' receptivity to ecogamified applications: A study on transports and mobility"

Aveiro University

Guião de Discussão dos Grupos focais

1. **Saudação**

I. Boas-Vindas aos participantes

2. **Prefácio**

I. **Objetivo**

i. Este grupo de discussão tem como objetivo estudar o potencial de recetividade do turista urbano à ecogamificação, especialmente, identificar elementos do jogo que podem influenciar ou não a recetividade do turista urbano à ecogamificação.

II. Apresentação moderador

III. Referir as regras do grupo de discussão

i. Não existem respostas certas, nem erradas.
ii. Respeitar a opinião de todos.
iii. Permitir que todos possam partilhar as suas ideias.

IV. Explicar aos participantes as razões para a gravação da sessão

V. Criar um ambiente propício para que os participantes possam esclarecer as suas dúvidas

VI. Entregar e solicitar o preenchimento da declaração de presença dos participantes

VII. Entregar e solicitar o preenchimento da declaração de autorização de gravação de áudio e reprodução de imagem

3. **Participantes:**

Segmented by types of entertainment (digital and non-digital) and types of technology proficiency (professional vs non-professional)

4. **Questões**

Opening (5 min)

Antes de iniciarmos a discussão, gostaria que cada um de vocês, à vez, fizesse uma breve apresentação indicando o nome, a idade e como mais gosta de se entreter nos tempos livres

1. Quais são as principais motivações de viagem?
2. Sustentabilidade é um fator que consideram em viagem? Se envolvem em atividades? Se sim, quais?
3. Quando pensam em aplicações mobile de transportes/mobilidade, que tipo de associações fazem?

Introdução (5 min)

4. Que tipo de aplicações de transporte mobilidade costumam utilizar? O que vos faz (ou não faz) utilizar esse tipo de app? Se não utilizam nenhuma, porquê?

(10 min)

5. Na vossa opinião, o que é que uma aplicação de transporte/mobilidade deve oferecer ao seu utilizador?

Transição (3 min)

Apresentar o protótipo: 5 mim

6. O que acharam da ideia da app?
7. O que os motivariam a descarregar a app? Porquê?
8. Na vossa opinião, como é que aquilo que acabaram de ver poderia aumentar o envolvimento dos turistas urbanos na utilização de transportes sustentáveis?
9. Acham que uma aplicação direcionada para o contexto de mobilidade/transportes sustentáveis necessita de sistemas gamificados para envolver os turistas urbanos?
10. Quais as características do protótipo lhe chamaram a atenção (ganhar prémios, criar rotas, cooperar com outros turistas, o avatar, receber notificações, partilhar informações nas redes sociais, preocupações com a privacidade das informações do utilizador e etc…)? Porquê?
11. Em relação ao ranking com os utilizadores que escolheram opções de transporte mais sustentáveis, como é que se sentiria em ver seu nome entre as pessoas, que através das suas escolhas, contribuem para melhorar o problema da mobilidade nas cidades?
12. Em relação à cooperação, como se sente em saber que pode ajudar outros turistas ao reportar em tempo real o status sobre o trânsito e o meio de transporte/mobilidade que utilizou para chegar ao local que pretende visitar.

13. Em relação à privacidade das informações do utilizador, que medidas considera importante numa app de transporte/mobilidade para proteger melhor os seus dados pessoais (ex. impedir publicidade direcionada, desativar a opção de localização, não ter o login sempre feito pelas redes sociais, alterar as definições de privacidade da conta)

14. Quais os benefícios que considera serem mais valorizados nesse tipo de aplicação.

15. Esta foi o primeiro grupo de discussão realizado sobre este tema. Se têm alguma(a) sugestão(ões) que possibilite(m) melhorar futuras discussões, gostaríamos que a(s) partilhasse(m) connosco.

Appendix 6

Gamification as a research strategy to promote sustainable urban tourism[2]

Abstract

This study addresses the methodological avenues of a Ph.D. research aimed at exploring the potentials of gamification to promote sustainable urban tourism destinations. For that purpose, the thesis exposes an hybrid methodological strategy includes elements of experimental design divided into five research phases, of which the development of a gamified app prototype was a crucial part. Preliminary results indicate the benefits and constraints of using gamification as a valuable tool to promote pro-environmental behaviour and enhance sustainable practices at urban tourism destinations. Furthermore, the study reflects on the innovative methods that can contribute to a diversified methodological discussion in tourism management research. The present research is therefore intended to make contributions to the literature on a better understanding of the methodologies used in the scope of gamification and sustainable tourism. At the same time, it provides methodological insights into ways of using gamification as an essential part of the tourism research strategy.

Keywords: Tourism research; Experimental design; Gamification; Sustainability; Urban destinations.

[2] Souza, V., Marques., Veríssimo, M., Costa, C. (2020). Gamification as a Research Strategy to Promote Sustainable Urban Tourism. 20th European Conference on Research Methodology for Business and Management Studies: ECRM 2020. DOI:10.34190/ERM.20.132

1. Introduction

Sustainable tourism is characterized by “minimizing environmental and cultural damage, optimizing visitor satisfaction and maximizing long-term economic growth for the region where the activity is developed” (Isabel, Peña, Polo et. Al, 2012, p. 1047). Recent literature on tourism from the perspective of sustainability suggests that one of the biggest challenges for the future of tourism focuses on developing sustainable tourism effectively (Hall & Hall, 2016).

In fact, tourism faces daily challenges that may clash with the objectives of sustainable development. Uncontrollable external factors such as global warming, and internal pressures, as tourist’s excesses on destinations, show to be impediments to effectively achieve the Sustainable Development Goals (Hall, 2019; Scott et al., 2019). However, even though tourism issues may change depending on the context and the time-period, overcoming the problems of sustainability remains a critical, practical and theoretical topic for discussion.

The growing awareness on environmental issues together with the relevance of Information and Communication Technologies (ICTs), has led destinations, on a global scale, to invest in ICTs with the hope of minimizing tourism negative impacts. Consequently, technology has become a great ally of tourism in the process of finding solutions towards sustainability (Ali & Frew, 2013; Ratten et al., 2019). Considering technological tools point at diverse objectives, such as saving energy, reducing waste, and promoting conscious consumption and travel behaviours, they play an effective role in promoting tourism sustainability (Kim et al., 2020).

Within this context, gamification - which is the "use of game design elements in contexts not related to games" (Deterding, Dixon, Khaled, & Nacke, 2011, p.2) and ecogamification is a segmentation of the broader concept of gamification, characterized by the use of “game mechanics and experience design to engage and motivate individuals to achieve the environmental awareness goals” (Yen, 2015, p.1) - has been gaining relevance as one of the most promising ICT technologies. In tourism, gamification has proven to impact different areas, as it penetrates into all levels of the travel experience, and contributes to factors as entertainment and co-creation of tourist experiences; it also increases tourists’ interests in the destination (Xu et al., 2013, 2016, 2017c).

Many examples illustrate how important gamification has become and how it has been applied to tourism, especially in urban destinations (Weber, 2014). London, for example, launched the gamified app ‘Play London with Mr.Bean’ in 2017. It aimed at fighting overtourism, while helping people to discover lesser-known parts of the city and its surroundings, driving traffic to them and promoting local businesses (Elmqvist, 2020). Another example is the ‘Wasteapp’, a gamified application developed by an EU project and implemented in several European cities in order to promote tourists’ recycling behaviour (Aguiar-Castillo, 2018).

Hence, in the practical field, there is a growing number of successful cases of gamification applied to tourism. In the academic field, current literature demonstrates a considerable research increase on ICT, especially in the context of gamification and tourism (Kiráľová, 2015; Negruşa et al., 2015; Xu et al., 2016; Aguiar-Castillo et al., 2018; Aguiar-Castillo et al., 2019). In what concerns the intersection between gamification, tourism and sustainability, research is also increasing, but is still scarce (Souza, Marques and Veríssimo, 2020). In this specific domain, it is important to highlight that studies that seek an hybrid methodological strategy that merges elements of experimental design to verify the application of gamification and its effectiveness for more sustainable urban tourism, are not abundant. Given this gap, the present study aims to addresses the methodological paths of a Ph.D. research which goal is to explore the potential of gamification to promote sustainable urban tourism destinations.

2. Gamification applied to sustainable tourism research

Various research fields use experimental design methods in different disciplines such as psychology, computer science, education, environmental studies, management, etc. However, in most social sciences areas the presence of these studies remains low, despite the fact that it has been increasing in the past decade. Therefore, in hospitality and tourism literature, they are still especially scarce. According to Fong, Law, Tang and Yap (2016) it happens because researchers are unfamiliar with them. In their systematic literature review, Fong et al (2016) draw up the scenario of experimental research in hospitality and tourism studies, identifying that most of them are used to applying quasi-experiments and performing experiments, also relying on conventional analytical methods (i.e. scenario) and on analytical methods (e.g., ANOVA and t-tests). Many of the studies used to recur to students as research samples (usually around 30 subjects), mainly due to the difficulties in soliciting non-student samples to participate in experiments.

Even considering the existence of numerous gaps when it comes to the use of ICTS, it is notorious that they have been increasingly present in social sciences, including tourism, in the past few years. Therefore, they have contributed to the emergence of technological tools to support experimental research in those areas. Gamification, for example, has drawn the attention of academics, practitioners and business professionals in diverse domains, hence, it has been applied to theoretical and empirical studies, with or without experimental design (Seaborn & Fels, 2015). In that sense, some recent studies (from 2011 on) were analyzed in order to pave the way of the thesis in terms of methodology, bearing in mind that one of its goals is to apply gamification as a research strategy to achieve sustainability goals in tourism.

A brief review of the topics related to gamification applied to sustainable tourism studies (Figure 1), indicates that gamification is seen as a valuable tool for holding the power to

induce behavioural changes (Centieiro et al., 2011), to engage citizens, tourists and other stakeholders in a unique goal (Díaz et al., 2014), to contribute to destination marketing (Kiráľová, 2015) and to promote pro-environmental behaviour in several perspectives, such as waste management , energy consumption, and recycling (Aguiar-Castillo et al., 2019; Bardhan et al., 2016; Negruşa et al., 2015b; Ro et al., 2017).

