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GAME ELEMENTS AS A TOOL TO ENHANCE THE INTENTION TO BEHAVE SUSTAINABLY WHEN TRAVELLING

Supervisors

PhD Candidate Felipe Cechella

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Student

Ludovica Grilli

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ABSTRACT

Title: Game elements as a tool to enhance the intention to behave sustainably when travelling

Keywords: gamification; behavioural intention; sustainable behaviour; experiment

Background: Tourism is one of the leading worldwide industries, extensively contributing to GDP growth, trades boost, workplaces creation. At the same time, the constant movement of individuals, the activities they carry out when on vacation and many of the choices they make negatively influence the surrounding environments. According to scholars, people manifest intentions to behave sustainably but, when travelling, their actual behaviour is not a reflection of their original intentions.

Purpose: The aim of this project is to understand whether gamification, a decade old ICT, could help enhance tourists' behavioural intention and encourage them to show more sustainable behaviours.

Methodology: The project is conducted through an experiment on three different groups. The Control Group fills in the questionnaire without undergoing any treatment; Treatment Group 1 is subject to a tool with game elements and then to the questionnaire; Treatment Group 2 reads some information defined as traditional communication tool and then does the questionnaire.

Limitations: Amongst the limitations it is possible to enlist: desirability bias; game elements instead of a real game; limited sample size.

LIST OF ABBREVIATIONS

TRA: Theory of Reasoned Action

TPB: Theory of Planned Behaviour

A: Attitudes

PBC: Perceived Behaviour Control

SN: Social Norms

S: Sensitivity

R: Responsibility

SE: Self-Efficacy

ICT: Information Communications Technology

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1. INTRODUCTION

In 2018, the World Travel and Tourism Council estimates that the Tourism sector had contributed to the global economic growth by generating 10.4% of the total global GDP and employed 319 million jobs (WTTC, 2019). Multiple are the positive impacts that the industry creates - for a wide range of destination, from big, well-known and extremely industrialised cities to small villages in still developing countries – and these are diverse. Among many other aspects, it is possible to mention that: there exists a positive long-run relationship between tourism development and real GDP per capita (Lee and Chang, 2008); at the beginning of the 21st century the term *empowerment* began being associated with the concept of tourism as an evidence of various types and levels of involvement in the tourism development process (Timothy, 2007); in aboriginal villages the council might see touristic activities as primary sources for economic and social growth so efforts are invested towards actively promoting tourism policies, enhancing in-depth experience activities and advertise local specialities (Wu *et al*., 2019).

Nevertheless, at the same time it is possible to identify downsides to the tourism industry that it is either impossible or extremely difficult to avoid; amongst them there are phenomena like: water and air pollution; biodiversity loss; energy consumption; damage to soils.

Undertaking a trip, whether for leisure or business reasons, is a process involving a multitude of stakeholders, activities and, inevitably, environmental impacts; given the intricacy of the relationships existing between the consequences of tourists' actions, as shown in *Figure 1*, it is immediately visible how challenging it is to try and find easy and feasible solutions to alleviate the impact of the tourism industry (Budeanu, 2007).
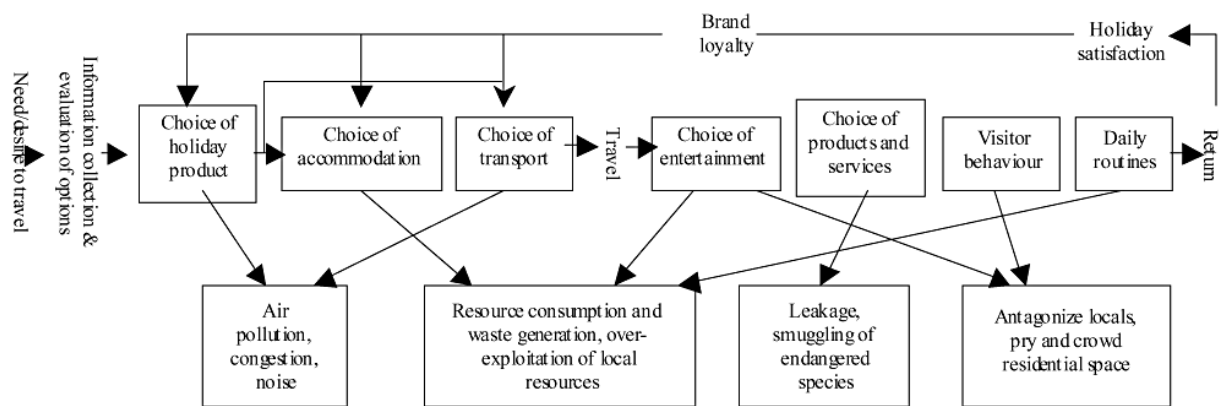

Figure 1.1 Interrelationships between tourists' choices and their consequences (Budeanu, 2007).

By the years, the focus on the behaviour of tourists has been increasing, taking a diverse range of directions categorizable in six streams: 1) types of nature tourism, which in turn is divided into environmentally friendly tourism, nature-based tourism, ecotourism; 2) motives driving tourists' environmental concerns; 3) eco-friendly intentions and predispositions; 4) environmental attitudes and behaviours; 5) sociodemographic characteristics of green tourists; 6) miscellaneous issues (Leonidou *et al*., 2015).

