

Implementation of Eco-Innovation in Hotels: A Dynamic Capabilities Approach

Abstract

In a context of increasing concern with environmental factors, hotels show a tendency to respond with passivity to eco-innovation. Furthermore, the literature is scarce about the way hotels adopt and integrate eco-innovation changes in their internal processes. As such, this article intends to present an integrative perspective of the dimensions that influence the adoption of eco-innovation, starting from the external dimension, which incorporates the context and drivers of eco-innovation. The internal dimension is divided into two levels: ordinary and dynamic capabilities. Based on a survey of a sample of hotels, the data were analyzed using partial least squares. The results indicate a positive and significant relationship between context and drivers in both dynamic and ordinary capacities. The influence of context on the green behaviour of hotels was only found in the technological dimension, while external drivers show a strong correlation with eco-innovation. The results also indicate that the two dynamic capacities and the three ordinary capacities studied have a positive and significant relationship with eco-innovation. The role of knowledge is highlighted, not only by its role in establishing a link with the external dimension, but also in the reconfiguration of the set of implementation capabilities that triggers eco-innovation.

Keywords: eco-innovation, capabilities, dynamic capabilities, PLS, hotel management

1. Introduction

In the hotel industry, eco-innovation it is gaining increasing importance as the environmental impacts of the sector are gaining more relevance (Wang et al., 2019). As such, eco-innovation practices have gained more prominence in the hotel industry by providing new business models in line with the growing demand from tourists for greener solutions (Aboelmaged, 2018; Bučar et al., 2019). The initial definition considered the development of new products, processes or services with significant decrease on environmental impact (Fussler & James, 1996). Other definitions followed. Some are simple and straightforward like Carrillo-Hermosilla et al. (2010): "innovation that improves environmental performance" (p. 1075) or "innovations which are able to attract green rents on the market" (Andersen, 2008). Other are more complex, for example European Union defined eco-innovation as "any form of innovation aiming at significant and demonstrable progress towards the goal of sustainable development, through reducing impacts on the environment or achieving a more efficient and responsible use of natural resources" (European Commission, 2007). Despite more than two decades of discussion, eco-innovation concept is still object of discussion (Díaz-García et al., 2015), but in general definitions "emphasize that eco-innovation is innovation that results in a reduction of the environmental impact of consumption and production activities, no matter whether or not that effect is intended" (Del Río et al., 2016, p. 2159).

Álvaro Dias, PhD, Corresponding author, Professor, Universidade Lusófona/TRIE, Lisbon, Portugal; ISCTE-IUL, Lisbon, Portugal; ORCID ID: <https://orcid.org/0000-0003-4074-1586>; e-mail: alvaro.dias1@gmail.com

Renato Costa, PhD, Researcher and Professor, ISCTE-IUL, Lisbon, Portugal; ORCID ID: <https://orcid.org/0000-0001-9364-534X>; e-mail: renatojlc@gmail.com

Leandro Pereira, PhD, Assistant Professor, ISCTE-IUL, Lisbon, Portugal; ORCID ID: <https://orcid.org/0000-0002-4920-0498>; e-mail: leandro.pereira@iscte-iul.pt

José Santos, PhD student, ISCTE-IUL, Lisbon, Portugal; e-mail: jose.santos@winning.pt

In the tourism sector, although there is a growing concern around eco-innovation, as a result of a higher attention paid by customers to firms' environmental concerns (Aguiló et al., 2005), few studies have focused on the thematic of green businesses in tourism from an integrative model perspective, especially in relation to the antecedents of tourism innovation and sustainability (Martin-Rios & Ciobanu, 2019; Wang et al., 2019). Considering the antecedents Aboelmaged (2018) defends that dynamic capabilities are the essential driving force for tourism eco-innovation, in particular due to the dynamic capabilities ability to initiate market changes (Wang et al., 2019).

Hjalager (1997) and Rodríguez-Antón and Alonso-Almeida (2019) discussed the slow pace in adopting innovation by the tourism industry, which is predominantly launched as part of defensive strategies. Tzschentke et al. (2008), in a small sample of thirty lodging operations, studied the role played by owners' personal values in decision-making. In the same vein, Ferrari and Vargas-Vargas (2010) analyzed entrepreneurs' environmental perceptions influence on business management of small tourism firms. An organizational capability construct was proposed by Leonidou et al. (2015) to explain eco-based competitive advantage. They used a sample of global hotel chains. Martínez-Pérez et al. (2015) analyzed social capital, knowledge-based approach and territorial perspective as antecedents of eco-innovation in small- and medium-sized firms in the cultural tourism sector. On the demand side, Han and Yoon (2015) analyzed hotel guests' decision formation. However, as suggested by Martin-Rios and Ciobanu (2019) there is no integrating framework that incorporates external and internal dimensions, as well as its link to performance.

Based on this framework, the objectives of this research are: (i) to develop an integrative model that incorporates the organizational and environmental (or context) dimensions as antecedents of eco-innovation in hotels; (ii) to explore the role of the dynamic capabilities as an antecedent of eco-innovation in hotels; (iii) to evaluate the function of knowledge exploration in the relationship between the external dimension and eco-innovation in hotels.

In order to clarify the underlying theoretical framework, usually neglected (Del Río et al., 2016), this research is based on the resource based view (RBV) for the internal dimension (Wernerfelt, 1984; Barney, 1991). In the same vein, Cheng et al. (2014) employed RBV theory as a framework for their conceptual model linking organizational resources and business performance. Their objective was to provide a holistic view in explaining the inter-relationship among eco-innovation implementation and performance. The link between institutional pressures, environmental innovation practices and performance was established by Li (2014) using RBV.

Our research also pretends to go further and include, in the conceptual model, an external dimension, considering firms environment or context. As such, the theoretical framework also includes corporate environmental strategy literature (Sharma, 2000; Aragón-Correa & Sharma, 2003). Finally, this research also intends to contribute by analyzing the impact on eco-innovation of internal factors such as resources and capabilities (Díaz-García et al., 2015).

2. Theoretical framework

Eco-innovation is conditioned by a set of factors or antecedents as indicated by Aboelmaged (2018). In the literature they are called drivers (Bossle et al., 2016; Hojnik & Ruzzier, 2015; Wang et al., 2019). These factors are usually divided into two main groups: external and internal. (Agan et al., 2013; Bossle et al., 2016; Del Río, 2009; Gadenne et al., 2009; Horbach et al., 2012).