Figure 1 Keywords word cloud
Source: The authors

Furthermore, the analysis confirms some points of Fong et al.'s (2016) study. Most of the analyzed studies are empirical and have tested gamified tools (whether apps or prototypes) by applying questionnaires as the main instrument for data collection. Although the use of mixed methods is recommended by many of the studies, just few of them recur to the use of complementary methods, as qualitative experiment with focus groups, interviews and participatory observation. In terms of data analysis, a miscellaneous of statistical tests are used, with an emphasis on inferential and multivariate techniques (e.g., multiple regression, MANOVA, CFA). Further details on the analyzed studies are systematized in Table 1:

Table 1 - Application of gamification in tourism and sustainability studies

Authors	Objective	Methods (Data collection & analysis)	Main results
(Centieiro et al., 2011)	To explore the use of a persuasive app to induce behaviour changes towards a better environmental consciousness through mobile phones and public displays.	Questionnaires applied with students in two rounds. Firstly, with 15 users and subsequently with 37; Descriptive Analysis.	A persuasive location-based multiplayer mobile game, which prompts people to recycle virtual objects located on a specific geographic area, in a fun and appealing way that can help to shape users' attitudes and

			behaviours towards a better environmental conscience.
(Díaz et al., 2014)	To report the use of a pervasive game to awaken the fantasy and curiosity of children about cultural heritage.	Questionnaire (82 students), semi-structured recorded interview (54 players), participatory observation (families and friends); Content analysis and descriptive statistics.	Gamification can be applied to education as well as entertainment. The Game awakens children's fantasy and curiosity by challenging their general knowledge and skills. It can also be used as an alternative activity to guide tourists around the central area of the city.
(Kiráľová, 2015)	To examine how gamification can be applied to tourism destination marketing.	Semi-structured interviews with 30 tourism stakeholders; Content analysis	Gamification can be used to attract visitors' attention, to arouse interest and to generate the desired behaviour when visiting a destination.
(Negruşa et al., 2015b)	To identify gamification techniques and applications used by organizations in the hospitality and tourism industry in order to improve their sustainable activities.	Multiple-case study of 37 gamified apps; Content analysis.	To aspire to a sustainable approach, gamification needs to not only tighten the relation between tourists and employees, but also to include the local community in the equation. Gamification can help to shift from a business-centric perspective of gamification to a truly sustainable one.
(Xu et al., 2016)	To explore the gamification trend and its potential for experience development and tourism marketing,	Four focus groups with 26 participants (Chinese university students);	Tourists' game playing motivation is multidimensional. Players tend to start with purposive information seeking, then, to move to an intrinsic

	besides analysing what drives tourists into playing games.	Thematic Analysis.	stimulation. Socialisation is also an important dimension.
(Bardhan et al., 2016)	To explore the use of persuasive technologies in which behaviour–oriented design techniques are employed to change users behaviour through persuasion and social influence.	Questionnaires with 168 respondents (students and other stakeholders) and prototype test with 70 school students; Descriptive statistics and CFA.	The results of the first-response experiment revealed the influence of persuasive game in the intent creation for waste segregation behaviour. The pilot deployment showed effectiveness and received positive feedback; users sought information on how to sustain this behaviour.
(Sailer et al., 2017b)	To investigate different game design elements, using an experimental study, in order to explain their specific effects on psychological need satisfaction.	Experiment with three controlled simulated environments and questionnaires with 499 users; Multivariate analysis of variance (MANOVA).	Badges, leader boards, and performance graphs positively affect competence need satisfaction, as well as perceived task meaningfulness, while avatars, meaningful stories, and teammates affect experiences of social relatedness. Perceived decision freedom, however, could not be affected as intended.
(Ro et al., 2017)	To develop a game-based behaviour intervention aimed at getting people to reduce their household energy consumption. The study was two-folded: (i) to test whether playing the game reliably decreases the electricity usage of employees in a commercial	Pre and post questionnaires Study 1: Phone interviews with 66 players (pre-game) and 45 (post-game) Study 2: questionnaires with 1909 employees from three companies;	It is possible to induce a long-term change of habits in the sustainability domain. It also shows that neither attitude change nor conscious implementation intentions are necessary for behaviour to change.

	construction firm, (ii) to focus on players' self-reports to assess whether there have been behavioural changes or not.	Regression analysis and correlations.	
(Mekler et al., 2017)	To investigate the effects of individual game design elements (points, leader boards, and levels) on the interplay between users' need satisfaction, intrinsic motivation and behaviour.	Online experiment (4 different scenarios) and questionnaires with 273 participants; Analyses of variance (ANOVA).	Points, levels and leader boards functioned as extrinsic incentives, effective in promoting performance quantity only.
(Aguiar-Castillo, 2018)	To evaluate the intention of using a gamified app based on premises such as expected benefits, expected threats, technical knowledge and personal features.	Survey with 79 experts (convenience sample of the experts who collaborate in the project); Exploratory factor analysis.	Only the expected social benefits and the perceived risks have a direct and significant influence on the intention to adopt the sustainability application based on gamification.
(Aguiar-Castillo et al., 2019)	To verify whether an ecogamified app can be a successful tool to promote recycling and enhance the destination's image.	Questionnaires with 141 tourists after using the app; Path equation modelling with AMOS.	The satisfaction of the user will influence the recycling behaviour, which, at the same time, improves the reputation of the destination. The expectations of the prizes can be counterproductive, though, if they are not perceived as useful for the promoted behaviour.

3. Research Design

This study addresses the methodological avenues of a Ph.D. research, which main goal is to analyse the potential receptivity of urban tourists to ecogamification. For that purpose,

this section describes in detail the exploratory research methodology and the construction of the study's research design (Figure 2). The methodology is underpinned on the theoretical concept of "research onion", proposed by Saunders, Lewis and Thornhill (2012) to describe the research methodology construction and to design the different research phases, as shown by Figure 3.

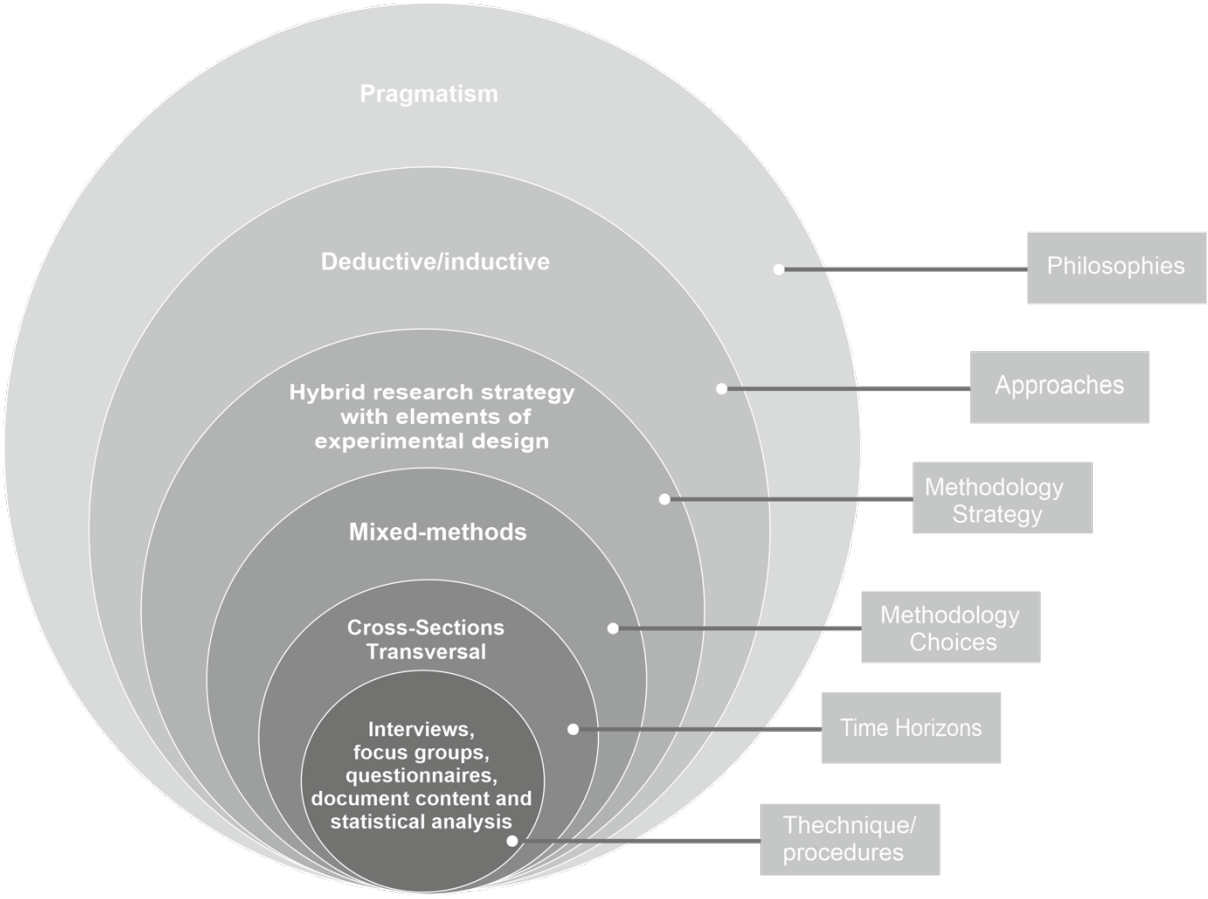


Figure 2 - Methodology construction and design (based on Saunders et al., 2012)
Source: The authors

- Philosophies – The study follows the pragmatic research paradigm, as according to Creswell (2009). The pragmatists' concern lies in the solution of problems, in which researchers are free to use different approaches to achieve the understanding and solution of the proposed problem.
- Approaches – According to Saunders et al. (2012) the deductive approach starts from the general to the specific, which involves literature review and experience, also basing its hypothesis on the theory random observations, in order to obtain a confirmation or rejection of the hypothesis. On the other hand, the inductive approach, which starts from the specific to the general, makes observations, finds patterns, creates hypotheses, exploring and validating them, forming a theory without hypotheses. This investigation adopts a deductive approach combined with some elements of the inductive approach.

- Strategy - It is related to the nature of the research question and objectives and to the coherence with the other elements of the research design, as the choice of its method (for example, survey, grounded theory, case study, experiment, etc.). In the social sciences, studies with an exploratory nature recurring to qualitative experiments can be applied to tourism. Besides, perspectives that explore elements of experimental design can be used to predict the impact that controlled changes may have on attitudes or behaviours (Díaz et al., 2014; Mekler et al., 2017; Sailer et al., 2017b). This investigation adopts an hybrid methodological strategy that merges elements of experimental design, which can be verified in more detail in the investigation phases, especially in phases III and IV.
- Choices - There are two types of choices: Mono-method (quantitative or qualitative) and multiple-method (multimethod or mixed-method) (Saunders et al., 2012). This study follows the mixed methods, considering that quantitative and qualitative research are combined in the research design, in a mixed and integrated way.
- Time horizon – it can be longitudinal or cross-sectional. The two methods are defined based on the research objectives, in which the first has as its principle a long data collection stage, whereas the second has as its premise a shorter data collection period. This research is cross-sectional, because it studies a phenomenon at a particular time.
- Techniques and procedures - it is characterized by data collection and analysis processes. This study used a miscellaneous of interviews, qualitative experiment with focus groups, questionnaires and document, content and statistical analysis. It was conducted in five different phases:

The first phase encompassed a literature review about the role of technology and the potential of gamification in the tourism field, as well as the relevance of pro-environmental behaviour in promoting sustainable tourism. The second phase covered the conduct of in-depth interviews with stakeholders, namely with potential buyers from tourism-related institutions and technology providers. The third phase comprised the design and prototype development of a gamified app, supported and validated by a panel of experts that included web developers, designers, and test engineers. The fourth and fifth phases, still in progress, will consist in conducting a qualitative experiment with focus groups and questionnaires with urban tourists. The development of an ecogamified app prototype is the key part of this study, as described in phase 3. Lisbon has been chosen as a case study since it is the capital of Portugal as well as a major urban destination. It has been recently struggling with the pressures of rapid tourism growth, resulting in overtourism that urges sustainable strategies in managing tourism in the city.