Even though in the literature it is said that, in 2015, one third of the European tourists showed concern with environmental practices and acted consequently, for example by paying attention to certificates when choosing an accommodation (Falk *et al*., 2019), scholars also point out remarkable discrepancies between tourists' beliefs and effective actions undertaken, hence depicting tourists as much less involved in the adoption of sustainable lifestyles and use of conscious tourism products in comparison to corporate and governmental efforts (Budeanu, 2007). The willingness to sacrifice personal convenience and modify behaviours that are part of a daily routine with the aim of contributing to the conservation of the environment should be accompanied by others' behavioural change in society (Stoll-Kleemann *et al*., 2001), since collective action is much more noticeable than the individual one (Eagly and Kulesa, 1997). In fact, a growing number of tourists declare themselves as being attentive and involved into social, cultural and environmental issues of the destinations they visit; they are curious to learn more about the place they are at, whilst they are there; and believe in the importance of making responsible choices when it comes to the accommodation (Chafe, 2005). On the other hand, only a small percentage of these same tourists uses the adjective "ethical" when talking about themselves, gathers information about corporate policies' and actually changes their vacation plans opting for more responsible touristic choices (Chafe, 2005). In 2014, Juvan and Dolnicar publish a study where they attempt to understand the reason why tourists who actively engage with environmental protection at home then adopt behaviours followed by negative environmental consequences when on vacation. After conducting interviews with the respondents, these were categorised into six classes, each of them presenting beliefs used to re-establish cognitive consonance (Juvan and Dolnicar, 2014). The above mentioned classes have been denominated as follows: 1) denial of consequences, consisting in not wanting to admit the gravity of an action; 2) downward comparison, when there is the belief that the behaviour currently adopted could be worst or someone else could be behaving worse; 3) denial of responsibility, when respondents pour responsibility on someone else; 4) denial of control, when respondents believe that they do not have either time or power or enough money or proper

information to actively take a decisive and impactful action; 5) exception handling, including all of those who consider a vacation as a special occasion in which is normal not to be consistent with their usual daily behaviour; 6) compensation through benefits, when it is believed that, even if they do not modify their choices and behaviours consciously, tourists are still somehow contributing positive value to the economy or to individuals or to communities (Juvan and Dolnicar, 2014).

In 2018, Tolkes uses the value-belief-norm theory to study the attention on the key-role of the importance of communicating sustainable messages. The results he draws show that, quite often, communication of sustainability features is not efficient, making it difficult for the tourists to even fully comprehend the product they have previously purchased.

Instability and unreliability in the behaviour of tourists has been object of study for many scholars, who describe it in terms of shades of green, from "very dark green" to "no green at all" (McDonald *et al*., 2006). McDonald *et al*. (2006) distinguish three categories of tourists: translators, exceptors, selectors. Their characteristics are enlisted in the table below (Table 1.1).

Translators	Exceptors	Selectors
For this group, awareness usually translates into action: -They feel very guilty about not doing it before; -They gradually include more and more activities; -Their concern is often at the level of products rather than companies or industries; -They are prepared to make some sacrifices and they are open to change if they can see the impact of their actions; -Their information seeking is largely passive; -Word of mouth and opinion leaders are important to this group; -They are uncritical of information sources.	Sustainability is a priority. This group has a complex understanding of a wide range of interdependent sustainability ideas: -They are change seeking; -Their information seeking is active, company level and very critical; -They are comfortable with non-mainstream outlets, products and information sources BUT there is an exception to their green lifestyle: -This is usually a conscious exception; -It is usually a "small" exception; -During the purchase process for this item they will completely ignore their usual green or ethical criteria; -They will have a specific justification for this purchase which allows them to be happy with their decision.	This group is green or ethical in one aspect of sustainability only – green peace OR recycling OR green energy OR organic: -Probably the most common group; -This would explain why green marketing fails and green marketing research can give conflicting results; -Support for Peattie's notion of a context-dependent portfolio of (possibly inconsistent) purchases; -Could be a starting point for the other groups; -Information seeking is selective, *ad hoc* and can be active depending on the issue.

Table 1.1 Typologies of green consumers (McDonalds *et al*., 2006).

Gamification is a quite recent discipline, and the term itself is interpreted as "an informal umbrella term for the use of video game elements in non-gaming systems to improve user experience (UX) and user engagement" (Deterding *et al.*, 2011). Its application has been implemented in a multitude of contexts. Xu *et al*. (2014) describe the importance of introducing gamification elements in the tourism industry mainly for two reasons: 1) to increase involvement of employees and tourists and ultimately plant a seed for behavioural change (different purchasing decisions and/or a more efficient way of working); 2) to enable tourists and employees to co-create values and stimulate intrinsic motivation. *Table 1.2* offers a synthetic overview of the implementation of gamification in the tourism sector by different actors (airlines, retail and hospitality, destination).

Table 1.2 Overview of examples of cases where gamification has been applied in tourism.

Industry	Company	Case Description	Gaming Elements
Airlines and Transportation	American Airlines	Gamified mobile app represents current elite status qualification visually	Progress bars, Points, Levels
	Turkish Airlines	QR-coded national flags have been placed on 100 digital bus shelters for London2012. Users who read the code can win a ticket to Australia. Goal is to have most check-ins in one place or individual places	Physical Rewards, Badges
Retail and Hospitality	Shopkick	Users are engaged with products by applying game mechanics for incentivising offers prior to shop visits. The gamification also involves a geo-targeted approach to drive local engagement. The aim is to influence buyers' behaviour via game mechanics.	Virtual currency, Rewards
	Starwood SPG programme	Partnership with Four square to provide customers 250 bonus points per check-in and chances to unlock a hidden Free Resort Night Award.	Point system, Badges
	Marriott – My Hotel	Aim of the social media game is to recruit new staff for job vacancies and familiarise players with various parts of a hotel.	Point system, Virtual Goods
Destination	Four-square	Users can claim mayor ships, unlock badges, receive special offers and rewards such as discounts to	Badges, Leader board Reward with real world offers

		specific retailers while also tracking against friends via a leader board while checking-in a restaurant	

In the light of the existing intention-behaviour gap in sustainable behaviours that tourists manifest when going on vacation and given the contribution of a relatively recent tool such as gamification, the purpose of this research is to evaluate the effectiveness of gamification as a communication strategy in order to reduce this intention-behaviour gap. The research objective can consequently be expressed through the following three research questions:

RQ1: Does gamification, as a communication strategy, make tourists behave more sustainably?