The first group includes, among others, factors like regulatory pressures (Cainelli et al., 2012; Carrillo-Hermosilla et al., 2010; Demirel & Kesidou, 2011; Paraschiv et al., 2012), normative pressures (Berrone et al., 2013; Chen et al., 2012; Demirel & Kesidou, 2011; Carić, 2018; Paraschiv et al., 2012), cooperation (Buttol et al., 2012; Cainelli et al., 2012; Carrillo-Hermosilla et al., 2010), market pressure (Doran & Ryan,

2012; Horbach et al., 2012; Li, 2014; Marušić et al., 2018) and technology (Díaz-García et al., 2015; Hojnik & Ruzzier, 2015; Oltra & Jean, 2009).

Internal group includes factors within the organization, such as human resources (Cainelli et al., 2012; Hojnik & Ruzzier, 2015; Paraschiv et al., 2012), management systems (Agan et al., 2013; Qi et al., 2010; Wagner, 2007), cost saving (Berrone et al., 2013; Demirel & Kesidou, 2011; Horbach et al., 2012; Triguero et al., 2013), leadership (Arnold & Hockerts, 2011; Chen et al., 2012; Paraschiv et al., 2012), and other organizational capabilities (Berrone et al., 2013; Chen et al., 2012; Hojnik & Ruzzier, 2015).

2.1. External dimension

The regulatory drivers (Horbach, 2008; Ghisetti et al., 2015), cost savings (Horbach et al., 2012) and demand pressure (De Marchi, 2012) are referred to in the literature as the major external drivers on the adoption of eco-innovation strategies. Recently Segarra-Oña et al. (2018) found that environmental orientation of companies is proactively affected by the typology of innovations and the existing relationship between the market drivers (customers, competitors, clients and suppliers). Furthermore, as observed by Horbach et al. (2012) there is a strong influence of regulation on eco-innovations. As such, companies' motivation towards eco-innovations is much related with standards compliance, much more than by truly sustainable goals (Bossle et al. 2016). In other words, the response given by companies corresponds to compliance with a set of standards (Cainelli et al., 2015). Hjalager (1997) found that "innovations are predominantly launched as part of defensive strategies by the tourism industry" (p. 35). In the end, the differentiation that would be the basis of the competitive advantage is difficult to achieve because, probably, other competitors will adopt the same measures, leading to a situation of competitive parity. Differentiation can be considered a motivation on the adoption of eco-innovation initiatives (Cuerva et al., 2014).

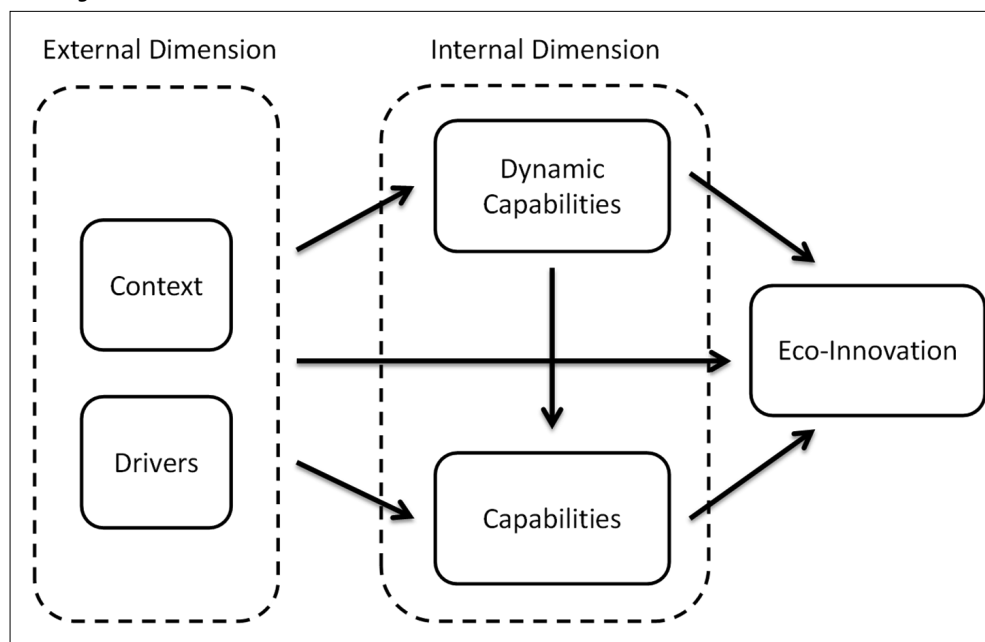
For the construction of an integrative model (Figure 1), the external dimension is certainly an aspect to consider. We considered this dimension composed by the context (affecting indirectly) and by the eco-innovation drivers (affecting directly). Hojnik and Ruzzier (2016) underlined the importance to capture the relevance of the local institutional and socioeconomic context. More recently, Horng et al. (2017) found that organizational environment moderates the relationship between innovation diffusion and environmental marketing strategy. The way it is structured is still on discussion in the literature. For example, Díaz-García et al. (2015) considers two external levels: macro and meso. Macro level includes items related to policy instruments and governance in economic development and innovation. Meso level includes market dynamics, pressure groups and networks that foster innovations that reduce negative impact of the economic activity on the environment. Bossle et al. (2016) considered that there are external factors over which companies have little control (they specify factors like regulatory pressures, normative pressures, market demands and changes in technology). Independently of having control or not, regulations often induced process innovations and recycling but other eco-innovations were introduced to obtain cost savings or to improve the corporate environmental image (Arundel & Kemp, 2009).

Recent literature as also emphasized the role of stakeholders on hotel innovation practices (Wang et al., 2019), suppliers (Aboelmaged, 2018) as well the customer demand (Horbach et al., 2012). Customer demand includes customers' environmental friendly attitudes and behaviors, green public procurement, and technology transfer and know-how support (Hojnik & Ruzzier, 2016). On the supply side, there are also several items considered, such as equity support, environmental research and development, pre-commercialization, education and training (Hojnik & Ruzzier, 2016).

However, the external dimension cannot be summarized on external drivers. The context is also a constraint of for eco-innovation strategies. Uncertainty in the company's environment creates economic risk that conditions investment decisions (Norberg-Bohm, 1999). Considering that the tourist market is made up

of a considerable proportion of international clients, it is important to understand the degree of influence they have on decisions of eco-innovation. For example, Han, Lee, Trang and Kim (2018) found that hotel practices such as water conservation and waste reduction essential to attract pro-environmental tourists. However, the influence of the international market in eco-innovation is not consensual. Some studies point to a positive influence on the strategies of eco-innovation (e.g. Horbach, 2008, Ghisetti et al., 2015, Cainelli et al., 2015), others evidence the opposite (e.g. De Marchi, 2012, Del Rio et al. 2015). The level of industry competitiveness is also another topic to consider on eco-innovation adoption. Nevertheless, this influence depends on the type of product (Ziegler, 2015), especially those linked to cost reduction. The technological intensity of the sector also appears as another factor due to the context. Some studies have shown that the relationship between the degree of technological intensity and the adoption of eco-innovation is significant (Del Rio et al., 2013, 2016).