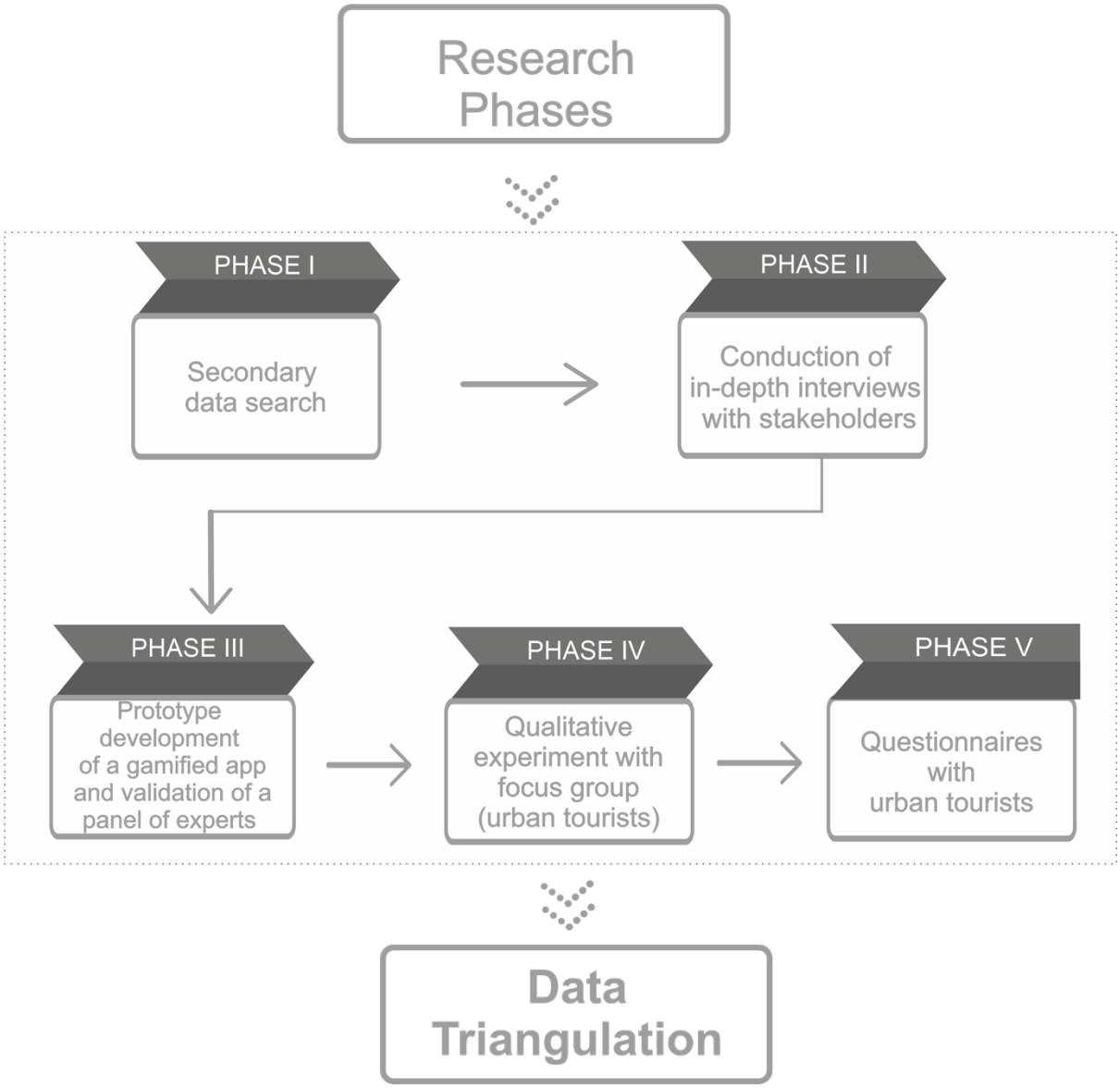


Figure 3- Phases of the research
Source: The authors

Phase I – Literature review

In this phase, secondary data, such as journals, articles, reports, websites, games, scientific journals, conference proceedings and specialized books were analysed. A literature review was carried out on central and transversal themes such as gamification, environmental sustainability, tourism and the environment, ecogamification, pro-environmental behaviour and technological strategies for sustainable tourism. For that purpose, online databases, such as SCOPUS and B-on were used to collect information, further analysed in Souza and Marques (2018). This phase was crucial for finding the research gaps and defining the research goals.

Phase II - Conduction of in-depth interviews with stakeholders

This phase aimed at identifying the opportunities and challenges that ecogamification may bring for tourism, considering the perspectives of the supply side. For that purpose, 10 semi-structured in-depth interviews were conducted with 7 buyers (from public and private sectors) and 3 providers from technology companies, in order to contextualize the emerging touristic and technological Portuguese context. The interviewees' selection followed the snowball sampling method, and the profiles suggested by others had been previously analysed in order to avoid bias. Data was collected from January to March 2018 through face-to-face interviews and had an average duration of 40 minutes, recorded with the interviewees' previous permission. The interviews were translated into English and evaluated through content analysis. The results of this phase are published in Souza, Marques and Veríssimo (2020).

Phase III - Prototype development and validation

This phase aimed at developing a prototype that facilitates users' perception about the gamification elements incorporated in a mobile application to sustainable tourism services. The prototype was built based on the suggestions of Morschheuser, Werder, Hamari and Abe (2017) in which the processes of project preparation follow the phases of analysis, ideation, design, implementation and evaluation. The ideation and design of the prototype were based on the inputs of phases I and II, while the implementation and evaluation referred to phases IV and V. The prototype development took into consideration the knowledge gained from literature review, besides buyers and providers' perspectives. In particular, those perspectives underline the potential of ecogamification to promote "green" behaviour, to transmit complex information through entertainment, to reward users for good practices, to improve engagement and to help avoiding overtourism. Additionally, the prototype included game design elements as cooperation, ranking, rewards and endorsement through an avatar.

The prototype was built using Adobe XD, which allows the creation of interactive prototypes that simulate the actual navigation of a mobile application, without the need to create the final product. After concluding the prototype, we consulted a set of experts from different areas including 5 web developers, 2 designers and 1 tester engineer, in order to offer inputs on the prototype. The experts evaluated its functionalities and consistency with the implemented gamification elements. The feedback was positive and most of their suggestions were incorporated. The experts also suggested the idea of naming the avatar as 'Greta Thunberg', the popular and young environmental activist, but, naturally, that idea will not be applicable. The final version is shown in the following images:

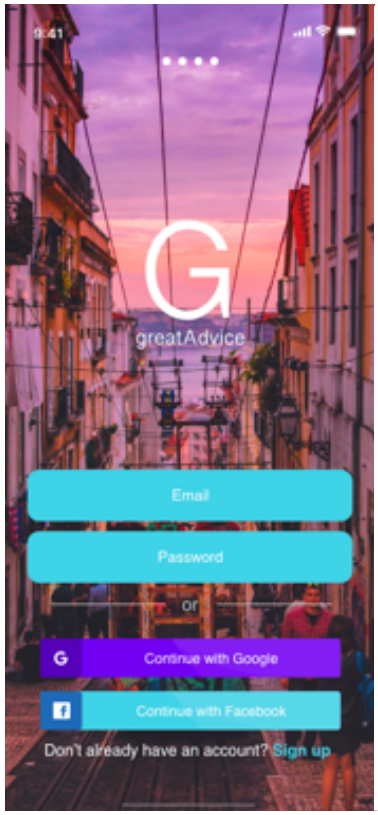


Figure 4 Login page

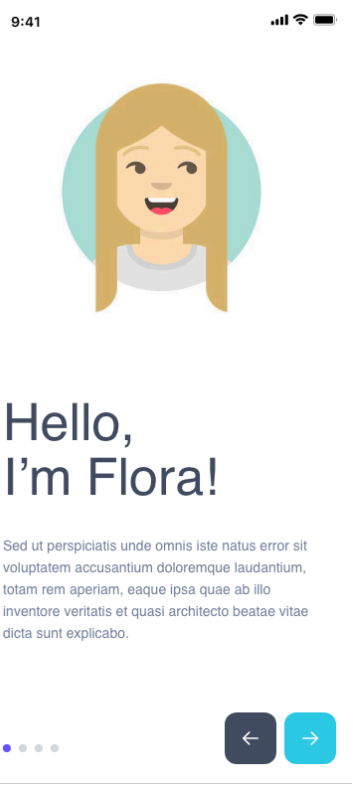


Figure 5 Avatar introduction

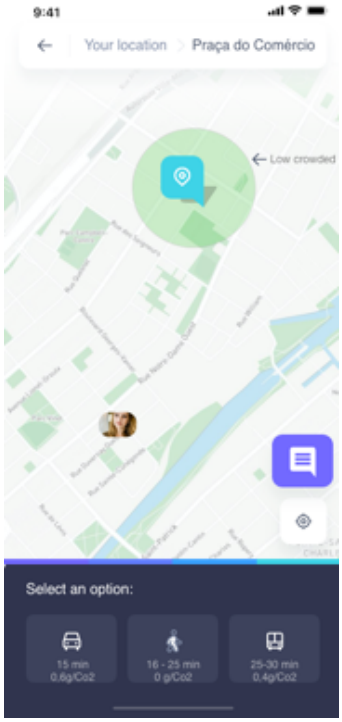


Figure 6 Route planning

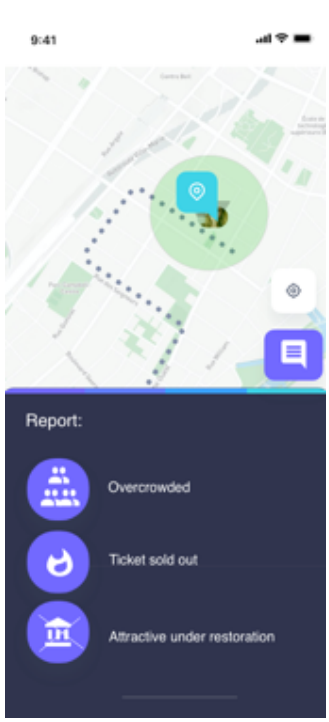


Figure 7 Route evaluation

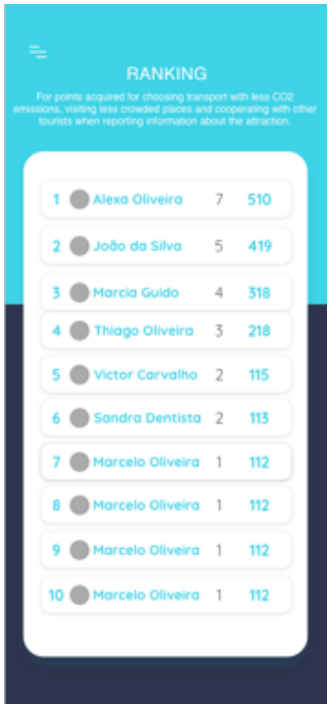


Figure 8 Ranking panel

Phase IV – Qualitative experiment with focus groups (urban tourists)

The main objective of phase IV is to assess the effective receptivity of tourists towards the ecogamified service. To achieve that purpose, a qualitative experiment method with focus groups will be held in order to verify to what extent the use of some game elements (e.g., cooperation, ranking, rewards and endorsement through an avatar) may contribute, or not, to increase the receptivity of urban tourist to ecogamification.

