

Knowledge agents as drivers of environmental sustainability and business performance in the hospitality sector

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Knowledge agents as drivers of environmental sustainability and business performance in the hospitality sector

Abstract

This study examines the role of knowledge agents as key enablers in the process of creating and updating the environmental knowledge base of a firm and, in doing so, having a positive effect on business performance. From the perspective of a hotel as the most important cog in the machinery of the hospitality sector, knowledge agents are those individuals who can provide information and knowledge that enables the firm to deal with environmental issues effectively. The paper describes an empirical, longitudinal study of 87 organisations in the Spanish hospitality industry. The results highlight the importance of the relationship between knowledge agents and environmental knowledge for business performance. Furthermore, our findings indicate that the role of knowledge agents is also relevant for the future management of the environmental knowledge base of a firm within the hospitality sector.

Keywords: Knowledge agents, environmental knowledge, performance over time, hospitality sector

1. Introduction

As the basis for attaining sustainable development in countries and regions, environmental protection and the improvement of organisational performance become two of the highest priorities for business and society (Galpin, Whittington, & Bell, 2015; Tee, Abdullah, Din, Abdullah, & Wu, 2017). Globalisation and industrialisation have resulted in a shifting of the impact of local environmental issues to a larger scale or a wider region, often been transformed into international environmental challenges (Wheeller, 2005). Different initiatives have been adopted by organisations with the aim of addressing such problems while minimising their financial performance (Boiral, Raineri, & Talbot, 2016; Chien & Shih, 2007; Chin, Marcolin, & Newsted, 2003; Font, Garay, & Jones, 2016; Martínez-Martínez, Cegarra-Navarro, & García-Pérez, 2015).

It can also be argued that environmental issues have turned into one of the most serious concerns for organisations worldwide due to an increasing, global interest in “green” initiatives. Firms’ attitude toward sustainability issues is changing in response to a combination of an increasing social awareness of environmental issues and the dynamics of the related regulatory and competitive landscape (Fraj, Matute, & Melero, 2015). In this context, new systems are created to help firms formalise and use knowledge associated with industrial ecology in a business setting (Tee et al., 2017). Thus, the concept of environmental knowledge has emerged to describe the relationship between the firm and those systems which connect environmentally-related data sets, their analysis and people for the benefit of the firm and society (Singjai, Winata, & Kummer, 2018; Wernick, 2003).

Knowledge management is a distinctive subject domain which has developed rapidly over the last three decades (Durst & Edvardsson, 2012; Nieves & Haller, 2014; Omotayo, 2015). However, the subject has become more focused on the development of applications for the identification and solution of different types of knowledge-related problems. Over the next decade a better understanding of these people-related issues will drive knowledge management forward (Chase, 2006; Johannessen, 2017), besides, organizational knowledge loss has emerged as one of the most important corporate risks today (Massingham, 2018). In this context, the term environmental knowledge management has emerged to describe the use of knowledge management strategies, tools and techniques to create, share and reuse tacit and explicit knowledge resources related to the environment and its protection (Martínez-Martínez et al., 2015). It is perceived by scholars as a result of the combination of environmental knowledge resources and knowledge management practices (Singjai et al., 2018; Wernick, 2003). Although the subject has been studied for almost two decades and from a variety of perspectives, key issues that define a successful environmental knowledge management initiative have not received enough attention in the literature.

Commitment to the environment is perceived by many as an integral environmental right and a responsibility for individuals and organisations operating in several sectors (Bell, 2005). For the hospitality industry, such commitment is particularly relevant. Conscious those natural resources are limited, society expects that hotels and other stakeholders within the hospitality sector will make their demands for environmental protection increasingly explicit. Paradoxically, the sector has been only marginally influenced by recent environmental regulations and there is currently a lack of a homogeneous, cross-industry response to today’s environmental concerns (Boiral et al., 2016; Céspedes-Lorente, Burgos-Jiménez, & Álvarez-Gil, 2003; Darnall, Henriques, & Sadorsky, 2010; Rahman & Reynolds, 2016). Furthermore,

it is fair to argue that environmental knowledge and its management within the hospitality sector have become a widely neglected research setting in recent years.