Figure 1
An integrative model for eco-innovation in tourism



2.2. Internal dimension

Firm resources and capabilities can justify different responses to the same environmental challenges (Hornig et al., 2017). For this reason, the model should also address the internal dimension. Del Río et al. (2016) posits that internal dimension refers to resources, preconditions and features of the firms which facilitate an eco-innovative attitude. They also serve as a safeguard on the achievement of a sustainable competitive advantage, which is supported by the firms' resources and capabilities, which should be characterized by their uniqueness, inimitability, value creation and non-substitutability, as advocated by RBV (Barney, 1991; Li, 2014).

The discussion about internal dimension involves several perspectives. First, is the willingness to be environmentally friendly. Eco-innovation emerges not because of external context or drivers but because it is a deliberate choice by firm owner. Tzschentke et al. (2008) points the role played by personal values in small firms' decision-making. Their findings suggested that personal ethics are a key determinant of business ethical/environmental behavior. These aptitudes should be expanded to organizational capabilities considering: environmental leadership, environmental culture and environmental capability (Chen et al. 2012; Bossle et

al. 2016; Hojnik & Ruzzier, 2016). Second, besides owner (and eventually top-level manager) personal values about being environmentally friendly, his entrepreneurial behavior is another perspective to consider (Arnold & Hockerts, 2011). Ferrari and Vargas-Vargas (2010) analyzed entrepreneurs' environmental perceptions influence on business management. They found that environmental awareness is present in all rural tourism entrepreneurs, but with different degrees of managerial integration: some acted only according to customer demands, while others were cost driven. There were also ecopreneurs that planned "the entire management to achieving the environmental sustainability of their economic activities" (p. 413). Entrepreneurial behavior is considered by Andersen (2008) as a knowledge base for competitiveness through eco-innovation.

Third, furthermore managerial commitment with environmental issues and ecopreneurial behavior, other capabilities are also to be considered. One is technological competencies (Del Río et al., 2016) another is financing (Cainelli & Mazzanti, 2013).

Fourth, human resources and the way they are managed can be understood as a platform to enhance all these capabilities (entrepreneurship, technological knowledge, culture, etc.) (Cainelli et al., 2012; del Rosario & René, 2017) and, simultaneously, be the support of competitive advantage based on eco-innovation adoption (Horbach et al., 2012; Bossle et al., 2016; Hojnik & Ruzzier, 2016). Human resources are also a reflex of visionary management and managerial concern, considered two of the most important factors in the development of eco-innovations and green organizational identity (del Rosario & René, 2017; Díaz-García et al., 2015).

Fifth, eco-innovation implementation capabilities (Berrone et al., 2013; Cheng & Shiu, 2012) involves activities of establishing different forms of organization and management through the firms in order to change or improve operational processes, existing products and the development of new products in response to changes in external environment (Mahmood et al., 2011). Cheng and Shiu (2012) identified three key dimensions: eco-organization implementation, eco-process implementation, and eco-product implementation.

As seen internal capabilities doesn't have the same strategic importance concerning eco-innovation. Some just permits to comply with the indispensable conditions to stay in business, but don't contribute to economic rents. Others are valuable in attracting customers and promoting differentiation from competitors. Still others, such as knowledge permits a continuous adaptation to market evolution. As such, the internal dimension can be understood at three levels: ▪ hypotheses

- (i) The minimum to comply with the regulations standards, which, at best, allows being equal - a competitive parity situation;
- (ii) The essential to aim differentiation through unique and difficult to imitate characteristics, which can provide a competitive advantage situation;
- (iii) The fundamental ones that allow maintaining superior levels of performance through the constant reinvention of the capabilities that underlie the eco-innovation strategy, which can lead to a sustained competitive advantage situation. Barney (1991) defined sustained competitive advantage when a firm is "implementing a value creating strategy not simultaneously being implemented by any current or potential competitors and when these other are unable to duplicate the benefits of this strategy" (p. 102).

3. Theoretical model and hypotheses

Figure 1 presents two dimensions of eco-innovation antecedents. The first dimension is external, which is also divided in two:

- (i) Context. The model integrates a contextual dimension which consists of several forces that affect all the players in the industry. Martínez-Pérez et al. (2015) divided those forces in three groups: technological turbulence which contemplates the speed and predictability of technological changes (Jaworski & Kohli,

1993), competition intensity that reflects the environmental hostility (Covin et al., 2000) and market dynamism that considers the velocity of customer preferences changes (Atuahene-Gima et al., 2006).

- (ii) External Drivers. On a plane closer to the company several external drivers of eco-innovation must also be considered. Previously discussed in the literature review, encompassing elements such as regulation, demand-pull and grants (Cai & Zhou, 2014).

These factors influence not only eco-innovation, but also internal factors, the second dimension, as explained below. The external influence on firms' resources and capabilities in many occasions result from environmental pressures such as "environmental regulation, grants, information campaigns on cost savings, and facilitating the integration of small firms in external knowledge flows" (Del Río et al., 2017, p. 285). The development of internal capabilities, among other factors, depends of firms' ability to form links within the environment. Those ties "provide stimuli for innovation, affiliate firms in business groups with buyer-supplier ties were particularly better able to acquire R&D capabilities than those without such ties" (Mahmood et al., 2011, p. 837).