Qualitative experiment method is defined as an 'intervention on an (social) object to research its structure, that is, the exploratory and heuristic form of the experiment' (Kleining, 1986, p. 724). The method submits participant to a certain experiment (e.g., task, game or stimulus) with the aim of perceiving attitudes and behaviours (Kleining & Witt, 2001). Operations of this type have been applied to studies in social sciences to explore a certain daily life, without resorting to defined hypotheses and with semi-delimited research questions (Kleining & Witt, 2001; Semerci et. al., 2018). Simultaneously, the method allows an alliance with other qualitative methods, offering flexibility and dynamism for research.

Focus groups are considered a strategic way of measuring in depth attitudes, behaviours and opinions about a problem, product or service (Kumar, 2011). Freitas, Oliveira, Jenkins and Popjoy (1998) explain that there are advantages and disadvantages of using the technique. In one hand, it allows 1. collecting an adequate amount of data in a short period of time, 2. flexibility in collecting data that is not usually achieved when applying an instrument individually and 3. spontaneity of interaction between participants. On the other hand, it requires a better preparation of the site itself (where focus groups will take place) and an in-depth analysis of the results. Furthermore, applying a focus group technique can be a valuable complement to quantitative methods of research (Freitas et al., 1998). Therefore, it will be used in this study in sequence with phase 5, aiming at achieving similar and complementary goals.

Three focus groups - with about 6 participants each - are planned to be conducted with students of a higher education institution in Lisbon. During the sessions, the moderator will present the prototype, discuss with participants their perceptions on the use of ecogamification, and collect their impressions about the best design features for the ecogamified app applied to tourism. The sessions, initially planned to be conducted offline, will be transposed to the online environment considering the circumstances related to COVID-19. Due to that fact, the researchers will recur to the online platform focusgroupit.com to conduct sessions with an estimated duration of 1 hour and 30 minutes.

Phase V - Questionnaires with urban tourists

Phase V is the last phase of the research, and its main goal is to verify the potential receptivity of urban tourist to ecogamification and their intention of using the ecogamification service. Online questionnaires will be the data collection instrument of this phase, which are planned to be applied with tourists who had visited Lisbon in the past year. According to Hung and Law (2011), the application of online surveys offers some advantages for researchers, as they are efficient instruments with fast response time, that enables the possibility to reach hard-to-find target audiences and may offer a fun / novel / enjoyable experience. Basing the quantitative collection of data on internet surveys will allow the access to a wider range of respondents, with heterogeneous profiles and from different geographical areas.

The questionnaire is planned to be published on social media (with an emphasis on travellers groups and pages) through Google Forms, since the platform offers a friendly interface, it is free and it allows researchers to control the integrity of their research, reducing the levels of missing values in the responses. In the final survey, questions will be organized in four parts, which have as specific goals: (i) to identify respondents' environmental behaviour when travelling and at home, (ii) to verify their travel motivation; (iii) to determine their intention to use ecogamification while travelling and to draw up the game user profile and, (iv) to analyze their demographic profile. The questionnaire will include open and closed questions with multiple choice and 5 points Likert-type scales. For the statistical data analysis, the researchers will use the software SPSS to proceed to the descriptive and inferential analysis.

4. Discussions and conclusions

Among many practical and theoretical purposes of gamification, it can be referred as a strategic tool to support sustainable tourism development. With this in mind, the present article addressed the methodological steps defined in an on-going study that aimed at investigating the potential of gamification to promote pro-environmental behaviour in an urban destination. For that purpose, a brief review on studies related to gamification, sustainability and tourism was conducted.

The analysis unveiled that gamification holds the power to engage different tourism stakeholders in sustainable practices, inducing pro-environmental behaviour. Furthermore, when analysing the methodologies applied in recent studies, the predominance of quantitative data collection and analysis (e.g., questionnaire and statistical tests) related to experimental research in tourism and hospitality was identified. However, as parts of social sciences, those areas lack complementary qualitative methods or mixed-methods strategies that may enrich future literature on both fields.

Aiming at filling this gap, this paper described a mixed research design – that recurred to the use of an hybrid methodological strategy that merges elements of experimental design strategy – for considering it an innovative approach that can contribute to a diversified methodological discussion in tourism management research. The research followed five

phases, which included: (i) literature review, (i) conduction of in-depth interviews with stakeholders, (iii) prototype development and validation, (iv) qualitative experiment with focus groups (urban tourists), and (v) questionnaires with urban tourists. All phases have presented some amount of limitations. First, the lack of studies encompassing gamification and tourism had narrowed the literature review, so, in order to broaden the theoretical framework, studies on related fields were included in the analysis. Second, the difficulty to reach gamification buyers and providers had reduced the sample size of the interviews, therefore, the snowball technique was used as a strategy to identify new interviewees. Third, the lack of resources to develop a gamified app had limited the third phase, so, as an alternative to it, a prototype was designed as a preliminary version that will be tested and can be improved in the future. Then, for the on-going phases of the research, due to the limitations related to COVID-19 issues, the face-to-face approaches will be replaced by online strategies of data collection.

The current state-of-knowledge regarding hybrid methodological strategies that merges elements of experimental design as part of the research remains scarce in the context of tourism. Therefore, this study brings contributions to the theory by presenting new ways of using gamification as a methodological tool to achieve answers to complex topics such as sustainability. This will allow further progress about the understanding and applicability of qualitative experiment methodologies in tourism research. The study also addresses practical implications when it considers the use of gamification in qualitative experiments can provide "realistic" answers to companies, so, tourism destinations, services and institutions can benefit from this type of research and from the implementation of the tool into society.

In that sense, future studies will be able to explore innovative methodologies involving qualitative experiments in the scope of ecogamification applied in different contexts and perspectives of tourism, seeking to bridge the gap between hybrid methodological strategies that merges elements of experimental design research and the fields of social sciences. In addition, these methodological innovations will certainly help to address more complex theoretical and practical challenges and to advance scientific knowledge.

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Appendix 7

Gamificação e Marketing para um Turismo Sustentável: uma revisão exploratória

Gamification and Marketing for Sustainable Tourism: an exploratory review

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Gamificação e marketing para um turismo sustentável: Uma revisão exploratória
Gamification and Marketing for Sustainable Tourism: An exploratory review

Resumo | O setor do turismo tornou-se mais sensível às oportunidades de criação de novos serviços e produtos gamificados, nomeadamente na perspectiva da sustentabilidade. Neste cenário, o principal objetivo deste artigo é analisar a literatura sobre as potencialidades da gamificação para um turismo mais sustentável e compreender de que forma a gamificação está a ser perspetivada e explorada para resolver problemas de sustentabilidade no contexto do Turismo. Para cumprir o objetivo, executaram-se pesquisas eletrônicas numa base de dados especializada, SCOPUS, resultando, no término da pesquisa, num conjunto de 53 artigos científicos identificados como relevantes para a abordagem deste estudo. A revisão exploratória da literatura viabilizou o mapeamento dos artigos disponíveis na base de dados SCOPUS e, a partir daí, foi possível identificar evoluções, tendências, alguns gaps de investigação e caminhos para investigação futura.

Palavras-chave | gamificação, sustentabilidade, turismo, marketing

Abstract | The tourism sector has become more sensitive to the opportunities of gamified services and products, mainly in the perspective of sustainability. In this scenario, the main objective of this article is to analyze the literature on the potential of gamification towards a more sustainable tourism and understand how gamification is being perspectived and applied to solve problems of sustainability in the context of tourism. To achieve these goals, an electronic research was carried out in a specialized database, SCOPUS, resulting in a selection of 53 scientific articles identified as relevant for this study. The exploratory literature review allowed mapping of available articles in SCOPUS and, based on the analysis, it was possible to identify evolutions, trends, research gaps and some future research paths.

Keywords | gamification, sustainability, tourism, marketing

1. Introdução

O setor do turismo tem vindo a dar grande atenção à problemática da sustentabilidade, visando antecipar, reduzir e minimizar os impactos negativos da sua atividade. A sustentabilidade é um conceito multidisciplinar (Silva, Analide, Rosa, Felgueiras & Pimenta, 2013) e define-se como o desenvolvimento que satisfaz as necessidades presentes, sem comprometer a capacidade das gerações futuras de suprir as suas próprias necessidades (United Nations, 1987). A ONU (Organização das Nações Unidas) defendeu, no contexto da adoção dos 17 Objetivos do Desenvolvimento Sustentável (ODS), que o turismo deve perseguir (i) a promoção do crescimento econômico sustentável e inclusivo, emprego pleno e produtivo e trabalho decente para todos; (ii) o consumo e a produção sustentável; (iii) a conservação e o uso sustentável dos oceanos, mares e fontes marinhas (United Nations, 2015). Para atingir estes objetivos, o turismo tem o dever de se desenvolver de forma harmoniosa com o meio ambiente, as culturas locais e os autóctones, de forma a que estes se transformem em beneficiários constantes e deixem de ser, assim, meros espectadores do processo de desenvolvimento sustentável (Souza, 2012).

De forma a trazer soluções mais inovadoras no sentido de um turismo mais sustentável, estudos em diversas áreas de conhecimento estão a ser desenvolvidos e novas ferramentas tecnológicas e comunicacionais estão a surgir como instrumento para a sensibilização de um comportamento mais sustentável. Várias pesquisas sugerem que os consumidores estão conscientes e sensíveis aos problemas da sustentabilidade e que gostariam de se comportar em conformidade. No entanto, esta disposição nem sempre se transforma em comportamento (Sangiorgi, 2014). Assim, faz sentido analisar de que forma novas ferramentas estão a ser estudadas e aplicadas no âmbito da sustentabilidade e turismo, a fim de diminuir a lacuna existente entre *querer ser sustentável* e *atuar de acordo com a sustentabilidade*.

Uma nova ferramenta emergiu para alterar o paradigma do marketing e dos negócios, designada de *gamification,* termo em inglês, e que tem sido definido como ‘o uso de elementos e *design* do jogo em contextos não-jogo’ (Deterding, Khaled, Nacke, & Dixon, 2011, p. 2). A propagação do uso da dinâmica de jogos na sua extensão para problemas

reais contribuiu para materializar a ferramenta. Hoje, elementos de mecânica do jogo estão a ser utilizados em diversas áreas: educação, área militar, formação de colaboradores, marketing, ecologia ambiental, campanhas de políticas públicas, programas orientados para a saúde física e turismo (Kachniewska, 2015; Xu, Tian, Buhalis, Weber & Zhang, 2015). A incorporação dos elementos do jogo como sistemas de pontuação, personificação, regras e recompensas (Berger & Schrader, 2016), tem vindo a ser aplicada no contexto do turismo e de uma maneira geral numa perspectiva de marketing, já que terá um grande potencial para envolver e influenciar as atitudes e comportamentos dos consumidores.