One area that has received particularly limited attention is the role of individual stakeholders and their knowledge in the process of solving environment-related issues and in doing so contributing to hotels' performance (Jain & D'lima, 2018; Zientara & Zamojska, 2016). This is important because previous research shows that a reason why some hotels seek, adopt, manage and benefit from environmental knowledge is directly related to the role played in those processes by their individual knowledge agents (Martínez-Martínez, Cegarra-Navarro, & Wensley, 2017; Tee et al., 2017). Knowledge agents, in this context, have been defined as individuals with the willingness to invest their own resources into acquiring environmental knowledge for the benefit of the environment and, directly or indirectly, of their own institution. Thus, the purpose of this study is to analyse the role played by knowledge agents as key enablers of the processes of creating and updating the environmental knowledge base of an organisation, and the impact that these activities could have on business performance. All of these with focus on the hospitality sector in general and hotels in particular.

Previous research initiatives have perceived service organisations as less harmful entities for the environment than their industry equivalent (Dangelico & Pontrandolfo, 2015; González-Benito & González-Benito, 2005; Molina-Azorín, Claver-Cortés, Pereira-Moliner, & Tarí, 2009). This has led researchers and practitioners to put significantly less attention into the subject in a service environment than they have in other subjects (Mina, Bascavusoglu-Moreau, & Hughes, 2014).

While most of previous studies focus on measuring the proactive attitude of firms towards environmental protection (e.g. their explicit efforts for the reduction of pollution), this study adopts a fresh approach to the study of the subject. We understand that firms' ability to reduce its environmental impact is also determined by a combination of two key issues. These are (1) how knowledge agents can foster the creation, development and continuous updating of an environmental knowledge base within the firm, and (2) how the environmental knowledge base can help the firm improve their business performance. Thus, this research seeks to contribute to improving the current understanding of the environmental impact of a firm in terms of its relationship with the firm's ability to implement specific environmental knowledge management strategies. This has been achieved by running two observations of the evolution of the same variables in the same context within a six-year period, in 2008 and 2014.

The rest of this paper is organised as follows: the theoretical framework and hypotheses development are presented in section 2. Section 3 describes the methodological approach to conducting the research and details of the approach to data collection and analysis. The theoretical contribution and managerial implications of the research are discussed in section 4, while the conclusions of the research, managerial implications, limitations and recommendations for future research are included in section 5.

2. Theoretical framework and hypotheses development

2.1. Environmental knowledge and the Spanish hospitality sector

The hospitality sector is key to the success of the Spanish economy. In a sector that represents approximately 70% of global gross domestic product (GDP) from services (WTO,

2010), Spain is the third most important economy with US\$ 57 billion (WTO, 2016), preceded only by the United States of America with US\$ 178 billion and China with US\$ 114 billion.

In a move towards more explicit efforts to protect the environment, organisations that have developed and promoted environmentally friendly products and services have received support from their respective governments (Leonidou, Leonidou, Fotiadis, & Aykol, 2015). It is widely acknowledged that 'green practices' contribute not only to an improved public perception of organisations but also to a reduction in business costs (Mittal & Dhar, 2016). In this context, it has become a norm that tourists consider 'care for the environment' as part of their preferences when making a purchase decision. All this, combined with an immediate and increased access to information about the sector, helps tourists organise their holidays taking into consideration a range of environmental issues (Civre & Omerzel, 2015). Tourism-related organisations therefore face an increasingly complex and competitive environment. Adaptation to the new explicit and implicit environment-related norms and the embracing of innovation in this domain become key elements for success and often for survival (Cruz, Martinez, Hincapié, & Torres, 2016).

The idea of environmental knowledge refers to the way in which businesses align their strategic goals to sustainable development (Singjai et al., 2018; Wernick, 2003). Research by Fryxell and Lo (2015) defined environmental knowledge as a general knowledge of facts, concepts, and relationships concerning the natural environment and its major ecosystems. In their recent research, Martínez-Martínez, Cegarra-Navarro, & García-Pérez, (2015) found that the conservation of the environment becomes a key factor to be considered in the management of hotel operations. In this regard, environmental knowledge involves what people or agents know about the environment, key relationships leading to environmental aspects or their impact, and an appreciation of systems and collective responsibilities necessary for sustainable development (Frick, Kaiser, & Wilson, 2004). On this basis, this study has focused on providing the hospitality research and practice communities with an understanding of how knowledge agents can contribute to the development of new environmentally-conscious business strategies and to the adaptation of existing environmentally-focused approaches to business operation and management (Cegarra-Navarro & Martínez-Martínez, 2010).