The following hypotheses result:

- H1: The external dimension influences firms' eco-innovation.
- H2: The external dimension enhances the development of firms' capabilities
- H3: The external dimension contributes to the development of firms' dynamic capabilities

Considering now the internal dimension, the hypothesis should also consider the internal dimension by incorporating the firms' resources and capabilities. The existence of external drivers or triggers can create a framework for the development of eco-innovation, but without internal competencies to embrace projects of eco-innovation the results will be very limited. They can be considered just as internal drivers (Agan et al., 2013; Cainelli et al., 2012; Hojnik & Ruzzier, 2015; Wagner, 2007) or they can be considered on a deeper approach. As previously discussed, they don't have the same strategic importance, as defended by RBV. This means that some internal resources and capabilities are just enough to permit to comply with regulatory standards, but it also means that other capabilities can contribute both to eco-innovation and competitive advantage (Leonidou et al. 2015). Considering the capabilities' role on the development of eco-innovation, the following hypothesis can be raised:

- H4: Eco-innovation resources and capabilities contributes to eco-innovation

In the model, there's a distinction within capabilities. Winter (2003) distinguished ordinary capabilities from higher order capabilities. The former are "those that permit a firm to 'make a living' in the short term" and the later he define as dynamic capabilities which are "those that operate to extend, modify or create ordinary capabilities" (p. 992). As such, ordinary capabilities can be considered as related to firms' daily life', whereas dynamic capabilities can be understood as capabilities to change capabilities (Helfat & Winter, 2011). Dynamic capabilities permit to sustain competitive advantage in the context of environmental change (Helfat & Peteraf, 2009). On this vein, the conceptual model considers both kinds of capabilities, the influence of dynamic capabilities on the other capabilities, as well their effect on eco-innovation. As such:

- H5: Dynamic capabilities contribute to development of eco-innovation resources and capabilities
- H6: Dynamic capabilities contribute to development of eco-innovation

4. Method

To test the model a quantitative study was conducted using a questionnaire applied to a convenience sample of Portuguese hotels from the center region of the country in May-June 2018. Portugal mainland is divided

in four main regions: north, center, Alentejo, and Algarve. This region was selected because it is the most expressive of the total country sector. The inclusion criteria were: independently run hotel and not part of an international chain; more than three years of activity (to be possible to measure the dynamic capability dimension), and to have more than 10 employees (to be possible to measure the RBV dimension). To ensure the overall perspective of the firm, the general manager or CEO were asked to respond the questionnaire. The operationalization of the model variables was done by using pre-existing measures in the literature, as described in the next section. A translation into Portuguese followed, and to ensure measures accuracy, a reverse translation was realized to verify consistency with original meaning. The questionnaire was then pre-tested with two hotel consultants and two hotel managers. Interpretation doubts lead to some adjustments. The use of an online questionnaire prevented respondents from missing any questions, since the response to each item must should be done before moving on to the next item.

4.1. Measures

Context measurement was divided in three dimensions: environmental hostility; market dynamism and technological turbulence. To measure environmental hostility, Covin et al. (2000) proposal was adapted considering a three items scale using questions such as "In the industry, the number of competitors is high". Market dynamism was measured by adapting a two item measure from Atuahene-Gima et al. (2006) with items like "In the industry, consumers' preferences change very quickly". Technological turbulence measurement was based on a four item scale from Jaworski and Kohli (1993) work. Items included questions like "In the industry, it is difficult foresee how the technology may evolve in the next years". In all three dimensions, Martínez-Pérez et al. (2015) adaptation to tourism industry was taken in consideration as well their seven-points likert scale (1 = strongly disagree, 7 = strongly agree).

External drivers were measured using five items collected from Cai and Zhou (2014) and Eurostat, Final harmonized CIS-2008 questionnaire. Items included sentences like "the government's forced environmental regulations on enterprises' energy saving and environmental protection" or "availability of government grants, subsidies or other financial incentives for environmental innovation". A five-point Likert scale was used to obtain the perception of the respondents (1 = strongly disagree, 5 = strongly agree).

Internal capabilities were measured by adapting 16 item scale from Cheng and Shiu (2012) which refers to 'organizational members' capabilities and commitment to implement new forms of management, organization, processes and product conducive to eco-innovation. According to their construct these capabilities can be divided in: eco-organization implementation, eco-process implementation and eco-product implementation. We used a five-point Likert scale (1 = strongly disagree, 7 = strongly agree). Questionnaire items were like "our unit management often uses novel systems to manage eco-innovation" or "our unit often emphasizes developing new eco-products through new technologies to use natural materials".

Dynamic capabilities included integrating capacity of eco-innovation and knowledge exploration strategy. The former was measured using Cai and Zhou (2014) four item scale. Respondents were asked to rank their enterprise's position compared to the level of the same domestic industry, where 1 = Least; 2 = Slightly below the average; 3 = Industry average level; 4 = Slightly above the average; and 5= Most. Items included topics such as "conversion time of new products/services" or "the enterprise's ability to adjust to the rapid promotion of eco-innovation". To measure knowledge exploration strategy, the scale proposed by Martínez-Pérez et al. (2015) which was previously adapted from Revilla et al. (2010) was adopted. It consists of a four item measure with a seven point likert scale (1 = strongly disagree, 7 = strongly agree). Items were like "we find out and creatively solve problems in products or services that generate customer dissatisfaction" or "we incorporate constantly new knowledge, ideas, and methods".

To measure eco-innovation, the scale from Martínez-Pérez et al. (2015) was adopted. Respondents were asked to evaluate the degree of eco-innovations introduced during the last five years, in a seven-point likert scale

(1 = none, 7 = many). The measure included six items covering areas like products or services, production processes, delivery methods, business strategies, managerial procedures and marketing techniques.

The final questionnaire is composed of 50 items divided as follows. A first section with six questions to characterize the hotel. Section 2 corresponds to the external dimension (context and drivers) and section 3 to the internal dimension (dynamic and ordinary capabilities). A final section measures eco-innovation.

5. Results and discussion

A sample of 531 hotels randomly was selected from an industry database to respond the questionnaire. A final sample of 62 hotels allowed a response rate of 11.67% (sample error of 6.57%). The respondents had the following characteristics: 72% were male, and 38% were female; 12% were between 18 and 30 years old, 38% between 31 and 40 years old, 27% between 41 and 50 years, and 23% had more than 51 years old. The sample is representative of the population by means of firms' size and regional distribution. Table 1 summarizes the characteristics of hotels whose management agreed to participate in the survey.

Table 1
Characteristics of respondent firms (N = 62)

Characteristic	%	Characteristic	%
Years of activity (firm)		Labor force	
Less than 5 years	16%	Less than 20 employees	15%
5 – 10 years	22%	21 – 50 employees	17%
11-20 years	27%	51-150 employees	35%
21 years and more	35%	More than employees	33%
Number of years of eco-innovation		Procedures to identify and regularly reduce environmental impacts	
Less than 3 years	15%	Yes	38%
3 – 5 years	25%	No	62%
6-10 years	27%		
11 years and more	33%		

According to the results, hotel managers recognized they compete on a turbulent environment biased by market dynamism (Mean = 5.397) and competitors hostility (Mean= 5.397). External drivers were considered to be of lesser importance by the respondents (even taking into account that it was a scale of 1 to 5). As such, the context was considered as a source of concern in relation to external drivers. This concern is consistent with Bossle et al. (2016) work since the context includes forces over which companies have little.