RQ2: Is gamification more effective than traditional communication tools to make tourists behave sustainably?

RQ3: Does gamification positively influence respondents who do not manifest the intention to behave sustainably, hence making them behave more sustainably?

2. THEORETICAL FRAMEWORK
2.1 DEFINITION OF SUSTAINABLE TOURISM

The travel and tourism industry is classified as one of the largest ones in the world, and, as for every other industry, with the positive come also the negative, so that it is necessary to invest efforts in trying to contain the degrading effects provoked by the industry and enhance the positive ones; exactly with this aim, the term *sustainable tourism* was coined, to addresses all of the elements covering a touristic experience (Zolfani *et al*., 2015). The goal of sustainable tourism is to establish a balance between conservation of the environment, support of cultural integration, establishment of social justice, promotion of economic benefits, address the needs of the host populations by enhancing their standards of living both in the present and in the future (Liu et al., 2013), in already developed countries and those that are still emerging (Mitchell & Hall, 2005), always thinking about intragenerational and inter-generational equity (Liu, 2003).

In their literature review of the concept of sustainable tourism, Zolfani *et al*. (2015) conduct a thorough review of 132 journal articles published in 47 sustainability and tourism journals between 1993 and 2013, and group them in fourteen categories of subject areas: (1) Paradigm; (2) Sustainable Tourism Development; (3) Market Research and Economics; (4) Policy Making; (5) Infrastructure; (6) Modelling and Planning; (7) Rural Tourism; (8) Environment

and Crisis Management; (9) Ecosystem and Eco-tourism; (10) Climate Change; (11) Ecology; (12) Culture and Heritage; (13) Human Resource Management; (14) Energy and Material Saving.

2.2 DEFINITION OF SUSTAINABLE TOURIST

Since the aim of this study is to start a dialogue towards bridging the gap detected by scholars in the existing literature between the sustainable intention and the actual behaviour tourists have when on vacation, it is necessary to offer a definition of what is meant by "sustainable tourist".

Multiple definitions of this concept have been given, and a comprehensive overview of how a sustainable tourist has been defined over the years is offered by Juvan and Dolnicar (2016) (*Table 2.1*). The authors arrive to the conclusion that all of the definitions are based on one of the following assumptions: 1) if a person manifests pro-environmental values and beliefs, she can be classified as environmentally sustainable; 2) if a person manifests pro-environmental intentions, she can be classified as environmentally sustainable; 3) in order for a person to be classified as environmentally sustainable, it is necessary for her to behave accordingly, since values, beliefs and intentions are not sufficient (Juvan and Dolnicar, 2016).

Table 2.1 Definitions of environmentally sustainable tourists (Juvan and Dolnicar, 2016).

Study	Term used	Definition / Description
Krippendorf (1987)	The emancipated tourist	"informed and experienced tourist…with an increasing awareness of the importance of immaterial values such as health, the environment…" (p. 74)
Wood & House (1991)	Alternative or responsible tourist	"a tourist with the need to avoid having a negative impact on the destination" (p. 101)
	Good tourist	"audits himself and his holidays" (p. 102) within the context of the impact on the people and places
Poon (1993)	New tourist	"Sensitive to environment" (p. 115); "See and enjoy but does not destroy" (p. 145).
Ioannides & Debbage (1997)	Post-fordist tourist	"an independent, experienced, flexible (sun-plus) traveller, who repeats visits and demands green tourism" (p. 232)
Swarbrooke & Horner (1999)	Totally green tourists	"Not take holiday away from home at all so as not to harm the environment in any way, as a tourist" (p. 202)
	Dark green tourists	"Boycott hotels and resorts which have poor reputation on environmental issues" (p. 202) and

		"pay to go on holiday to work on a conservation project" (p. 202)
	Light green tourists	"Think about green issues and try to reduce normal water consumption in destinations where water is scarce" (p. 202), "use public transport … while on holiday" (p. 202)
Dinan &Sargeant (2000)	Sustainable tourist	"someone who appreciates the notion that they are a visitor in another person's culture, society, environment and economy and respects this unique feature of travel" (p. 7)
Miller (2003)	Green consumers [in tourism context]	"actively seeking and then using that information [green product information] in the decision-making process for their holiday" (p. 33)
Dolnicar (2004)	Sustainable tourists	tourists "who care about maintaining and protecting the natural environment at the travel destination" (p. 212)
Crouch et al. (2005)	Environmentally caring tourist	"the efforts to maintain unspoilt surroundings play a major role" (p. 14)
Dolnicar (2006)	Nature conserving tourists	"want to protect the natural resources and act in a nature-conserving way during their vacation" (p. 237)
Dolnicar & Matus (2008)	Green tourist	"behave in an environmentally friendly manner when on vacation in a wide range of tourism contexts" (p. 320)
Stanford (2008)	Responsible tourist	Has several dimensions, including "the concepts of respect, awareness, engagement (and taking time to engage), excellence and reciprocity, as well as the harder facts of spending money" (p. 270).
Dolnicar & Long (2009)	Environmentally responsible tourist	"assigns some value to the environmental responsibility demonstrated by the tour operator" (p. 10)
Bergin-Seers & Mair (2009)	Green tourists	"are interested in being environmentally friendly on holiday; at times select holidays by considering environmental issues; and are potentially willing to pay extra for products and services provided by environmentally friendly tourism operators" (p. 117)
Mehmetoglu (2009)	Sustainable tourists	have a "consumption attitude or behaviour that intends to contribute to ecological … sustainability in a holiday context" (p. 8)
Mehmetoglu (2010)	Sustainable tourist	"Someone who was [is] concerned about sustainability issues (i.e. of economic benefit to local people" (p. 184)
Wehrli et al. (2011)	Sustainability aware tourist	"sustainability is among the top three influencing factors while booking vacations" (p.2).