2.2. Environmental knowledge: an enabler for knowledge agents

A wide range of knowledge agents can be identified within the hospitality sector. These generally include roles such as managers and employees in firms from all sectors, from travel and tourism to recreation, lodging and those dependants on food and beverage. Such agents require continuous acquisition of new knowledge in order to adapt their roles and responsibilities to the challenges posed by the current, changing environmental conditions. Knowledge agents often engage with customers in important face-to-face and online activities. These agents try to respond to external demands by using the skills and knowledge they have acquired over time, both within and outside their job. Thus, knowledge agents play a key role in the hospitality sector not only by making the right decisions but also by providing customers with valuable insights into environmental issues of relevance for both the customer and the business (Kim & Lee, 2013).

As they seek to meet their customers' needs, knowledge agents would share their expertise, become problem solvers and, as a consequence, improve the financial performance of their

organisation (Céspedes-Lorente, de Burgos-Jiménez, & Álvarez-Gil, 2003). Previous studies have shown that transactive memory systems (i.e. tacit knowledge of agents) potentially support initiatives designed to increase efficiency and effectiveness in the use of environmental practices (Fraj et al., 2015; Lewis, 2004). Thus, although knowledge agents often work autonomously or share knowledge with others within their own firm, they are also found collaborating with external institutions and individuals (Mundbrod, Kolb, & Reichert, 2013). In doing so, knowledge agents use their distinctive skills, experience and expertise to solve increasingly demanding and complex tasks on a regular basis. This collaboration and knowledge exchange with other bodies concerning initiatives of common interest is key to both the creation of new environmental knowledge and its absorption by the firm (Cegarra-Navarro & Martínez-Martínez, 2010; De Marchi & Grandinetti, 2013). This analysis has led to the formulation of the following hypothesis:

H1: Knowledge agents have a positive effect on the presence of environmental knowledge in a firm at a given point in time t .

In the face of the growing impact of environmental change on the planet, it has been acknowledged that businesses may gain a competitive advantage by creating and maintaining an up-to-date environmental knowledge base (Liao, Chang, & Wu, 2010; Singjai et al., 2018). Once the environmental knowledge base of the organisation exists, its continuous evaluation and updating becomes essential for it to be effective while dealing with the effects of new global challenges. Further, only an up-to-date environmental knowledge base enables compliance with the ever-evolving body of climate change legislation (Boiral et al., 2016; Font et al., 2016; Kim & Lee, 2013; Molina-Azorín et al., 2009). From a different perspective, authors such as Garay, Font, & Pereira-Moliner (2017), Liu (2018) and Thomas & Wood (2014) have argued that organisations ability to effectively capture and understand any new developments in the domain depends on the quality of their existing environmental knowledge base.

Scholars have already provided a single-moment-in-time ‘snapshot’ view of their findings on this subject (Font et al., 2016; González-Benito & González-Benito, 2005; Liao et al., 2010). However, despite the perceived imperative for studies focused on the evolution of environmental knowledge over time and the impact of this evolution on performance, a longitudinal perspective of the problem is still missing in the current literature.