In relation to the internal dimension of the model, the capabilities of eco-innovation ranked means of 4.671, 5.083 and 4.776 in relation to eco-organization implementation, eco-process implementation and eco-product implementation, respectively. Dynamic capabilities were slightly above ordinary capabilities, meaning that the hotels are investing in their ability to evolve and respond proactively to environmental changes. Knowledge exploration strategy had a very good result (Mean = 5.196) and integrating capabilities evidenced a lower mean value of 3.500 (scale from 1 to 5). For eco-innovation resulted a mean of 4.401 (scale from 1 to 5), which represented an average value.

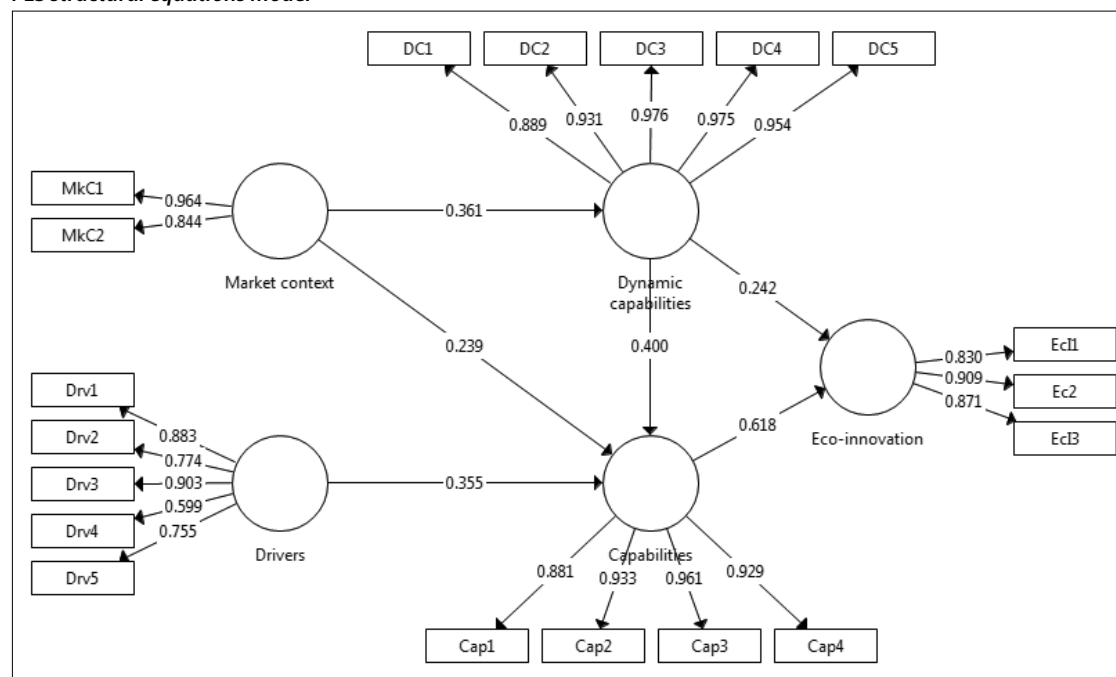
Table 2 presents the inter-correlations between the variables. We also used partial least squares (PLS) to test the measurement and structural models, a variance-based structural equation modeling tool (Hair et al., 2017), in SmartPLS 3 software (Ringle et al., 2015), Figure 2 and Table 3 show the results from PLS.

Table 2
Cronbach's alpha and Pearson correlations between the variables

	Cronbach's alpha	Mean	S. D.	2	3	4	5	6	7	8	9	10
1. Eco-innovation	.936	4.401	1.672	.632**	.380*	.702**	.713**	.762**	.654**	.303	.205	.425**
2. Knowledge strategy	.943	5.196	1.554		.567**	.773**	.730**	.725**	.655**	.416**	.351*	.470**
3. Integrating cap.	.929	3.500	.927			.647**	.442**	.451**	.362*	.495**	.575**	.549**
4. Cap. eco-org	.981	4.671	1.796				.903**	.815**	.711**	.548**	.430**	.368*
5. Cap. eco-process	.944	5.083	1.511					.863**	.738**	.622**	.486**	.385**
6. Cap. eco-prod.	.936	4.776	1.528						.769**	.584**	.389*	.466**
7. External drivers	.841	3.467	.958							.413**	.378*	.413**
8. E. hostility	.801	5.397	1.143								.804**	.553**
9. M. dynamism	.801	5.583	1.082									.689**
10. Tecnol. turb.	.875	5.226	1.042									

*p < 0.05; **p < 0.01.

Figure 2
PLS structural equations model



To evaluate the standards of the model, the researchers assessed the reliability, convergent validity, internal consistency reliability, and discriminant validity (Hair et al., 2017). All the standardized factor loadings were above 0.6. Furthermore, they were found to be reliable as they showed to be significant at $p < 0.001$. As can be seen in table, the average variance extracted (AVE) for all constructs were above 0.50 (Bagozzi & Yi, 1988), meaning that convergent validity is confirmed.

Table 3
Composite reliability and average variance extracted

	Composite reliability	Average variance extracted (AVE)
Capabilities	0.960	0.858
Drivers	0.891	0.625
Dynamic capabilities	0.977	0.894
Eco-innovation	0.903	0.757
Market context	0.901	0.820

According to the results, H1 was not supported, revealing the inexistence of a direct relation with eco-innovation suggests that both the context and the external drivers affects dimension, and, as a result, the firm is compelled to invest in eco-innovation. Results also indicate that the context influences directly and positively the dynamic capabilities and the three organizational capabilities studied. External drivers also showed a significant and positive influence both on the organizational and dynamic capabilities, providing support for hypothesis H2 and H3. These findings are consistent with the literature, since "environmental strategy adoption depends largely on public pressure and managerial environmental concern" (Hojnik & Ruzzier, 2016, p. 38). This is interesting since hotels seem to develop their internal capacities for eco-innovation, as a result of external influences, in particular the drivers, but this doesn't necessarily have repercussions on eco-innovation. Chen et al. (2012) and Wang et al. (2019) identified the 'internal origins' as important to environmental innovations. These findings are consistent with previous research since managerial environmental concerns are a strong internal driver to eco-innovation (Qi et al., 2010).

Two interpretations may result. Either there is an investment in capabilities which isn't translated into eco-innovation, or there may be other explanations so that the direct relationship between context factors and eco-innovation is not verified. Previous research alerts that the stage of adoption may affect this relationship (Kesidou & Demirel, 2012), or firms may need to evaluate past results from eco-innovation to further invest in this area (Horbach, 2008).