Os profissionais de marketing e da área de consultadoria passaram a promover a gamificação como potencial fonte de receita (Fizek, Fuchs, Ruffi, & Schrape, 2014). Um bom exemplo disso é a rede social *Foursquare,* considerada o grande caso de sucesso de aplicação da gamificação na perspectiva do marketing. Através do serviço de geolocalização desenvolve-se uma competição entre os utilizadores. Esta ação ficou conhecida por revolucionar a interação homem-computador e a experiência dos utilizadores (Sigala, 2015a). Por meio de elementos do jogo, os clientes passam a realizar mais *check ins* em troca de pontos que, posteriormente, podem ser trocados por novos serviços. Desta maneira, o cliente é recompensado por intermédio de um serviço gamificado, contribuindo para que haja um maior envolvimento com a campanha (Hamari, Huotari & Tolvanen, 2012).

A gamificação transformou-se numa tendência mundial, expondo-se, simultaneamente, ao posicionamento crítico de profissionais e estudiosos de diversas áreas de conhecimento. O livro *Rethinking Gamification,* editado por Fizek, Fuchs, Ruffi, & Schrape (2014) propõe que a gamificação seja repensada, precisamente, porque ela "funciona". A obra reflete sobre a gamificação por meio de distintas abordagens e autores. Temas como envolvimento, ludicidade, história e cultura, comportamentalismo e psiquiatria, antagonismo e competição são analisados em diversos contextos de aplicação. Os autores concluem que dado o elevado potencial da gamificação, impõe-se uma séria reflexão, multidisciplinar, que vá para além da aplicabilidade técnica da ferramenta.

Nesta mesma lógica, a antologia *The Gameful World: Approaches, Issues, Applications,* editada por Walz & Deterding (2015), cruza olhares e abordagens, analisando a gamificação numa perspectiva da vida quotidiana, cultural e de trabalho (nas quais a gamificação se encontrará numa posição de epifenómeno) e, simultaneamente,

contextualizando-a em diferentes debates acadêmicos e de mercado. Uma série de trabalhos são apresentados ao longo do livro, entre eles '*Gamification Is Bullshit',* do *designer* e crítico de jogos, Ian Bogost. Este autor tem uma visão particularmente crítica e considera que a gamificação tem sido aproveitada como um fenómeno de marketing essencialmente para iludir e domesticar os consumidores. Froehlich (2015), no capítulo *'Gamifying Green'* , também expõe uma perspectiva pouco romantizada, e muito pragmática, sobre a aplicabilidade da gamificação no contexto da sustentabilidade ambiental. O autor sublinha que os problemas ambientais são temas difíceis de serem solucionados e questiona se a gamificação conseguirá ser a solução. Para uma possível resposta, apresenta uma abordagem focada na psicologia ambiental, tecnologia persuasiva e gamificação para incitar o comportamento sustentável, para além de fundamentar o seu argumento com casos de sucesso e insucesso. Por fim, o autor conclui que ao 'invés de ver a ferramenta como uma fonte de desilusão e dano, perceber-se-á como uma fonte de empoderamento e de conhecimento que pode ser utilizada como uma base para o bem, particularmente no que diz respeito à saúde pessoal e sustentabilidade ambiental' (Froehlich, 2015, p. 36). Desta forma, percebe-se a importância de olhar para a gamificação através de diferentes perspectivas e contextos, no sentido de construir um pensamento holístico e crítico, direcionado para a melhoria continuada da ferramenta, nomeadamente, quando direcionada para soluções de problemas complexos.

Face ao explicitado, este artigo pretende analisar a literatura sobre as potencialidades da gamificação na perspectiva do marketing para um turismo mais sustentável e compreender de que forma a gamificação está a ser explorada para alterar comportamentos e ajudar a resolver problemas de sustentabilidade no turismo. Para alcançar estes objetivos, o artigo persegue os seguintes tópicos: (i) surgimento dos primeiros estudos sobre as temáticas; (ii) autores e publicações de destaque nas áreas de conhecimento (gamificação, marketing, sustentabilidade e turismo); (iii) territórios e áreas de pesquisa; (iii) evolução do conceito; (iv) gamificação na perspectiva do marketing turístico; (v) gamificação e sustentabilidade e, por fim, (vi) gamificação para solucionar problemas de sustentabilidade no turismo. Para atingir os objetivos, fez-se necessário uma revisão exploratória de literatura.

2. Metodologia

Para a revisão exploratória de literatura proposta neste estudo, efetuou-se uma pesquisa nas bases de publicações científicas SCOPUS, entre os meses de Outubro e Dezembro de

2016. Aplicou-se a palavra – chave ‘gamification’ para uma primeira etapa. Na segunda etapa, utilizaram-se os termos ‘gamification and sustainability’. Na terceira etapa, empregaram-se os termos ‘gamification and tourism’. Na quarta etapa, foram utilizados os termos ‘gamification and tourism marketing’. Por último, na quinta fase, utilizara-se os termos ‘gamification, sustainability and tourism’.

A fim de obter um resultado mais completo, os conceitos-chave foram pesquisados nos seguintes campos: título, resumo e palavras-chave, nas áreas ‘Social Sciences & Humanities’, ‘Life Sciences’, ‘Health Sciences’ e ‘Physical Sciences’. Por a gamificação ser uma temática recente na literatura e pouco explorada nos âmbitos do turismo, marketing e sustentabilidade, optou-se por não restringir os resultados, utilizando-se a opção *todo tipo de documento*: ‘Articles’ or ‘Articles in press’, ‘Journals’, ‘Book or Book chapter’, ‘Article or conference paper’, ‘Conference Review’, ‘Editorial’, ‘Business Article’, ‘Short Survey’ e ‘Erratum’. Deste procedimento, surgiram como fontes ‘Conference Paper’, ‘Article’ e ‘Book Chapter’.

Quanto ao idioma, em todas as etapas utilizaram os termos em inglês. Nas cinco fases, e em termos de horizonte temporal, foram escolhidos todos os estudos até dezembro de 2016. Na primeira etapa, foi encontrado um total de (1.969) artigos. Na segunda etapa, foram localizados (38); na terceira (13); na quarta (4) e na quinta (2) (Figura 1). Os artigos da segunda etapa até a quinta estão inseridos nos documentos da primeira etapa.

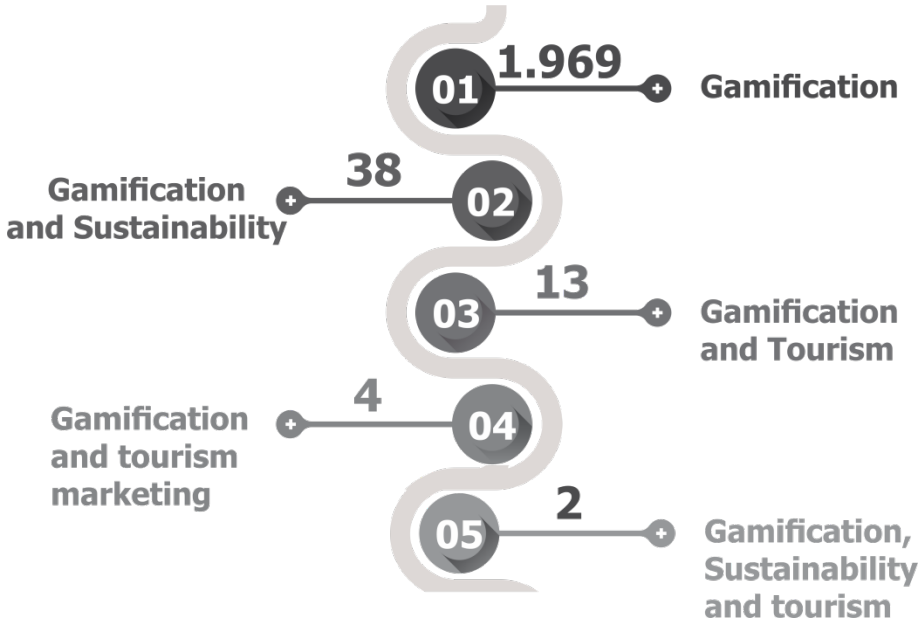

Figura 1. Etapas, palavras-chave e quantidade de artigos

Fonte: Elaboração própria (2016)

Depois dos resultados atingidos, seguiu-se uma sexta etapa, na qual foram lidos os resumos dos artigos e, com base nestes resumos, foram incluídos para análise apenas os trabalhos que relacionavam *gamificação, sustentabilidade, marketing* e *turismo*. Deste procedimento resultaram 53 artigos que foram, posteriormente, lidos e analisados na íntegra.

Os trabalhos selecionados foram analisados em quatro níveis (Figura 2): no primeiro nível desenvolve-se uma análise mais genérica sobre a evolução dos estudos, principais autores, ano de publicação, os territórios de domínio de publicação e autores mais citados. No segundo nível, e de uma forma mais direcionada, a análise recai na gamificação, na perspectiva do marketing turístico. Num terceiro nível analisa-se a relação entre gamificação e sustentabilidade. Por fim, no quarto nível, foca-se a análise da gamificação no contexto da sustentabilidade e turismo.

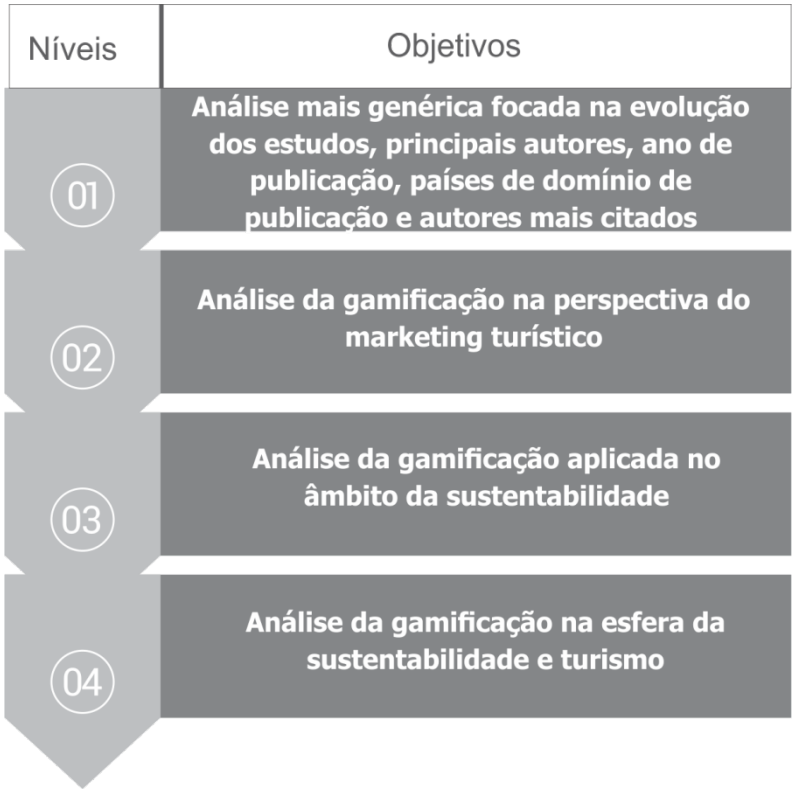

Figura 2. Níveis e objetivos de análise

Fonte: Elaboração própria (2016)

3. Resultados

3.1 Surgimento dos primeiros trabalhos sobre as temáticas em estudo

Na base de dados SCOPUS foi encontrado um total de 1.969 estudos sobre gamificação, tendo os primeiros surgido entre 2011 e 2016. Em 2011, na base de dados, surgem os estudos sobre a gamificação aplicada no contexto da sustentabilidade. Em 2012, identificam-se os primeiros registos de pesquisas sobre a gamificação direcionada para o setor do turismo. Em 2015, surgem as primeiras pesquisas orientadas para o marketing e turismo e estudos que cruzam as três temáticas *gamificação*, *sustentabilidade* e *turismo* (Figura 3).