This, together with the perceived consensus in the literature about the need for knowledge agents to continuously update their own knowledge (Fraj et al., 2015), suggest that a longitudinal study may become the right approach to elucidate the long-term effects of knowledge agents on the environmental knowledge base of an organisation

This research has therefore focused on the study of evolution of environmental knowledge over a six-year period, leading the authors to hypothesise that:

H2: The presence of an environmental knowledge base in an organisation at a point in time (t) favours the presence of an up-to-date environmental knowledge base in that organisation at a later stage ($t+6$ years)

Previous scholars have found that consumers not only endorse the activities and success of environmentally-friendly hotels (Han & Chan, 2013) but are also willing to pay more to

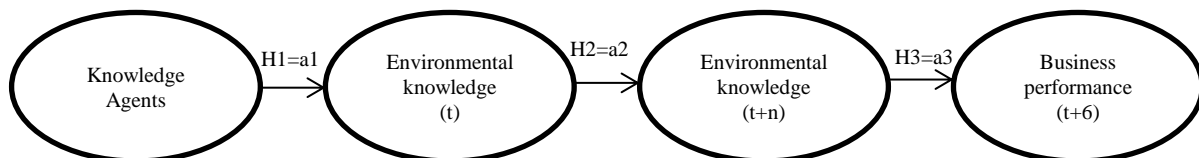
experience such activities (Ogbeide, 2012; Rahman & Reynolds, 2016). In those hotels perceived as ‘green’, environmental protection activities have been found to be embedded in business operations. This may bring some direct benefits, including cost savings, competitive advantage, perception of ecological responsibility, legitimisation, media recognition, risk reduction, employee commitment to the business, better outcomes of public scrutiny, enhanced investor relations, increased social benefits, local community support and better marketing benefits. (Bansal & Roth, 2000; Cegarra-Navarro & Martínez-Martínez, 2010; Céspedes-Lorente et al., 2003; Park, Kim, & McCleary, 2014). Such a range of benefits have the potential to drive up the occupancy rates of hotels and therefore improve their operational efficiency. All of this, in turn, drive hotels’ management and decision makers to embrace environmental management initiatives. It can therefore be argued that through improvements in their environmental knowledge base, hotels can improve the business performance and develop new sources of competitive advantage (Callan & Thomas, 2009; Dangelico & Pontrandolfo, 2015).

The above considerations led the authors to propose that hotel performance is likely to be positively associated to environmental knowledge as in the following hypothesis:

H3: The presence of an up-to-date environmental knowledge base at a given point in time (t+6) could enable a hotel to improve its business performance.

Consistent with these considerations, this research proposes the structural model shown in Figure 1, which could be briefly described as follows: knowledge agents become key enablers of environmental knowledge management in the medium to long-term, which in turn leads organisations to achieve improved levels of business performance.

Figure 1: Theoretical Model



3. Methodological approach

3.1 Data collection

The population sampling used in this study comprised managers of hotels within the tourist industry in Spain. The relevance of this sample was based not only on the maturity of the industry and its levels of environmental commitment, but also on the importance of this industry for the Spanish economy and in particular for its recovery over the period that this research was conducted. Approximately 13% of the Spanish gross domestic product (GDP) and 11% of all employment in the country are directly related to tourism (WTTC, 2017). All of these enabled the analysis of several aspects related to the presence of an up-to-date organisational learning strategy and levels of business performance in hotels. The National Classification of Economic Activities (CNAE-552) and the economic information database SABI (Iberian Balance Sheet Analysis System) were used in 2007 to identify a list of 560 hotels in Spain which had at least 10 employees.

From September to October 2008, in the first phase of the data collection, 560 hotels managers were contacted by telephone with an invitation to participate in the research. A sample of 245 managers agreed to participate and were later contacted with a survey. Therefore, 127 valid responses were obtained.

Managers from those 127 were sought to be contacted during the second stage of the data collection between January and February 2014 with the aim of conducting a similar survey. The research acknowledged that the roles of some participants in the initial study may have changed and others may have even left their organisations in the six years since the initial research was conducted. In those cases, the role -as opposed to the individual, became the focus of our research. This meant that, when contact with the hotel was established, the person in the same role as the previous participant was invited to participate. Additionally, it was found that a number of hotels that had originally participated were no longer in business or had ceased being independent entities. This meant that data from those entities were not possible to be collected during the second phase. Fortunately, 68.5 per cent of the same people surveyed in 2008 responded the survey in 2014, which means that a total of 87 valid responses to the survey were received over the two-month period, representing a response rate of 15.53 per cent for the second phase. This enabled the conduct of a successful longitudinal study.