The results also indicate a key role of the dynamic capabilities on eco-innovation organizational capabilities. Furthermore, organizational capabilities are influenced by the context, the drivers and by the dynamic capabilities. In the latter case, the influence is more expressive. This effect is in line with the role played by knowledge transfer mechanisms in establishing a link between external environment and firm capabilities (Eisenhardt & Martin, 2000; Zahra & George, 2002). These results provide support for H5 and are consistent with previous research concerning the role dynamic capabilities on environmental orientation and eco-innovation practices in hotels (Aboelmaged, 2018).

Finally, the correlation with eco-innovation. There is a strong and positive relation of all three organizational capabilities with eco-innovation, proving support for H4. Capabilities relationship is stronger than the dynamic capabilities' influence on eco-innovation, what is predictable since their link to performance is indirect (Winter, 2003) as they are recognized as capabilities to change capabilities (Helfat & Winter, 2011). However, the influence of knowledge exploration is not negligible since it has a moderate high value, thus H6 is not supported. As previously mentioned knowledge plays an important role in the external link to sources of information and emerging technology. This represents an important contribution of this study since it underlines the key role of the dynamic capabilities in the development of hotel green capabilities and eco-innovation.

Our model and research is based on RBV theory which addresses the role of firms' bundle of resources and capabilities as a basis for competitive advantage (Barney, 1991). The proposed model integrates this dimension by including firms' eco-innovation implementation capabilities, which are influenced by external factors as well by internal dynamic capabilities that influence and change them (Helfat & Winter, 2011). Is also integrates corporate environmental strategy literature (Aragón-Correa & Sharma, 2003).

According to the findings, an integrative perspective of how eco-innovation evolves in hotels can be defined, extending recent research referring the need to fast develop eco-innovation in tourism to the hotel industry (Martin-Rios & Ciobanu, 2019). At the external level, the model incorporates not only the drivers to which the literature alludes, but also the broader context where the whole phenomenon unfolds. Market dynamism and technological and competitive turbulence can't be set aside in the conceptual model, since uncertainty is a determining factor for investment risk, including in innovation.

At the internal level there are also two levels within the capabilities that contribute to eco-innovation. At a first level, the eco-innovation implementation capabilities. These capabilities not only enable hotels to comply

with existing standards and regulations and equate competitors (Carrillo-Hermosilla et al., 2010), but above all are the basis for sustaining competitive advantage through market orientation and differentiation (Bossle et al. 2016). On a second level, dynamic capabilities allow the firm to be able to reinvent itself and maintain those competitive advantages (Eisenhardt & Martin, 2000; Winter, 2003). The role of knowledge and integrative capabilities allow adequate access to external information and technology sources, integrating them into internal routines (Leonidou et al., 2015).

Another contribution is the fact that this study is dedicated to a service sector, more specifically in hotels, in a realm of research on eco-innovation centered in industrial sectors (Cuerva et al., 2014; Cainelli et al., 2015). As such this study contributes to eco-innovation discussion bringing sectorial diversity.

6. Conclusion

According to the results of this study, the relationship between the context and the drivers of eco-innovation in both dynamic and ordinary capacities was identified. This is an important contribution because it clarifies, in the context of the hotel sector, the influence of external factors in the creation, development and change of the resource and capabilities base. In turn, the relationship of dynamic and ordinary capacities to eco-innovation has also been identified, which is also an important contribution of this research in enabling academics and professionals to understand that investment in eco-innovation must result from a previous process of allocating resources and capacities to engage in eco-innovation.

This research has four implications for eco-innovation research. First, this article presents a new integrative model linking the external environment to eco-innovation through dynamic and ordinary capabilities. Second, the results also shed light on the role of the dynamic capabilities as an antecedent of eco-innovation. Third, existing theory was expanded by enhancing the key role of knowledge exploration to mediate the relationship between the external dimension and eco-innovation. Fourth, the RBV theory was integrated in the hotel eco-innovation development.

This research is a basis for further research contributing to consolidate the results obtained in other countries and sectors. A larger and more international sample will be important to reinforce the results obtained. The research model incorporated specific variables for dynamic capabilities and ordinary capabilities. The same model can be further tested by changing the variables in each capability order. For example, dynamic capabilities can be measured in learning capabilities, networking, inter-functional integration or orchestration (Teece, 2012). Other ordinary capabilities can be used: technological, marketing, operational capabilities as well human resources management, leadership (Cainelli et al., 2012), entrepreneurship (Ferrari & Vargas-Vargas, 2010) or environmental management systems (Hojnik & Ruzzier, 2016).

This research also has some limitations. The sample presented has an acceptable representativeness value. However, its capacity for generalisation is limited. In this sense, future investigations may replicate the study in other countries and eventually with larger samples. Another limitation also related to the sample is that the moderating effects have not been studied. In particular, it will be important to test whether the model has different behaviours depending on some control variables. For example, the size of the hotel or its location may condition the results obtained and it is important to test its moderating effect.

References

- Aboelmaged, M. (2018). Direct and indirect effects of eco-innovation, environmental orientation and supplier collaboration on hotel performance: An empirical study. *Journal of Cleaner Production*, 184, 537-549.
- Agan, Y., Acar, M.F., & Borodin, A. (2013). Drivers of environmental processes and their impact on performance: A study of Turkish SMEs. *Journal of Cleaner Production*, 51, 23-33.