	Ecological type sustainable tourist	"considers in particular ecological aspects to be relevant for sustainable tourism" (p. 2)
Perkins & Brown (2012)	A true ecotourist	"traveller with strong biospheric values, who expresses greater support for environmental responsibility in tourism, expresses support for green tourism suppliers, feels less entitled to consume resources simply for enjoyment without considering personal impact on environments" (pp. 795-796)
Shamsub & Lebel (2012)	Sustainable tourists	"those who (1) agree with a code of conduct that recommends how they as visitors should behave, (2) appreciate that their activities have impacts on the environment and tailor their actions accordingly; (3) would like to make economic contribution to the host economy and therefore purchase local products such as food and crafts" (p.27)
Lee et al. (2013)	Sustainable tourist	"A person [tourist] respects to local culture, conserves natural environment, and reduces interference of local environment" (p.457).
	Pro-environmental tourist	"A person [tourist] voluntarily visits a destination less or none while the spot needs to recover because of environmental damage" (p. 457).
	Environmentally friendly tourist	"A person [tourist] takes action to reduce the damage of a specific destination" (p.457).
	Environmentally responsible behaviour	"any action that alleviates the adverse environmental impact of an individual or group" (p.466)
Chiu et al. (2014)	Environmentally responsible tourist	A tourist who helps limit or avoid damage to the ecological environment

The definitions reported above focus on different aspects, being more or less specific and leaving or not space to interpret the concept more openly. Not many of them are centred on the behavioural aspect of the concept, which is what this study actually aims at observing, after intervening with manipulations on the intention; hence, what seems to be a suitable definition is the one formulated by Juvan and Dolnicar (2016):

Intended environmentally sustainable tourist behaviour is when a person makes a vacation-related decision or displays behaviour at the destination that is different from how they would have otherwise decided or behaved for reasons of environmental sustainability.

2.3 DEFINITION OF GAMIFICATION

As previously mentioned in the introduction, gamification is referred to as "an informal umbrella term for the use of video game elements in non-gaming systems to improve user experience (UX) and user engagement" (Deterding *et al*., 2011). These elements are often applied on the basis of concepts like emotions, motivation, attractiveness, engagement, commitment, whose ultimate goal is to eventually raise, increase or direct a certain behaviour (Marache-Francisco and Brangier, 2013). Liu *et al*. (2011) use the concept of gamification loop; at the centre of the loop a point system can be found, and this is in turn surrounded by a precise structure: definition of the challenge; establishment of winning conditions; presence of rewards, leader board and badges; and, ultimately, an automatic change in the players' social and network status. Nevertheless, several critiques have been raised on the efficacy of solely using feedback elements, since this is believed not to be sufficient in boosting intrinsic motivation (Marache-Francisco and Brangier, 2013). The concept of intrinsic motivation, in opposition to extrinsic motivation (Ryan and Deci, 2000a), can be found in the Self-Determination Theory (SDT), a social-psychological theory that adds, in comparison to theories from the same field, the assumption that human behaviours are not always dictated by the context, but that individuals have inner tendencies to act autonomously (Deci and Ryan, 1991). According to this theoretical framework, intrinsic motivation is defined as "the doing of an activity for its inherent satisfactions rather than for some separable consequences" (Ryan and Deci, 2000b); on the other hand, extrinsic motivation refers to activities carried out with the goal of achieving tangible rewards or some separable outcomes (Ryan and Deci, 2000b). Intrinsic motivation can be implemented through fostering the need for autonomy, defined as a feeling of causality that individuals want to perceive and that gives them perception of control over their own actions (Deci and Ryan, 1991).

Marache-Francisco and Brangier (2013) elaborate a gamification design process - based on many elements already taken from the existing literature – divided into two major steps: context analysis and iterative concepts. The former consists of gathering the necessary knowledge regarding the situation where gamification wants to be applied, the intention that rouses the necessity for gamification, the tasks and the user(s) profile(s) (Nicholson, 2012). The latter focuses on choosing the experience to design for; when executing this part of the design process it is important to have in mind six core principles (Marache-Francisco and Brangier, 2013): (1) freedom of choice – endowing user(s) with the chance of making free decisions, like disabling functions and quitting (Marache-Francisco and Brangjer, 2013); (2) benefits and

meaningfulness – making use of gamification tools should be an added value to both the end user(s) and those who implement it, otherwise non-meaningful elements could be either ignored or perceived badly (Deterding, 2011); (3) personalised experience – different users have different characteristics, hence ignoring and generalising them would be counterproductive (Nicholson, 2012); (4) long-term interaction – designing keeping in mind that there should be an evolution in the interaction (Kim, 2011); (5) unwanted secondary effects anticipation – including, for example, stress for the performance (Apter, 1991), feeling of violation of privacy, focusing on extrinsic elements like rewards (Montola et al., 2009); (6) legal and ethical matters – referring to legal aspects like data protection (Werbach and Hunter, 2012; Kumar and Herger, 2013).