3.2 Common method variance

Most researchers would agree that social desirability is a potentially serious bias threat in behavioural research, especially with single informant surveys when collecting data in each company (Podsakoff, MacKenzie, Lee, & Podsakoff., 2003). In this study, several procedures were used to empirically determine whether or not common method bias threatened the interpretation of the results. These included: a) the two-sample *t*-test (also called independent samples *t*-test); b) the Harman one-factor test; and c) a confirmatory factor-analytic approach to the common latent factor approach.

From the perspective of knowledge management, the capacity to influence on the hotel's decisions not only involves the internal stakeholders, but also the external stakeholders (Li, Eden, Hitt, & Ireland, 2008). Without collaboration with them it is impossible for internal stakeholders to develop a strategy and prioritisation (Lee, Hsu, Han, & Kim, 2010). We therefore started by asking respondents to indicate whether the hotel belongs to any chain (0 - no, 1 - yes), this study then compares whether or not belonging to the chain in terms of knowledge agents, environmental knowledge (*t*), environmental knowledge (*t*+6) and business performance (*t*+6) and the independent sample *t*-test revealed no significant difference between the two groups ($p= 0.583$; $p= 0.853$; $p= 0.734$ and 0.410 , respectively).

Secondly, the authors used factor analysis, the recommended way of testing for the presence of such bias, all variables were analysed in order to ensure that there was only one important factor. The results showed five factors with eigenvalues greater than 1.0 and the total variance explained was 74.82%.

Finally, this study also used a confirmatory factor-analytic approach to the Harman one-factor test as a more sophisticated evaluation (Chang, Van Witteloostuijn, & Eden, 2010). A worse fit for the one-factor model would suggest that common method variance does not pose a serious threat. The one-factor model yielded a Satorra-Bentler $\chi^2_{(119)}= 411.22$; $\chi^2/d.f.=3.45$ (compared

with the Satorra-Bentler $\chi^2_{(113)} = 224.26$; $\chi^2/d.f = 1.98$). The fit is considerably worse for the one-dimensional model than for the measurement model, suggesting no substantial common method bias.

Together, these three points support that *social desirability bias* was not considered to be a problem in this study, as per Armstrong and Overton (1977) and Podsakoff et al. (2003).

3.3 Measures

Using Churchill's (1979) techniques, we developed a first draft of 16 items, which was refined and validated through a pilot study with three hotels.

Knowledge agents (KA): Previous studies by Reinhardt, Schmidt & Sloep (2011) provide guidance in the development of items to measure KA. The importance of 'environmental knowledge' to cognitively diverse groups was related to the enhancement of external relations with those who have knowledge of the administrative and social strategies. Such knowledge would have been gained through the accurate understanding of information available to the knowledge agents as well as the relevance of such information in relation to environmental initiatives (Barney, 1986).

Environmental knowledge (EK): We have designed a four-item scale drawing on the ideas established by Martínez-Martínez, Cegarra-Navarro, & García-Pérez, (2015). The items included are: the conscientious use of less polluting industrial processes and products; and the implementation of a green program and the presence of environmental emergency plans.

Business performance (BP). In this research, BP is included as the dependent variable and it is operationalised by asking questions about growth rate of profits, growth rate of sales, profitability rate on total assets and productivity (Kaplan & Norton, 1992; Klassen & McLaughlin, 1996; March & Sutton, 1997).

3.4 Data analysis and results

The methodology used for the data analysis was structural equations modelling (SEM) using the Partial Least Squares (PLS) technique in the SmartPLS software tool (Chin, 1998; Chin et al., 2003). PLS was selected due to the characteristics of the model and population sample, which met the criteria set by Chin et al. (2003). Previous studies by (Dijkstra & Henseler, 2015; Henseler, Hubona, & Ray, 2016) take into consideration that reflective indicators are determined by the theoretical construct, and the high correlation that exists among them, the following were specified as reflective indicators: *knowledge agents*, *environmental knowledge* and *business performance*. *Knowledge agents* was defined by and measured with the use of four reflective indicators (Barney, 1986); for *Environmental knowledge*, three reflective indicators were used (Imran, Alam, & Beaumont, 2014). Finally, reflective indicators such as growth rate of sales, productivity growth and profitability were used to operationalise *business performance*.