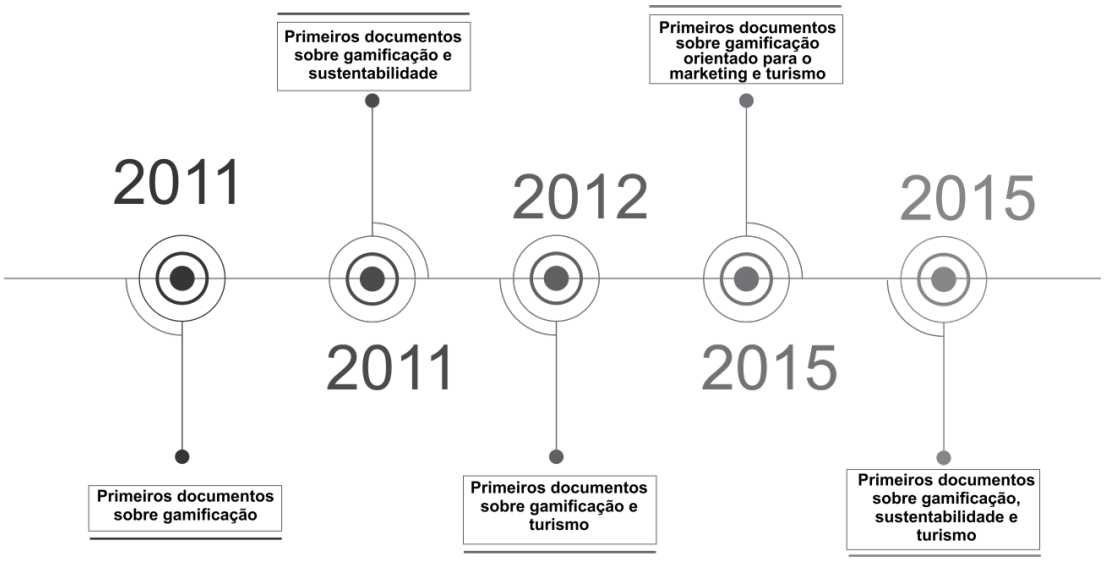

Figura 3. Base de dados SCOPUS - evolução do ano de publicação dos artigos
Fonte: Elaboração própria (2016)

3.2 Autores e publicações de destaque nas áreas de conhecimento de estudo (gamificação, marketing, sustentabilidade e turismo)

Considerando os 1.969 artigos, os autores com maior número de publicações são Hamari, J. (15), Nakajima, T. (15), Isotani, S. (11), Sakamoto, M. (11). No que diz respeito à quantidade de publicação, destes autores, o primeiro e o segundo apresentam-se com um total de quinze artigos, o terceiro e quarto com onze.

Os artigos mais citados são dos autores Deterding et al., 2011 (301); Domínguez, Saenz-De-Navarrete, De-Marcos, Pagés & Martínez-Herráiz, 2013 (113); Deterding, O'Hara, Sicart, Dixon & Nacke, 2011 (99). No que diz respeito aos estudos sobre a gamificação aplicada ao contexto da sustentabilidade, todos os autores identificados na pesquisa possuem apenas um artigo publicado na área, sendo os artigos mais citados os seguintes: Law, Kasirun & Gan, 2011 (15); Massung, Coyle, Cater, Jay & Preist, 2013 (12); Jylhä,

Nurmi, Sirén, Hemminki & Jacucci, 2013 (7). Em relação aos estudos sobre a gamificação aplicada ao contexto do turismo, a autora que se destaca é Sigala, 2015, com (2) artigos, sendo os artigos mais citados os de Gordillo, Gallego, Barra & Quemada, 2013 (5) e Sigala, 2015 (4). No que se refere à gamificação aplicada no contexto da sustentabilidade e turismo, identificaram-se dois artigos (Negruşa, Toader, Sofică, Tutunea & Rus, 2015; Cirulis, Paolis & Tutberidze, 2015), tendo o primeiro uma citação.

3.3 Países e áreas de pesquisa

A base de dados analisada (SCOPUS) sugere que a maior parte dos estudos sobre a gamificação advém dos Estados Unidos da América com 368 artigos, seguidos da Alemanha (186), Inglaterra (170) e outros. No âmbito da sustentabilidade, surgem trabalhos advindos da Alemanha (8), Estados Unidos (5) e Itália (4). No contexto do turismo, os trabalhos advêm de países como Grécia (2), Espanha (1), República Tcheca (1) e outros. No âmbito da gamificação e marketing turístico, os trabalhos dispersam-se por países como China (1), República Tcheca (1), Grécia (1), Polônia (1) e Inglaterra (1). Por último, no contexto da sustentabilidade e turismo, verifica-se referência a apenas dois países: Geórgia (1) e Itália (1).

As áreas de pesquisa sobre a gamificação nos 1.969 artigos concentram um número maior de estudos na área da ciência da computação (1.459); a segunda e a terceira maiores áreas de estudo relacionam-se com as ciências sociais (507) e a engenharia (384). Na temática da sustentabilidade, salientam-se as áreas da ciência da computação (30), ciências sociais (9) e matemática (8). Relativamente à gamificação aplicada ao turismo, a maior parte dos estudos vem das áreas da ciência da computação (7) e negócios, gestão e contabilidade (4). No cruzamento da gamificação, sustentabilidade e turismo, as áreas são ciência da computação (1) e ciências sociais (1).

3.4 Evolução do conceito

A partir de 2011, a gamificação começa a ser conceptualizada no âmbito acadêmico. Pela revisão dos estudos identificados, complementados com a análise do trabalho de Ferreira (2015), verifica-se que a literatura apresenta diferentes definições de gamificação. A figura 3 sintetiza as perspectivas mais dominantes.

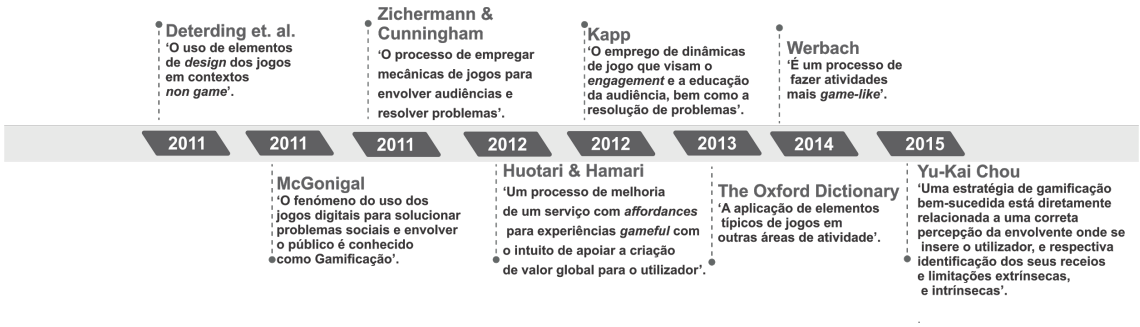

Figura 3. Perspectivas dominantes sobre a evolução do conceito de gamificação

Fonte: Adaptado de Ferreira (2015)

Apesar da diversidade de conceitos de gamificação, o mais utilizado parece ser o de Deterding et al. (2011, p. 2), que a definem como o "uso de elementos de *design* do jogo em contextos de não-jogo". Um ano após o surgimento dessa primeira definição, Hamari e Huotari (2012, p. 20) refinaram o conceito anterior para a perspectiva do marketing de serviços como 'um processo de reforço de um serviço com *affordances* para experiências divertidas, a fim de apoiar a criação de valor global dos utilizadores'. Recentemente, Chou (2015) sublinha que para ter uma estratégia de gamificação de sucesso, é necessário haver uma perceção correta da envolvente onde se insere o utilizador, isto é, faz-se indispensável entender o público – alvo e suas motivações. O autor desenvolve um conjunto de *drivers* da gamificação sistematizando-os em *Left Brain Core Drivers e Right Brain Core Drivers.* Os primeiros direcionam-se para as motivações extrínsecas do utilizador, isto é, há motivação se houver recompensas. Os segundos focam-se nas motivações intrínsecas em que o utilizador é motivado para realizar a atividade em si, independentemente de ganhar a recompensa ou atingir um objetivo. O argumento é o de que um bom uso destes *drivers* pode contribuir para o *design* de uma gamificação eficaz.

Em 2015, Deterding (2015) refina a conceptualização de 2011, contrariando a visão restrita da gamificação como ferramenta técnica e sugerindo que se considerem sistemas e contextos mais complexos, como a estética experiencial e a relação direta entre os atores da sociedade e o meio ambiente. Desta maneira, a evolução do conceito é fundamental para a compreensão e aplicabilidade mais abrangente da gamificação, inclusive, no contexto da sustentabilidade.

Dos 13 artigos analisados sobre a gamificação no contexto do turismo, verifica-se a utilização predominante da concetualização de Deterding et al., (2011) (Tabela 1). De outro modo, os estudos que abordaram os temas da sustentabilidade (Negruşa, Toader,

Sofică, Tutunea & Rus, 2015), marketing (Kachniewska, 2015; Kiráová, 2015) e educação (Barcena & Sanfilippo, 2015) refletem uma visão mais recente sobre o conceito da gamificação. Estes direcionam-se para a definição de Chou (2015), que se foca na customização da gamificação e nas motivações intrínscas e extrínsecas que condicionam a sua aplicabilidade.