- Aguilo, E., Alegre, J., & Sard, M. (2005). The persistence of the sun and sand tourism model. *Tourism Management*, 26(2), 219-231.
- Andersen, M.M. (2008). *Eco-innovation—towards a taxonomy and a theory* [Paper presentation]. 25th Celebration DRUID Conference, Copenhagen, Denmark.
- Aragón-Correa, J.A., & Sharma, S. (2003). A contingent resource-based view of proactive corporate environmental strategy. *Academy of Management Review*, 28(1), 71-88.
- Armstrong, J.S., & Overton, T.S. (1977). Estimating nonresponse bias in mail surveys. *Journal of Marketing Research*, 14(3), 396-402.
- Arnold, M.G., & Hockerts, K. (2011). The greening dutchman: Philips' process of green flagging to drive sustainable innovations. *Business Strategy and the Environment*, 20(6), 394-407.
- Arundel, A., & Kemp, R. (2009). *Measuring eco-innovation* (Working paper series #2009-017). United Nations University.
- Atuahene-Gima, K., Li, H., & De Luca, L.M. (2006). The contingent value of marketing strategy innovativeness for product development performance in Chinese new technology ventures. *Industrial Marketing Management*, 35(3), 359-372.
- Bagozzi, R.P., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the Academy of Marketing Science*, 16(1), 74-94.
- Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99-120.
- Berrone, P., Fosfuri, A., Gelabert, L., & Gomez-Mejia, L.R. (2013). Necessity as the mother of 'green' inventions: Institutional pressures and environmental innovations. *Strategic Management Journal*, 34(8), 891-909.
- Bossle, M.B., de Barcellos, M.D., Vieira, L.M., & Sauvée, L. (2016). The drivers for adoption of eco-innovation. *Journal of Cleaner Production*, 113, 861-872.
- Bučar, K., Van Rheenen, D., & Hendija, Z. (2019). Ecolabelling in tourism: The disconnect between theory and practice. *Tourism: An International Interdisciplinary Journal*, 67(4), 365-374.
- Buttol, P., Buonamici, R., Naldesi, L., Rinaldi, C., Zamagni, A., & Masoni, P. (2012). Integrating services and tools in an ICT platform to support eco-innovation in SMEs. *Clean Technologies and Environmental Policy*, 14(2), 211-221.
- Cai, W.G., & Zhou, X.L. (2014). On the drivers of eco-innovation: Empirical evidence from China. *Journal of Cleaner Production*, 79, 239-248.
- Cainelli, G., & Mazzanti, M. (2013). Environmental innovations in services: Manufacturing–services integration and policy transmissions. *Research Policy*, 42(9), 1595-1604.
- Cainelli, G., De Marchi, V., & Grandinetti, R. (2015). Does the development of environmental innovation require different resources? Evidence from Spanish manufacturing firms. *Journal of Cleaner Production*, 94, 211-220.
- Cainelli, G., Mazzanti, M., & Montresor, S. (2012). Environmental innovations, local networks and internationalization. *Industry and Innovation*, 19(8), 697-734.
- Carić, H. (2018). Perspectives of greening tourism development – The concepts, the policies, the implementation. *Tourism: An International Interdisciplinary Journal*, 66(1), 78-88.
- Carrillo-Hermosilla, J., Del Río, P., & Könnölä, T. (2010). Diversity of eco-innovations: Reflections from selected case studies. *Journal of Cleaner Production*, 18(10-11), 1073-1083.
- Chen, Y.S., Chang, C.H., & Wu, F.S. (2012). Origins of green innovations: The differences between proactive and reactive green innovations. *Management Decision*, 50(3), 368-398.
- Cheng, C.C., & Shiu, E.C. (2012). Validation of a proposed instrument for measuring eco-innovation: An implementation perspective. *Technovation*, 32(6), 329-344.
- Cheng, C.C., Yang, C.L., & Sheu, C. (2014). The link between eco-innovation and business performance: A Taiwanese industry context. *Journal of Cleaner Production*, 64, 81-90.
- Covin, J.G., Slevin, D.P., & Heeley, M.B. (2000). Pioneers and followers: Competitive tactics, environment, and firm growth. *Journal of Business Venturing*, 15(2), 175-210.
- Cuerva, M.C., Triguero-Cano, Á., & Córcoles, D. (2014). Drivers of green and non-green innovation: Empirical evidence in low-tech SMEs. *Journal of Cleaner Production*, 68, 104-113.
- Del Río, P. (2009). The empirical analysis of the determinants for environmental technological change: A research agenda. *Ecological Economics*, 68(3), 861-878.

- Del Río, P., Peñasco, C., & Romero-Jordán, D. (2015). Distinctive features of environmental innovators: an econometric analysis. *Business Strategy and the Environment*, 24(6), 361-385.
- Del Río, P., Peñasco, C., & Romero-Jordán, D. (2016). What drives eco-innovators? A critical review of the empirical literature based on econometric methods. *Journal of Cleaner Production*, 112, 2158-2170.
- Del Río, P., Romero-Jordán, D., & Peñasco, C. (2017). Analysing firm-specific and type-specific determinants of eco-innovation. *Technological and Economic Development of Economy*, 23(2), 270-295.
- Del Rosario, R.S. M., & René, D.P. (2017). Eco-innovation and organizational culture in the hotel industry. *International Journal of Hospitality Management*, 65, 71-80.
- Demirel, P., & Kesidou, E. (2011). Stimulating different types of eco-innovation in the UK: Government policies and firm motivations. *Ecological Economics*, 70(8), 1546-1557.
- Díaz-García, C., González-Moreno, Á., & Sáez-Martínez, F.J. (2015). Eco-innovation: Insights from a literature review. *Innovation*, 17(1), 6-23.
- Doran, J., & Ryan, G. (2012). Regulation and firm perception, eco-innovation and firm performance. *European Journal of Innovation Management*, 15(4), 421-441.
- Eisenhardt, K.M., & Martin, J.A. (2000). Dynamic capabilities: What are they? *Strategic Management Journal*, 1105-1121.
- European Commission. (2007). *Competitiveness and innovation framework program (2007-2013)*. http://ec.europa.eu/cip/files/docs/factsheets_en.pdf
- Ferrari, G., & Vargas-Vargas, M. (2010). Environmental sustainable management of small rural tourist enterprises. *International Journal of Environmental Research*, 4(3), 407-414.
- Fussler, C., & James, P. (1996). *Driving eco-innovation: A breakthrough discipline for innovation and sustainability*. Financial Times; Prentice Hall.
- Gadenne, D.L., Kennedy, J., & McKeiver, C. (2009). An empirical study of environmental awareness and practices in SMEs. *Journal of Business Ethics*, 84(1), 45-63.
- Ghisetti, C., Marzucchi, A., & Montresor, S. (2015). The open eco-innovation mode. An empirical investigation of eleven European countries. *Research Policy*, 44(5), 1080-1093.
- Hair, Jr, J.F., Hult, G.T. M., Ringle, C., & Sarstedt, M. (2017). *A primer on partial least squares structural equation modeling (PLS-SEM)*. Sage Publications.
- Han, H., & Yoon, H. J. (2015). Hotel customers' environmentally responsible behavioral intention: Impact of key constructs on decision in green consumerism. *International Journal of Hospitality Management*, 45, 22-33.
- Han, H., Lee, J.S., Trang, H.L. T., & Kim, W. (2018). Water conservation and waste reduction management for increasing guest loyalty and green hotel practices. *International Journal of Hospitality Management*, 75, 58-66.
- Helfat, C.E., & Peteraf, M.A. (2009). Understanding dynamic capabilities: Progress along a developmental path. *Strategic Organization*, 7(1), 91-102.
- Helfat, C.E., & Winter, S.G. (2011). Untangling dynamic and operational capabilities: Strategy for the (n)ever-changing world. *Strategic Management Journal*, 32(11), 1243-1250.
- Hjalager, A.M. (1997). Innovation patterns in sustainable tourism: An analytical typology. *Tourism Management*, 18(1), 35-41.
- Hojnik, J., & Ruzzier, M. (2016). What drives eco-innovation? A review of an emerging literature. *Environmental Innovation and Societal Transitions*, 19, 31-41.
- Horbach, J. (2008). Determinants of environmental innovation—New evidence from German panel data sources. *Research Policy*, 37(1), 163-173.
- Horbach, J. (2014). Do eco-innovations need specific regional characteristics? An econometric analysis for Germany. *Review of Regional Research*, 34(1), 23-38.
- Horbach, J., Rammer, C., & Rennings, K. (2012). Determinants of eco-innovations by type of environmental impact—The role of regulatory push/pull, technology push and market pull. *Ecological Economics*, 78, 112-122.
- Horng, J.S., Liu, C.H., Chou, S.F., Tsai, C.Y., & Chung, Y.C. (2017). From innovation to sustainability: Sustainability innovations of eco-friendly hotels in Taiwan. *International Journal of Hospitality Management*, 63, 44-52.
- Jaworski, B.J., & Kohli, A.K. (1993). Market orientation: Antecedents and consequences. *The Journal of Marketing*, 53-70.
- Kemp, R., & Horbach, J. (2008). *Measurement of competitiveness of eco-innovation*. European Commission.