Using PLS involved a two-stage approach, according to Barclay, Higgins, & Thompson, (1995). The first of these required an assessment of the measurement model. This allowed for the relationships between the observable or manifest variables and the theoretical concepts or latent variables to be specified. This analysis is performed in relation to individual item

reliability, construct reliability, average variance extracted (AVE), and discriminant validity of the indicators of latent variables. In the second stage, the structural model is evaluated. The aim of this evaluation is the testing of the extent to which the causal relationships specified by the proposed model are consistent with the data available. The results in Table 1 suggest a good fit for the 14 measurement items since: the values for composite reliability are greater than 0.8 (Nunnally, 1978); the Average Variance Extracted (AVE) for all the constructs is greater than 0.5 (Fornell & Larcker, 1981); the square root of the AVE is more than the correlations between the constructs, which indicates that each dimension relates more strongly to its own items than to others (Fornell & Larcker, 1981).

Table 1: Construct correlation matrix

	Mean	S.D	CA	CR	AVE	R ²	Correlation matrix			
							1	2	3	4
1. Knowledge agents	6.40	1.40	0.72	0.82	0.50	0.00	0.70			
2. Environmental knowledge (t)	6.91	1.71	0.77	0.85	0.61	0.31	0.54	0.78		
3. Environmental knowledge (t+6)	6.85	1.73	0.77	0.85	0.61	0.74	0.54	0.76	0.78	
4. Business performance	5.83	1.83	0.85	0.90	0.69	0.17	0.42	0.52	0.54	0.83

Notes:

Mean = the average score for all of the items included in this measure; S.D. = Standard Deviation; CA= Cronbachs Alpha; CR = Composite Reliability; AVE = Average Variance Extracted. The bold numbers on the diagonal are the square root of the Average Variance Extracted. Off-diagonal elements are correlations among construct.

Cross-loadings should be evaluated by checking that each indicator loading has a greater correlation with its own constructs than it has with other constructs. This enables the analysis of whether each indicator is correctly assigned to its corresponding factor (Henseler et al., 2016). As shown in Table 2, all indicators had a greater correlation with their corresponding factors than with other factors. As a result of this analysis, it was established that there is enough evidence of content validity, reliability and convergent validity, and discriminant validity for the reflective constructs.

Table 2: Discriminant validity based on Cross-loading evaluation

	KA	EK t	EK t+1	BP
KA_1	0.741	0.367	0.364	0.488
KA_2	0.733	0.367	0.368	0.326
KA_3	0.735	0.476	0.478	0.410
KA_4	0.667	0.322	0.327	0.287
EKt_1	0.506	0.835	0.704	0.580
EKt_2	0.428	0.750	0.633	0.544
EKt_3	0.338	0.746	0.738	0.365
EKt+n_1	0.545	0.704	0.838	0.538
EKt+n_2	0.412	0.605	0.752	0.493
EKt+n_3	0.280	0.723	0.723	0.339
BP_1	0.326	0.284	0.266	0.663
BP_2	0.319	0.317	0.312	0.761
BP_3	0.332	0.358	0.327	0.645
BP_4	0.516	0.674	0.626	0.864

Notes:

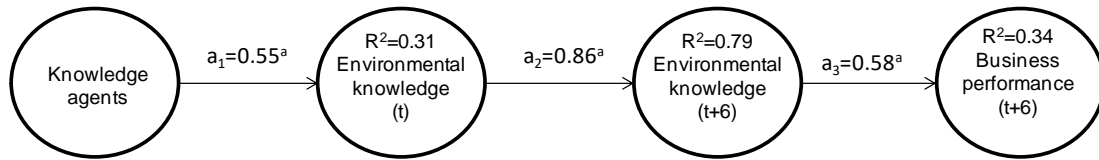
KA → [knowledge agents]; EK → [environmental knowledge]; EK_{t+n} → [environmental knowledge_(t+6)]; BP → [business performance]

3.5. Results

The PLS-Graph software, version 3.00, was used to conduct the analysis of the data collected. Amongst other reasons, this was due to the fact that PLS is recommended for studies where

there are fewer than 250 observations (Reinartz, Haenlein, & Henseler, 2009). For hypothesis testing, bootstrapping was conducted with 4999 subsamples. The structural model resulting from the PLS analysis is summarised in Figure 2, where the R2 value for the endogenous constructs and the standardised path coefficients are shown.