Tabela 1
Conceitos de gamificação utilizados em trabalhos no turismo

Definições/ autores	**Autores/ publicações em turismo**
'uso de elementos de *design* do jogo em contextos de não-jogo' (Deterding et al., 2011, p. 2)	Giovannella et al., (2013); Gordillo, Gallego, Barra e Quemada (2013); Guadalupe, Díaz e Toftedahl (2014); Xu, Tian, Buhalis, Weber e Zhang, (2015); Sigala (2015a); Sigala (2015b); Negruşa, Toader, Sofică, Tutunea e Rus (2015); Kachniewska (2015); Yamamoto, Yoshin e Sonehara (2015); Cirulis, Paolis, & Tutberidze (2015)
'um processo de reforço de um serviço com *affordances* para experiências divertidas, a fim de apoiar a criação de valor global dos usuários' (Hamari & Huotari, 2012, p. 20)	Sigala (2015b)
'implementação e utilização de elementos de jogo (*design* e técnicas), pensar o jogo, mecânica e análises do jogo, tecnologia do jogo de computador em modelos de negócios, atividades de enquadramento, processos, procedimentos, serviços e outros, visando melhorar habilidade do usuário, a experiência, o envolvimento, eficácia e produtividade, além de puro entretenimento, tanto para os colaboradores como para os clientes' (Uskov & Sekar, 2014 como citado em Negruşa, Toader, Sofică, Tutunea & Rus, 2015, p. 11162)	Negruşa, Toader, Sofică, Tutunea e Rus (2015)
'o uso de elementos de vídeo jogos em contexto não-jogos para melhorar a experiência e envolvimento do usuário' (Zichermann & Cunningham, 2010 como citado em Kachniewska, 2015, p. 2)	Kachniewska (2015)
'é um processo que utiliza as melhores ideias de jogos, lealdade e economia comportamental para envolver as pessoas e motivá-las a mudar o	Kiráová (2015)

comportamento, desenvolver habilidades ou resolver problemas (Zichermann & Linder, 2013; Burke, 2013 como citado em Kiráová, 2015, p. 202)	
'o conceito de gamificação está relacionado com a utilização de mecânicas próprias do jogo fora desses contextos, de modo a que as pessoas adotem, nestes contextos, aspectos positivos dos jogos relacionados com o comportamento' (Popkin, 2010 como citado em Barcena & Sanfilippo, 2015, p. 124)	Barcena e Sanfilippo (2015)

Fonte: Elaboração própria (2016)

3.5 Gamificação na perspectiva do marketing turístico

Ao considerar os 13 trabalhos sobre a gamificação e turismo, uma parte destes aborda a gamificação numa perspectiva do marketing, sendo eles: Kachniewska (2015); Kiráová (2015); Xu, Tian, Buhalis, Weber, e Zhang (2015) e Sigala (2015a). Estes estudos evidenciam, entre outros aspectos, a importância da gamificação e seu potencial para criar e acrescentar valor a produtos e serviços turísticos.

De acordo com Kachniewska (2015, p. 9) os turistas estão 'resistentes a anúncios publicitários de massa e passaram a ser mais individualistas'. Neste sentido, o marketing pensado para atingir o público em massa já não é eficaz, impondo-se um marketing mais direcionado para nichos de mercado, cada vez mais específicos, e que procure envolver os consumidores com as marcas, experiências, produtos e serviços.

No turismo, a gamificação proporciona uma variedade de benefícios, podendo aumentar a notoriedade da marca, atrair potenciais clientes, melhorar as experiências *in loco* dos turistas e aumentar o seu envolvimento (Xu et al., 2015). A popularidade da gamificação no contexto do turismo ocorreu após o sucesso da aplicação *Foursquare*, já anteriormente referida. O interesse das empresas na gamificação deve-se à sua capacidade para revolucionar a interação homem-computador e a experiência dos utilizadores (Sigala, 2015a). Assim, a gamificação potencia as oportunidades de negócio através de diversas formas: clientes mais envolvidos, *crowdsourcing* e abordagens inovadoras para motivar e melhorar o desempenho dos colaboradores (Kachniewska, 2015).

No contexto dos destinos turísticos, há formas de gamificação muito utilizadas como *transmídia*, *letterboxing*, g*eocaching*, *waymarking*, caça ao tesouro, *wherigo*, resposta rápida e realidade aumentada (Kiráová, 2015). Simultaneamente, a literatura analisada

sugere formas adicionais de gamificação como ferramenta de competitividade e marketing nos destinos turísticos como, por exemplo, guias turísticos baseados em geolocalização (Kachniewska, 2015), promoção da sustentabilidade ambiental (Negruşa et al., 2015) e *uploading* de fotografias durante as viagens (Yamamoto et al., 2015).

As empresas de turismo e os gestores de destinos podem utilizar a gamificação para desenvolver uma colaboração ativa com os viajantes, através de várias atividades de cocriação. Uma adequada utilização da gamificação poderá influenciar positivamente as experiências de viagem dos turistas, os processos de formação de imagem dos destinos e apoiar a formação e difusão de modas e tendências na indústria do turismo (Sigala, 2015b).

De acordo com Kiráová (2015), tanto os visitantes quanto os destinos turísticos poderão beneficiar com a aplicação da gamificação, numa perspectiva do marketing. Os visitantes beneficiam ao experienciarem novas atrações e atividades de lazer, vivenciando assim um turismo singular; os destinos (e as empresas turísticas) ganham pelo aumento e maior envolvimento dos visitantes, prolongando a sua estadia e motivando o seu envolvimento e a sua lealdade à marca.

Assim, a gamificação pode apoiar na diferenciação e criação de valor dos serviços turísticos com um foco nas experiências, especialmente quando se trata de aprofundar o comprometimento na mudança de comportamentos complexos relacionados com a sustentabilidade. Logo, faz sentido analisar a forma como a gamificação tem sido aplicada no âmbito da sustentabilidade.

3.6 Gamificação e sustentabilidade

Após uma análise em profundidade dos artigos identificados através das palavras-chave 'gamification and sustainability', é possível identificar diferentes contextos de aplicação, sendo eles: educação, marketing, mobilidade e meios de transporte, setor alimentar e hábitos alimentares, turismo, ambientes inteligentes, segurança e meio ambiente (Figura 4).

Vários estudos aplicados às questões da educação, vêem a gamificação como uma ferramenta de apoio à aprendizagem e com o potencial de envolver pessoas no ensino de educação ambiental. Na perspetiva do marketing, os estudos utilizam a gamificação como uma ferramenta para melhorar a comunicação, o envolvimento, a mudança de comportamento e a interação social. No contexto do setor alimentar/hábitos alimentares, a maior parte dos estudos centra-se no potencial da gamificação para um comportamento

mais sustentável e, no geral, fazem o uso de aplicações *mobile* como ferramenta intermediadora.

Principais temáticas/ autores	Contextos de aplicação	Contribuições relevantes
Realização educacional e envolvimento emocional na aprendizagem (Lee & Doh, 2012); jogos para a educação ambiental (Wang & Tseng, 2014); transferência de conhecimento (Wang, Wolter, Lindow, & Stark, 2015); gamificação para educação sustentável, ambiental e negócios sustentáveis (Kim, 2015); ensino de sustentabilidade (Levinsen & Ørngreen, 2016)	Educação	A gamificação traz um reforço importante no envolvimento emocional e na mudança de atitude em relação a aprendizagem e contribui para o aumento da interação e interesse em novas ferramentas de aprendizagem.
Comunicação de iniciativas sustentáveis (Tördal, 2012); sistema de recomendação de sustentabilidade (Silva, Analide, Rosa, Felgueiras, & Pimenta, 2013); envolvimento com o facebook para mudança de comportamento sustentável (Comber et al., 2013); incentivos de atividades sociais através das redes sociais (Sakamoto & Nakajima, 2014); promoção do comportamento sustentável (Sangiorgi, 2014); Big data (Panchariya et al., 2015)	Marketing	A gamificação melhora o envolvimento social e contribui para gerar recomendações em favor da sustentabilidade.
Rastreio dos modos de transporte e suas emissões de CO^2 das viagens dos utilizadores (Jylhä, Nurmi, Sirén, Hemminki, & Jacucci, 2013); campanha corporativa de ciclismo (Wunsch et al., 2015); mudança de comportamento para mobilidade sustentável (Weiser, Bucher, Cellina, & De Luca, 2015); incentivo da mobilidade urbana sustentável (Kazhamiakin et al., 2015)	Mobilidade e transporte	A gamificação contribui para motivar utilizadores na seleção de meios de transporte sustentáveis, incentiva de forma mútua as empresa e os colaboradores na utilização de transportes sustentáveis e apoia a mudança de comportamento em relação ao uso de transportes sustentáveis.
Gestão de hábitos alimentares (Huber, Hilty, & Glinz, 2015); mudança de comportamento nutricional (Berger & Schrader, 2016)	Alimentação e hábito alimentar	A gamificação colabora para a mudança positiva de hábitos alimentares e comportamento nutricional.
Digitalização de conteúdos, a fim de assegurar a sustentabilidade das identidades nacionais (Cirulis, Paolis, & Tutberidze, 2015); identificação de técnicas de gamificação para promover a sustentabilidade (Negruşa et al., 2015)	Turismo	A gamificação auxilia na criação de elos de interação entre turistas, organizações e comunidades locais, a fim de estimular o comportamento responsável e ético.
Gerenciamento de residências (Denti, 2014); efeitos de aparelhos inteligentes em residências (Dirienzo, Krishnan, Srija, & Santos, 2014); aumento da consciência energética e incentivo de economia de energia (Nguyen, 2014)	Ambientes inteligentes	A gamificação apoia a humanização da gestão de residências familiares em prol da sustentabilidade e incentiva a economia de energia em residências.
Gestão da procura para energias renováveis (Gnauk, Dannecker, & Hahmann, 2012)	Meio ambiente	A gamificação incentiva e motiva os utilizadores para o uso de energia renováveis.
Relato de casos de acidente de viação (Law, Kasirun, & Gan, 2011)	Segurança	A gamificação traz mais resultados quando atinge incentivos tangíveis relacionados com a vida real.

Figura 4 . Gamificação e Sustentabilidade: principais temáticas, autores, contextos de aplicação e contribuições relevantes

Fonte: Elaboração própria (2016)

No turismo, há dois estudos muito específicos e com abordagens diferentes entre si. Um deles direciona-se para a análise de técnicas de gamificação para promover a sustentabilidade no turismo e o outro foca-se no uso de conteúdos digitais baseados em cenários gamificados, com o objetivo de obter recomendações de atrações culturais e, com isso, assegurar a sustentabilidade das identidades culturais. No contexto de ambientes inteligentes, os estudos sugerem o uso da gamificação no quotidiano de uma residência familiar, para envolver as famílias num comportamento mais sustentável. Na perspectiva do meio ambiente, o estudo analisa a gamificação na gestão da procura de energias renováveis. Por fim, no contexto da segurança, perspetiva-se a gamificação como uma ferramenta de apoio ao relato de acidentes de viação.

Para exemplificar formas de utilização da gamificação nos estudos referidos, apresenta-se uma síntese das diferentes aplicabilidades. Kazhamiakin et al. (2015) desenvolveram um experimento de cinco semanas com quarenta participantes, através da *App mobile Viaggia Rovereto*, objetivando 'avaliar o impacto das recomendações de mobilidade sustentável e os incentivos da gamificação ao comportamento de mobilidade dos passageiros que precisam viajar rotineiramente para o centro da cidade, de carro', (p. 3). O experimento dividiu-se em três fases: a primeira durou uma semana e teve como objetivo a familiarização dos utilizadores com a *app,* solicitando-se aos seus utilizadores que designassem os seus comportamentos e itinerários rotineiros. A segunda (com duração de duas semanas) incluíu recomendações de itinerários sustentáveis, sem o uso de elementos da gamificação. Por último, a gamificação é introduzida com a aplicação de um *green game*, com três tipos de pontuações (pontos verdes, pontos saúde e *Park & Ride*). No final do experimento, foi entregue um certificado com o relato descritivo das conquistas pessoais dos participantes e os três melhores jogadores receberam um passe grátis de um mês para o novo serviço de partilha de bicicletas. Os autores sublinham os resultados positivos da intervenção.