Even though gamification *per se* is a relatively recent discipline, its application is being explored in a broad range of fields, like business, education, and health care, for a variety of scopes, like training, medical applications, leisure activities, marketing campaign, sustainable behaviour application (Xu *et al*., 2017), yet the hospitality industry is not fully benefitting from it (Negrusa *et al*., 2015). Connecting sustainability and gamification, Seaborn and Fels (2015) consider that "Sustainability applications seek to support and encourage sustainable behaviours, such as reducing the amount of resources used, investing in recycling initiatives and renewable forms of energy, and reusing material whenever possible". Information and Communications Technology (ICT) has been used, among other touristic purposes, to promote sustainability through: (a) Destination Management System (DMS), whose aim is to amplify the positive of tourism by promoting appreciation and protection of vulnerable ecosystems and resources (Buhalis, 1997); (b) Geographical Information System (GIS), which explores sustainability of locations for proposed developments (Bahaire and Elliott-White, 1999). Negrusa *et al*. (2015) make a review of potential gamification's applications in the tourism industry and how this could originate multiple effects: (a) improved tourist relationship – gamification can been seen as a tool to remodel fidelity schemes, update the way of doing advertising, create new and tailored touristic products; (b) enhanced HR dynamics – gamification can be applied to training, in order to reduce resource consumption with regard to money, travelling and manpower; to recruiting, by targeting concurrent international candidates; stimulating and monitoring productivity; (c) better community relationships – since studies comparing resource consumption at home and on vacation show a significant increase in the latter case (Schipper *et al.*, 1989; Bin and Hadi, 2005), gamification can be a tool to direct tourists towards the adoption of more considerate behaviours in terms of, for example,

energy, water, gas, food consumption. This can be made possible by giving tourists the feasibility of quantifying their advancements and progresses – through collection of points and chance to get discounts (in restaurants and hotels, for example); targets to reach – through progressions of levels; the opportunity of being in competition with other tourists – through lead boards and scores (Negrusa *et al.*, 2015).

2.4 THEORY OF PLANNED BEHAVIOUR

The theoretical model used as the starting point in this work is the Theory of Planned Behaviour (TPB) (Ajzen *et al*, 1992). This has evolved from the previously elaborated Theory of Reasoned Action (TRA) (Ajzen and Fishbein, 1980) and it consists of the addition of a variable to the already existing model. The TRA stipulates that behavioural intentions, the natural antecedent of actual behaviours, are a direct outcome of someone's beliefs that holding a certain behaviour leads to determinate consequences (Ajzen *et al*, 1992). These beliefs lie into two conceptually separated notions: behavioural and normative; the former is considered the basis for an individual's attitude towards performing an action, whereas the latter affects an individual's subjective norms; consequently, the TRA sees behaviours being anticipated by intentions, which in turn have foundation in attitude and subjective norms (Ajzen *et al*, 1992).

"(…) attitudes develop reasonably from the beliefs people hold about the object of the attitude" (Ajzen 1991). Before performing a behaviour, individuals associate to it certain beliefs connected to certain outcomes, that can be either positive or negative; at the same time immediately associating an attitude to a specific behaviour (Ajzen, 1991). This relationship can be mathematically expressed through the following equation: A α $\sum b_i e_i$, interpretable as: a person's attitude (A) is directly proportional (α) to the sum of all the products between each belief's strength (b) and the correspondent subjective evaluation of the attitude towards that belief (e) (Ajzen, 1991).

"Normative beliefs are concerned with the likelihood that important referent individuals or groups approve or disapprove of performing a given behaviour" (Ajzen, 1991). The relationship between NB and SN can be mathematically expressed through the following equation: SN α $\sum n_i m_i$, meaning that SNs are directly proportional (α) to the sum of all the products between each normative belief's strength (n) and the correspondent person's motivation to comply to that SN (Ajzen 1991).

The only means other variables have to enter the model, hence to have a concrete impact on the intentions, is exclusively through the direct impact that they can exercise on attitude and

subjective norms (Ajzen *et al*, 1992). Fishbein and Ajzen (1975) (in Ajzen *et al*, 1992) point out three situations where the relationships between intention and behaviour is potentially altered: 1) level of equivalence between the measurement of the intention and that of the behaviour, referring to the depth of their measurement; 2) cohesiveness of intentions between the moment these are measured and when the behaviour actually takes place; and 3) control that an individual can exert over the performance of an action.

The same authors of the TRA expand on the model described above, bringing to life the TPB. Through the TPB, the authors intervene on the concept of "control of the individual on an action" by introducing a new variable: perceived behavioural control (PBC) (Ajzen, 1985 in Ajzen *et al*, 1992). This concept represents the conviction that someone has about possessing the resources and opportunities required to perform a certain action, consequently establishing a positive correlation between the confidence of being equipped with the necessary means of carrying out a behaviour and the actual behaviour itself. "(…) control beliefs may be based in part on past experience with the behaviour, but they will usually also be influenced by second-hand information about the behaviour, by the experiences of acquaintances and friends, and by other factors, that increase or reduce the perceived difficulty of performing the behaviour in question" (Ajzen 1991). Hence, PBC can be expressed as follows: PBC α $\sum p_i c_i$, where PBC is directly proportional to the sum of all the products between each control belief (c) and the correspondent perceived power (p) that can be exercised when carrying out a certain action (Ajzen, 1991). In the TPB, PBC is treated as an exogenous variable having a double impact in the model: when PBC is truthful, it offers relevant information on the actual control that a person is able to exercise in a certain situation and therefore can be used as a direct predictor of behaviour (Ajzen, 2002); its indirect impact is based on the assumption that PBC influences intention first (Ajzen *et al*, 1992).