Figure 2: Structural equation model



Notes:

Notes: ^a <0.01 [(based on t(4999), two-tailed test); t(0.01, 4999) = 2.577]

In order to estimate the indirect effects, the PROCESS macro developed by Hayes and Scharkow (2013) was applied. Using latent variable scores from SmartPLS 3 as input, PROCESS produces estimates and bias-corrected 95% bootstrap confidence intervals for the indirect effect. Table 3 shows that the indirect effect of knowledge agents is significant in all scenarios analysed. In addition, the indirect effects of environmental knowledge (t) on business performance at the future point in time (t + n years) via environmental knowledge (t+n) are statistically significant, as the intervals determined through bootstrapping do not contain any zero value. It should be also noted here that since the indirect effects of knowledge agents (t) and environmental knowledge (t) on business performance are statistically significant (see Table 3), the present of these variables in time (T) positively support BP's indices at the future point in time. In other words, if we remove knowledge agents (t) and environmental knowledge (t) there is a lower level of performance at the moment (T+6) obtaining lower explained variance. Hence, environmental knowledge is found to mediate knowledge agents' influence on business performance, even when this indirect effect decreases over time. Consequently, our findings fully support all hypotheses H1, H2 and H3.

Table 3. Indirect effects

Indirect effects on	Point estimate	Percentile bootstrap 95% confidence interval		
		Lower	Upper	p-value
Environmental Knowledge (t+6)				
$KA \rightarrow EK(t) \rightarrow EK(t+n) = a_1 \times a_2$	0.473	0.385	0.616	0.000
Business performance (t+6)				
$EK(t) \rightarrow EK(t+n) \rightarrow BP = a_2 \times a_3$	0.498	0.260	0.611	0.000
$KA \rightarrow EK(t) \rightarrow EK(t+n) \rightarrow BP = a_1 \times a_2 \times a_3$	0.274	0.137	0.380	0.004

Notes:

Knowledge agents → KA, Environmental knowledge (t) → EK(t), Environmental knowledge (t+n) → EK(t+n), Business performance → BP

4. Discussion

The findings of this research have shown the importance of the creation, continuous update and effective management of an environmental knowledge base for organisational performance, in particular within the hospitality sector. In doing so, the study has made a number of contributions which have both theoretical and managerial implications.

In terms of management studies and theoretical frameworks supporting research in the hospitality sector, the results of the data analysis first of all support the fact that in order to enhance the environmental knowledge base of an organisation, management needs to have a clear notion of who their knowledge agents are, the role they play in the operation and management of the business, their individual perception of the current environmental challenges, and their aspirations and concerns in this regard. This finding fully supports our hypothesis H1 and is also in line with previous studies of this subject in other contexts by scholars such as Kim & Lee (2013) and Mundbrod, Kolb, & Reichert (2013). This can also be interpreted as an indication that when hotels understand and acknowledge the value of environmental knowledge provided by their internal and external knowledge agents, then such individuals feel encouraged and enabled to contribute significantly to understanding and facilitating the transformation of environmental concerns into operational processes at the business planning and development stage (time t in our research). A possible justification for this result would be the fact that knowledge agents enable hospitality companies to develop, maintain and exploit an environmental knowledge base formed by the knowledge and experiences of other organisational members, in order to ensure that appropriate actions by management lead to improved efficiency (Céspedes-Lorente et al., 2003). The relevance of this finding resides in its potential to counteract the tendency by hospitality managers to pair resources in a bid to reduce costs. By giving their knowledge agents a voice, better mechanisms to translate environmental concerns into a successful business action plan could be created while bureaucracy and its cost for the organisation are reduced.