- Kesidou, E., & Demirel, P. (2012). On the drivers of eco-innovations: Empirical evidence from the UK. *Research Policy*, 41(5), 862-870.
- Leonidou, L.C., Leonidou, C.N., Fotiadis, T.A., & Aykol, B. (2015). Dynamic capabilities driving an eco-based advantage and performance in global hotel chains: The moderating effect of international strategy. *Tourism Management*, 50, 268-280.
- Li, Y. (2014). Environmental innovation practices and performance: Moderating effect of resource commitment. *Journal of Cleaner Production*, 66, 450-458.
- Mahmood, I.P., Zhu, H., & Zajac, E.J. (2011). Where can capabilities come from? Network ties and capability acquisition in business groups. *Strategic Management Journal*, 32(8), 820-848.
- Martínez-Pérez, Á., García-Villaverde, P.M., & Elche, D. (2015). Eco-innovation antecedents in cultural tourism clusters: External relationships and explorative knowledge. *Innovation*, 17(1), 41-57.
- Martin-Rios, C., & Ciobanu, T. (2019). Hospitality innovation strategies: An analysis of success factors and challenges. *Tourism Management*, 70, 218-229.
- Marušić, Z., Sever, I., Basta, J., & Žmuk, B. (2018). Towards informed and responsible environmental management: A case study of economic valuation of natural resources in Croatia. *Tourism: An International Interdisciplinary Journal*, 66(4), 461-475.
- Norberg-Bohm, V. (1999). Stimulating 'green' technological innovation: An analysis of alternative policy mechanisms. *Policy Sciences*, 32(1), 13-38.
- Oltra, V., & Saint Jean, M. (2009). Sectoral systems of environmental innovation: An application to the French automotive industry. *Technological Forecasting and Social Change*, 76(4), 567-583.
- Paraschiv, D.M., Nemoianu, E.L., Langa, C.A., & Szabó, T. (2012). Eco-innovation, responsible leadership and organizational change for corporate sustainability. *Amfiteatru Economic*, 14(32), 404.
- Qi, G.Y., Shen, L.Y., Zeng, S.X., & Jorge, O.J. (2010). The drivers for contractors' green innovation: An industry perspective. *Journal of Cleaner Production*, 18(14), 1358-1365.
- Rave, T., Goetzke, F., & Larch, M. (2011). *The determinants of environmental innovations and patenting: Germany reconsidered* (Ifo Working Paper No. 97).
- Revilla, E., Prieto, I.M., & Prado, B.R. (2010). Knowledge strategy: Its relationship to environmental dynamism and complexity in product development. *Knowledge and Process Management*, 17(1), 36-47.
- Ringle, C.M., Wende, S., & Will, A. (2014). *SmartPLS 3.0*. Hamburg. www.smartpls.de
- Rodríguez-Antón, J.M., & Alonso-Almeida, M.D.M. (2019). The circular economy strategy in hospitality: A multicase approach. *Sustainability*, 11(20), 5665.
- Ryszko, A. (2017). Ecoinnovation performance and selected competitiveness issues perceived by managers in the EU member states—A crosscountry analysis. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, 65(5), 1751-1760.
- Segarra-Oña, M., Peiró-Signes, A., De-Miguel-Molina, M., & De-Miguel-Molina, B. (2018). How does the Spanish hospitality industry envision its eco-innovation orientation? In V. Katsoni & K. Velandar (Eds.), *Innovative approaches to tourism and leisure* (pp. 261-273). Springer.
- Sharma, S. (2000). Managerial interpretations and organizational context as predictors of corporate choice of environmental strategy. *Academy of Management Journal*, 43(4), 681-697.
- Teece, D.J. (2012). Dynamic capabilities: Routines versus entrepreneurial action. *Journal of Management Studies*, 49(8), 1395-1401.
- Triguero, A., Moreno-Mondéjar, L., & Davia, M.A. (2013). Drivers of different types of eco-innovation in European SMEs. *Ecological Economics*, 92, 25-33.
- Tzschentke, N.A., Kirk, D., & Lynch, P.A. (2008). Going green: Decisional factors in small hospitality operations. *International Journal of Hospitality Management*, 27(1), 126-133.
- Wagner, M. (2007). On the relationship between environmental management, environmental innovation and patenting: Evidence from German manufacturing firms. *Research Policy*, 36(10), 1587-1602.
- Wang, Y., Font, X., & Liu, J. (2019). Antecedents, mediation effects and outcomes of hotel eco-innovation practice. *International Journal of Hospitality Management*, 102345.
- Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal*, 5(2), 171-180.

- Winter, S.G. (2003). Understanding dynamic capabilities. *Strategic Management Journal*, 24(10), 991-995.
- Zahra, S.A., & George, G. (2002). Absorptive capacity: A review, reconceptualization, and extension. *Academy of Management Review*, 27(2), 185-203.
- Ziegler, A. (2015). Disentangling technological innovations: A micro-econometric analysis of their determinants. *Journal of Environmental Planning and Management*, 58(2), 315-335.

Submitted: January 12, 2020

Revised: May 20, 2020

Revised: July 22, 2020

Revised: August 05, 2020

Accepted: August 10, 2020

Refereed Anonymously