The TRA, especially in its upgraded version TPB, is extremely popular among scholars whose aim is to study the intention and consequent behaviour of individuals in relation to environmental and sustainable thematic (Nguyen *et al*., 2019), hence the appropriateness of this theory for the intent of the current study. Between the authors who have built their argument based on this theory it is possible to mention: Vermeir and Verbeke (2008) who studied sustainable food consumption in Belgium; Kaiser and Gutscher (2003) who try to predict ecological behaviours in households and find that cumulatively, the three TPB's variables account for 81% of intention's variance and intention explain ca 52% of the respondents' ecological behaviour; Paul *et al*. (2016) who use the TPB to predict Indian

consumers' green purchase intention and they add another variable, namely environmental concern, to the model; Chen and Tung (2014) who extend the TPB including environmental concern and also perceived moral obligation to study tourists' intention to visit green hotels; Chen (2016) who relies on the TPB to explain the root cause for which people engage in energy saving and carbon reduction behaviours with the intent to mitigate climate change's issues; Maloney *et al*. (2014) who make use of the TPB to explore the willingness to purchase organic apparel, also expanding the model to include awareness.

The ample use that has been done of the TPB in the investigation of sustainability issues has brought Mancha and Yoder (2015) to the creation of an ETPB, where "e" stands for environmental. Based on the literature, they highlight the importance of considering the role played by self-identity in the formation of green intent, pointing out how scholars have extended the TPB by using multiple ways of treating the concept of self-identity. In their construct, Mancha and Yoder (2015) test A, SN and PBC as variables depending on interdependent self-construal and independent self-construal. Ultimately, they suggest that people who show a stronger sense of identity, either in relation to themselves or to the sense of commitment they nurture towards others, might be those who majorly contribute to environmental awareness and action (Mancha and Yoder, 2015).

2.5 SENSITIVITY

Pan *et al*. (2018) study the impact that knowledge regarding environmental matters has on the concepts of "sensitivity" and "responsibility", which are inferred to exist in a direct relationship with the intention of behaving sustainably. This study is based on a sample of 390 tourism students from nine different universities in Taiwan. Results show that the impact of environmental knowledge on environmental intentions is 0.42 (t = 6.94 **, p < 0.01), meaning that environmental knowledge positively impact environmental intentions; furthermore, sensitivity and responsibility have a total mediating effect of 0.32 (t= 6.26 **, p < 0.01) (Pan *et al*., 2018).

Chawla (1998) describes environmental sensitivity as empathy felt towards the environment, considering it as a variable influencing the level of awareness of environmental matters and the propensity to translate it into behaviours. He believes (Chawla, 1998) that those who are concerned about the environment will be more interested in learning about it, being concerned for it, and ultimately taking action to safeguard it. Peterson (1982) divides the concept of environmental sensitivity into: "individuals' favour for natural environment" and "intention to

have action for a harmonious relationship with natural environments"; those manifesting sensitivity towards the environment are more concerned and appreciative of what surrounds them, although their concern is not strong enough to be followed up by a concrete action. Hungerford and Volk (1990) regards sensitivity as "an empathetic perspective towards the environment" which is one of the parameters contributing to responsible environmental citizenship and they also identify the closeness between sensitivity and behaviours. Cheng and Wu (2015) conduct a study on 512 tourists travelling to Penghu Islands, registering 477 valid questionnaires; in their model, amongst the four hypothesis they establish, they infer that (H1.1) environmental knowledge has a direct impact on environmental sensitivity and that (H2.1) environmental sensitivity exerts a direct impact on tourist place attachment and (H2.2) an indirect impact on environmentally responsible behaviour. Both hypotheses are significant and supported, and the goodness of fit of the overall model has a X^2 of 0.595 (pD 0.00, df D 31). Goh and Balaji (2016) use the term "environmental concern" indicating the degree to which an individual is involved in environmental matters; this definition is extremely close to that of sensitivity, hence the two locutions can be easily interchanged. They use environmental concern as one of the variables to justify green purchase intention, together with green scepticism and subjective environmental knowledge. Kim (2005) develops a model where environmental concern and perceived consumer effectiveness, both on a direct relation with the presence of collectivist traits, influence green purchase behaviour. Similarly, Hartmann and Ibanez (2010), after exposing 750 participants to different environmental advertisement, conclude that environmental concern positively affects consumers' attitude and purchase intentions towards an imaginary green energy brand.