Denti (2014) direcionou o seu estudo para as residências inteligentes, objetivando controlar os eletrodomésticos para além do consumo de energia. Para alcançar o objetivo, realizou uma ligação inteligente entre a automação domiciliar, meio ambiente, tecnologias onipresentes e gamificação. No estudo, a gamificação foi direcionada para o aspecto lúdico de entretenimento e envolvimento social. Além disso, o autor expõe um modelo de referência de arquitetura que é aplicado no sistema através de sete camadas de interação (gamificação,

social, inteligência, utilizador, coordenação, controle e informação), estando estas relacionadas com os requisitos tecnológicos e com valores adicionados para os utilizadores. Utilizando um relato em formato de banda desenhada, explica-se, de forma lúdica, a forma como o controle dos eletrodomésticos pode ser mais humanizado através da dinamização da gamificação, coordenação, controle e informação. Por tratar-se de um estudo teórico não se consegue identificar o fator de sucesso e insucesso que este tipo de tecnologia pode efetivamente trazer. No entanto, os autores concluem que há uma aspiração social proporcionada pelos *smartphone*s em controlar tudo com facilidade, logo, estes e outros fatores poderão contribuir para uma boa ou melhor gestão, também, das residências.

Wunsch et al. (2015) tentaram compreender a forma como as as dinâmicas sociais evoluem nas organizações através de campanhas de ciclismo gamificadas. Realizaram uma intervenção durante cinco semanas, com 239 colaboradores de 14 empresas, localizadas na região de Boston (Estados Unidos da América). Um ambiente de competição foi criado com quatro categorias: i) ciclistas, ii) distância média, iii) distância total e iv) entusiasmo. Durante as três primeiras semanas utilizaram-se as três primeiras categorias e, na quarta semana, a categoria 'entusiasmo' foi incorporada, pretendendo-se uma pontuação de mudança na quota dos participantes. Diferentes formas de classificação foram apresentadas, no sentido de não desmotivar os participantes. A competição pretendia desenvolver a cooperação entre os colaboradores e, para isso, as classificações gamificadas foram expostas em áreas comuns das empresas, pretendendo tornar mais fácil a partilha de bicicletas e aumentar a interação. Os autores concluem que houve um incremento efetivo e significativo no uso e partilha de bicicletas entre os colaboradores.

Os exemplos e estudos apresentados demonstram o potencial da gamificação, em diversos contextos, para motivar e envolver os utilizadores em comportamentos mais sustentáveis. Estes estudos obtiveram resultados e reações positivas. Mas, será que estas reações são momentâneas ou de longo prazo? Será que estes exemplos podem ser transferidos para contextos de mudança comportamental (comportamentos mais sustentáveis) dos turistas? Portanto, faz sentido analisar de que forma a gamificação tem sido aplicada para ajudar a solucionar problemas de sustentabilidade em turismo.

3.6.1 Gamificação, sustentabilidade e turismo

A literatura sobre o potencial da gamificação para solucionar problemas de sustentabilidade no turismo é muito escassa. A investigação (conceptual) de Negruşa, Toader, Sofică, Tutunea & Rus (2015) sugere que a gamificação tem esse potencial. Os autores sugerem que no âmbito empresarial há possíveis compradores de serviços gamificados na área do turismo, sendo eles: empresas (cadeias de hotéis, restaurantes, operadores turísticos), instituições locais (governamentais, órgãos oficiais de turismo, setor público) e Organizações Não Governamentais-ONG (preocupadas com as dimensões social, ambiental e política). No estudo, são desenvolvidos três *frameworks,* assim como os benefícios e efeitos da gamificação no relacionamento com as organizações de turismo, abordando o tripé social, ambiental e económico da sustentabilidade.

Cirulis, Paolis e Tutberidze (2015) descreveram aprimoramentos baseados em tecnologias interativas de realidade aumentada, com base em cenários de gamificação, para obter recomendações de atrações culturais e, com isso, assegurar a sustentabilidade das identidades nacionais. Neste estudo, as tecnologias interativas são apresentadas como meio essencial de localização de informação. A sustentabilidade aparece neste contexto como consequência da interação. A principal conclusão do estudo sugere que existem no mercado inúmeras soluções que apoiam os utilizadores a encontrar informações sobre atrações turísticas. No entanto, estas soluções não priorizam a participação e motivação dos participantes para a localização de locais reais. Por esta razão, a gamificação, quando integrada em dispositivos móveis, surge potenciada.

Os estudos específicos sobre a gamificação no âmbito da sustentabilidade e turismo são de natureza conceptual. Assim, será relevante analisar os contributos potencialmente transferíveis (da literatura analisada na secção anterior) para contextos e problemas de sustentabilidade no turismo.

O estudo de Kazhamiakin et al. (2015) poderá eventualmente contribuir para o objetivo de ajudar a solucionar o problema da mobilidade sustentável durante a visita dos turistas nos destinos. Por exemplo, a partir da prática do jogo, o turista seria incitado a realizar um tipo de mobilidade sustentável e, como recompensa, poderia receber descontos em atrações turísticas e afins. A disseminação deste tipo de jogo, para além de criar uma oportunidade de diversificação de meios de transporte durante o período de estadia do turista no destino,

também poderia influenciar a mudança de comportamento (que, se bem trabalhada, teria o potencial de ultrapassar o simples momento da viagem).

Ainda no âmbito da mobilidade, o estudo de Wunsch et al. (2015) parece poder ser direcionado para as empresas e profissionais do turismo. Assim, a criação de uma aplicação *mobile* com uma competição gamificada para promover o uso de bicicletas entre trabalhadores de empresas do turismo poderia ser introduzida, com vários benefícios: maior envolvimento das empresas do setor do turismo, melhoria na saúde e bem estar dos colaboradores, mudanças de comportamento em prol do uso de meios de transporte sustentáveis, envolvimento e interação entre equipas e redução da poluição ambiental.

O estudo de Denti (2014) terá algum potencial de adaptação ao contexto da hospitalidade, na medida em que hotéis, pousadas, *hostel*s, alojamento local e plataformas como a *AirBnb* enfrentam alguns desafios similares aos das residências familiares. Assim, tal como outros segmentos do turismo, o setor da hospitalidade enfrenta o sério desafio de redução do consumo de energia, nomeadamente quando se trata de negócios em expansão, como por exemplo as residências registadas na plataforma do *AirBnb*. Neste sentido, a implementação de uma ação lúdica com o objetivo de estimular os hóspedes para a economia de energia nas residências registadas naquela plataforma talvez possa produzir bons resultados (e uma vez que se pressupõe recetividade dos hóspedes aos comportamentos sugeridos por seus anfitriões). Apesar das potenciais contribuições da literatura analisada, há sem dúvida a necessidade de aprofundamento e de mais evidências empíricas sobre os benefícios e desafios da gamificação quando examinamos problemas complexos e comportamentos difíceis de influenciar, numa perspetiva de longo prazo.

4. Conclusão

O principal objetivo deste artigo foi o de analisar a literatura sobre as potencialidades da gamificação para um turismo mais sustentável e compreender de que forma a gamificação está a ser perspectivada e explorada para resolver problemas de sustentabilidade no Turismo. Com base na revisão exploratória de literatura, apresentam-se algumas conclusões, lacunas e caminhos para futuros estudos.

Sobre a análise mais genérica desenvolvida no primeiro nível de análise deste trabalho (que se focou na evolução dos estudos, principais autores, ano de publicação, territórios de

domínio de publicação e autores mais citados) parece evidente que a investigação sobre as temáticas da gamificação, sustentabilidade, marketing e turismo está a aumentar. No entanto, ainda há um número muito reduzido de estudos que desenvolvam uma perspetiva de marketing e direcionados para o turismo sustentável, dificultando análises profundas e comparativas sobre o tema. Também, conclui-se que grande parte dos estudos sobre gamificação advém de países como Estados Unidos, Alemanha e Inglaterra. O conceito da gamificação começou a ser difundido nos Estados Unidos e, naturalmente, isso reflete-se no elevado número de publicações advindas deste país. Além disso, trata-se de um país mundialmente conhecido por fazer grandes investimentos em tecnologia e inovação para solucionar, eficaz e pragmaticamente, os mais diversificados tipos de problemas. Por outro lado, e ainda numa quantidade reduzida, os estudos sobre a gamificação no âmbito do marketing, sustentabilidade e turismo, tendem a centrar-se em países europeus, como Espanha, Grécia e República Checa, o que não surpreenderá dada a importância económica do turismo e da sua preocupação em fidelizar e proporcionar experiências inovadoras, garantindo e fortalecendo a sua competitividade. Por fim, é notória a evolução em termos de conceptualização da gamificação, com visões mais holísticas, integradoras e multidisciplinares.

No segundo nível de análise, conclui-se que a gamificação na perspectiva do marketing turístico tem sido estudada principalmente no contexto dos destinos turísticos. Para além disso, e mesmo no âmbito dos destinos, são muito poucos os trabalhos que cruzam gamificação e sustentabilidade. Em subsetores como hotelaria e restauração, a literatura é também ainda escassa.

No terceiro nível de análise, sobre gamificação e sustentabilidade, identificam-se os principais contextos em que se tem estudado a aplicabilidade da gamificação (educação, marketing, mobilidade e meios de transporte, setor alimentar/hábitos alimentares, turismo, ambientes inteligentes, segurança e meio ambiente). A maior parte dos estudos relaciona-se com a educação, a mobilidade/transportes e o marketing. No que diz respeito às potencialidades da gamificação em si, os estudos tendem a perpetivar a gamificação ainda de forma muito limitada aos elementos de pontuação, medalhas e recompensas. Assim, não integram outras potencialidades como a estética experiencial, customização, motivações intrínsecas e extrínsecas e a relação direta entre os atores da sociedade e o meio ambiente,

como sugeridos nas conceptualizações mais atuais (Chou, 2015; Deterding, 2015). Para além disso, visões menos romantizadas e mais críticas têm também, ainda, pouca explicitação.

Por fim, no quarto nível de análise, sobre gamificação na perspectiva dos problemas de sustentabilidade no turismo, conclui-se que a literatura é muito escassa. Nesse sentido, é possível identificar contribuições de outros contextos de estudo potencialmente transferíveis e potencialmente eficazes na transformação de atitudes em comportamentos. Simultaneamente, parece também haver necessidade de estudos que não se limitem a replicar boas práticas de gamificação na resolução de problemas de sustentabilidade e mudança comportamental. Os debates críticos e recentes sobre gamificação deverão materializar-se na investigação em turismo, num confronto produtivo entre benefícios, desafios e riscos e, também, entre tecnologia, *design* e marketing. Complementarmente, será importante analisar, de forma explícita, tensões entre o curto e o longo prazo, particularmente importantes (e incontornáveis) quando o propósito é influenciar comportamentos complexos relacionados com a sustentabilidade.

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