2.6 RESPONSIBILITY

Hines *et al.* (1986) define responsibility as a psycho-social variable representing individual's feelings of duty or obligation. In his meta-analysis he explains that in the literature responsibility is referred to as either obligation towards the whole environment (expressed through concepts like social responsibility or personal responsibility to help the environment) or duty towards accomplishing more specific actions (for example the reduction of air pollution, the purchase of lead-free gasoline, recycling). A comprehensive explanation of Consumer Environmental Responsibility can be found in Stone et al. (1995): "a state in which a person expresses an intention to take action directed toward remediation of environmental problems, acting not as an individual consumer with his/her own economic interests, but through a citizen consumer concept of societal-environmental wellbeing. Further, this action

will be characterized by awareness of environmental problems, knowledge of remedial alternatives best suited for alleviation of the problem, skill in pursuing his or her own chosen action, and possession of a genuine desire to act after having weighed his/her own locus of control and determining that these actions can be meaningful in alleviation of the problem". Taufique *et al.* (2014) design a scale to measure environmental responsibility, where environmental knowledge is used as a predictor for it. Their study is conducted on a sample of 1345 university students in Turkey and they observe that where there is a higher level of environmental knowledge, students are more stimulated to developing attitudes, concern and responsibility in caring for the environment. Hsu and Roth (1999) explain environmentally responsible behaviour through locus of control, environmental action strategies and environmental responsibility. Paskova and Zelenka (2019) infer that a substantial attention in the field of social responsibility in a touristic framework is paid to the social responsibility of tourists; the interest is on: willingness of tourists to pay different ranges of price when receiving a standard touristic offer in the context of implementation of social responsibility; inclination to support social responsibility; tourists' social responsibility performance.

2.7 SELF-EFFICACY

Bandura (1991) defines self-efficacy as "people's beliefs about their capabilities to exercise control over their own level of functioning and over events that affect their lives" and as "the conviction that one can successfully execute the behaviour required to produce certain outcomes" and consequently, perceived self-efficacy is interpreted as "belief's in one's capabilities to organize and execute the course of action required to produce given levels of attainments" (Bandura, 1998). All these interpretations have one clear commonality: the focus is on the degree to which is possible to control the behaviour and not on the outcomes (Ajzen, 2002). In 1991, Ajzen uses the concepts of SE and PBC interchangeably when explaining his TPB, since they may look like two very similar concepts, but in 2002 he recognises how different they are and the need for a separation. Hanss and Bohm (2010) explore self-efficacy in the context of sustainable development and how domain-specific self-efficacy beliefs relate to general self-efficacy and to sustainable consumption behaviours. Kornilaki *et al.* (2019) want to explain why some small touristic businesses implement sustainable solutions and others don't, even though they seem to be equally concerned and in possession of the same amount of information. One of the solutions they find to describe differences in the actions taken is due to self-efficacy, which is used to explain sustainable attitude formation and the attitude-behaviour gap. In fact, their results indicate that perceived self-efficacy is influenced

by, and also influences, the external environment, how respondents interpret it, how they asses inner and outer elements and, finally, wether they possess or not the capabilities and drive to act consequently (Kornilaki *et al.,* 2019). Tabernero and Hernandez (2011) carry out interviews in Cordoba, Spain and prove that the merger between self-efficacy and motivation is needed to explain environmentally responsible behaviours, with a focus, in this case, on recycling behaviour. Oliver *et al.* (2019) partially confirm these findings; they investigate whether environmental values, attitudes towards recycling, perception of the value of recycling and environmental self-efficacy predict recycling knowledge, attitudes and behaviours both at home and when on vacation; they ultimately conclude that self-efficacy allows to explain tendencies to recycle at home but not when away.

2.8 PROPOSED RESEARCH MODEL AND HYPOTHESES

Considering the theoretical framework showed above, the final model used to investigate the research questions of this project results from a blend of different variables explored in environmental and sustainability studies. The TPB (Ajzen, 1991) represents the core structure of the model here in use, since its successful implementation in a number of studies related to environmental issues and its empirically tested suitability in measuring intentions that precede actual behaviours. Even though the three variables A, SN, PBC included in the model do not always equally impact the behavioural intentions, the goodness of the model is repeatedly proven. The fact that the TPB dates back to the '90s has given time to experiment the addition of other potentially significant variables affecting intentions or acting as moderators between intentions and behaviours. The model here used hence includes the TPB with the addition of three other concepts: sensitivity, responsibility, self-efficacy (Figure 2). The intent is to measure intentions to behave sustainably when on vacation by trying to understand the goodness of a model where A, SN, PBC, S, R, SE, usually not studied in the same context, are all posited as being on the same level influencing intentions.
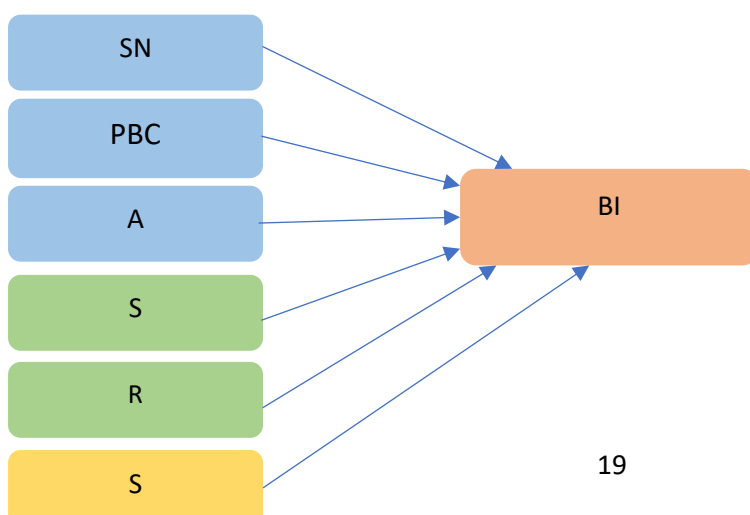

Figure 2 *Research Model*

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All the variables investigated are adapted to the context of this study, and are used to generate the following hypothesis:

H1: *Subjective norms have a positive and significant effect on the intention of tourists to behave sustainably when on vacation.*

H2: *Perceived Behavioural Control has a positive and significant effect on the intention of tourists to behave sustainably when on vacation.*

H3: *Attitudes have a positive and significant effect on the intention of tourists to behave sustainably when on vacation.*

H4: *Sensitivity has a positive and significant effect on the intention of tourists to behave sustainably when on vacation.*

H5: *Responsibility has a positive and significant effect on the intention of tourists to behave sustainably when on vacation.*

H6: *Self-Efficacy has a positive and significant effect on the intention of tourists to behave sustainably when on vacation.*

H10: *There is a statistically significant difference between the three groups (experimental group 1, experimental group 2, and control group) when measuring sustainable behavioural intention.*

3. METHODOLOGY

In the experiment there is the use of a convenience sample without preferences on the country of origin or residence of participants or their age. The treatment and the questionnaire are administered either in person or via Skype, hence creating an extremely controlled environment in both cases. The sample size is made of at least 30 persons per group. The self-administered questionnaire (SAQ) is made of prompted closed questions since they represent the easiest and most immediate technique to collect data; at the same time, this method risks yielding answers highly influenced by the social desirability bias, hence exaggerating results that picture respondents as having positive sustainable intentions and behaviours (Juan and Dolnicar, 2016). In cases where the use of prompted closed questions is absolutely unavoidable, as in this case, Juan and Dolnicar (2016) propose to insert them in such a way "(…) to minimize the possibility of the respondent guessing the purpose of the study as to minimize the perceptions of social expectations about the behaviour". Each variable of the model proposed in the

theoretical framework is assessed through items, taken and adapted from the already existing literature.

 The questionnaire is created through the software Sphinx iQ2 and results are then analysed through Excel and the software SmartPLS by using different statistical methods.

Respondents are randomly divided into three groups (Figure 3). One group (G1) is defined as "control group"; the aim of keeping a group as "control group" is that of studying what kind of behaviour follows certain intentions when no external input is given; in fact, this can be thought of as a neutral environment, necessary to understand how respondents would react when they are not biased by any collateral intervention.

Another group (G2) is defined as "experimental group number 1"; this group is subjected to a gamified tool. The aim of using this tool, as for the previous case, is to understand how respondents modify their intentions when they are manipulated through game elements.

The last group (G3) is defined as "experimental group number 2"; this group is subjected to a traditional communication strategy, for example either a short video or a short informative text or a brief storytelling. The aim of using a traditional communication strategy is to investigate how respondents modify their intentions when making contact with traditional communication strategy.

Figure 3.1 Graphical representation of the research experiment.

4. CONTRIBUTIONS AND LIMITATIONS

This project presents both contributions and limitations.

Among the former it is possible to enlist:

- The research methodology: an experiment is a valuable source of data gathering alternative to the more common questionnaire.
- The theoretical model: the TPB is taken as a reference point to investigate the topic, but at the variables attitude, social norms and perceived behavioural control, other three variables are added: sensitivity, responsibility, self-efficacy. Even though these variables have been already studied by practitioners, the novelty in this project is to combine them all together and investigate the goodness of this model;
- Three groups: respondents answering the first questionnaire will be consequently divided into three groups, giving the possibility to make intergroup comparisons;
- Sustainability goals: the idea is to understand if respondents would modify their intentions thanks to a gamified tool.

At the same time there are several limitations that is necessary to report:

- Social desirability bias: respondents might be negatively influenced by social pressure, consequently overreporting their intentions and behaviours, with the aim of making a better impression;
- Sample size: since the project is designed as an experiment and there are no funds allocated for it, it might be very difficult to engage with potential respondents and encourage them to take part in the experiment, hence the size of the sample might not be ideal for publication purposes;
- Adaptability of items: even though it is always safer to take items previously tested, it is not always possible, and using an adaption of an item might give a result that respondents might interpret differently than what it was expected, hence misleading the results.

WORKPLAN TABLE

Please note that the following workplan shows indicative dates by which it would be ideal to finish certain activities; nonetheless, adjustments will be surely made according to the research needs and eventual issues that might take longer to be solved. Deadlines are quite tight with the aim of working more rapidly since the beginning and eventually use buffer times when needed.

DEADLINE DATE	ACTIVITY NAME	ACTIVITY DESCRIPTION
30/09/2019	Exposé submission	Submission of abstract, introduction, theoretical background, methodology (without items), contributions and limitations.
20/10/19	Experiment creation	First step: creation of the questionnaire that must be used to assess intentions (find items, adapt them, translate them, design questionnaire, choose how to measure each item) and consequently create the questionnaire that will be used to assess behaviours (this is supposed to be a parallel of the first questionnaire). Second step: decide whether a pre-defined gamification tool will be used or will be specially created. If a tool will be created, this will require choosing the elements to insert, what has to be measured, and the ultimate results that should be obtained. After having all the elements, the experiment must be tested to check it runs smoothly and everything is in place. Whilst the experiment is created, also the written part (in the methodology) will be carried out parallelly, so that

		a good part of the final thesis will be already ready.
20/11/19	End of data collection phase	By this time data should be collected so that the analysis phase can take place.
20/12/2019	End of data analysis	By this time the data analysis and consequent writing part of the data analysis should be over.
31/12/2019	End of thesis writing	By now also the conclusions and limitations should be over, so that there will be enough time to proof-read everything, make the necessary changes and submit a printed copy of the project by the 13th of January.

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