Secondly, in addition to highlighting the importance of knowledge agents for the achievement of current environmentally-friendly business goals, our research raises awareness of role of knowledge agents in the implementation of strategic business plans over time. Results of the data analysis fully support our hypothesis H2, showing that the effect of the presence of environmental knowledge in the organisation at a given point in time (t) on its business performance at a future time ($t + n$ years) is statistically significant by way of environmental knowledge at that future time ($t + n$ years). A plausible explanation for this finding is that the accumulated environmental knowledge at a time (t) needs to be fully considered and updated at a future time ($t + n$ years), due in part to the caution required as a result of uncertainty about future developments in the business and its environment. In other words, prior environmental knowledge is required for the development of environmental knowledge and business performance (i.e. at a time $t + n$ years]. This particular issue is related to the notion of 'absorptive capacity' and the potential effects that prior knowledge may have on the assimilation of new knowledge (Cohen and Levinthal, 1990). These findings also support the conclusions of Martínez-Martínez, Cegarra-Navarro, & García-Pérez (2015) who drew attention to the fact that hospitality companies need to update and consider their prior environmental knowledge in order to adapt their services to the demands of their potential and new customers. In this respect, the environmental knowledge base of a hotel at a given time (t) can be seen as an enabler for an improved environmental knowledge base at a future time ($t + n$ years), which in turn support improvements in organisational performance, given that updating the environmental knowledge base of the business is a process which involves replacing outdated environmental knowledge.

With regard to the testing of the hypothesis H3, results are consistent with the extant literature on organisational performance. As this study proposed, the presence of up-to-date environmental knowledge base at a point in time (e.g. $t + 6$ years) makes it possible for hotels from the hospitality sector to achieve better business performance (Bansal & Roth, 2000; Cegarra-Navarro & Martinez-Martínez, 2010; Céspedes-Lorente et al., 2003; Park et al.,

2014). This means that hotels may be enabled to improve their business performance if their management is aware and able to reduce environmentally-related losses such as fines, a drop in their customer base, a diminished corporate image or reputation, among other factors (Haron, Paim, & Yahaya, 2005). Avoiding fines and other sanctions by hotel management as a result of having access to a relevant environmental knowledge base including, for example, changes in the environmental legislation, is just but one example of the positive relationship between environmental knowledge and business performance.

From a practical perspective, this study provides a number of insights relating to the environmentally-friendly operation and management of hotels and other institutions within the hospitality sector. First, our results indicate that an environmentally-friendly behaviour, driven by continuous efforts to acquire and utilise knowledge of the environment is increasingly important for management to consider within the hospitality sector. A mismatch between the environmental knowledge base of the hotel and the environmental expectations of knowledge agents within the hotel and its network may lead to a lack of commitment from key stakeholders to the overall business model. Such a mismatch may occur when hotel managers cannot relate the new environmental knowledge to their existing knowledge and management frameworks. Second, this research provides evidence that enables hotel managers to understand the long-term effects of an adequate environmental knowledge base on business performance, hence encouraging the embedding of organisational learning through the exploration and exploitation of environmental knowledge in their long-term business strategy. Third, the research has also shed light on an issue of relevance for hotel managers, namely the lack of environmental knowledge prior to the need for it to be used for performance or compliance, e.g. when asked to report back to the industry or government on the potential effects of their activities on the environment, e.g. pollution of soil or water by hotel residues. In other words, there is a need for environmentally-focused initiatives that inform, involve and motivate internal and external knowledge agents of hospitality firms. Such activities and their stakeholders are likely to help managers increase public interest in their institutions and strategies, thus attracting environmentally conscious customers and encouraging sustainable lifestyles in the communities.

Despite the contributions made to the theory and practice, a number of areas for future research on this subject have been identified. Firstly, the research has focused on the hospitality sector, which is directly affected by its interaction with the environment. Future research could carry out a more extensive empirical testing of this model in other sectors. Secondly, the data collected covers the role of a knowledge agent as perceived by the hotel. Collecting data from knowledge agents outside of hotels may provide additional, valuable insights. Thirdly, our study analyses business performance of hotels, leaving an opportunity open for future research to investigate social performance (Su & Swanson, 2017) of the institutions within the hospitality sector and its relationship with their business performance. Finally, as the extant literature contains different definitions of the concept of a “knowledge agent”, there is a potential for further avenues of research including additional measurement constructs and a different definition of a “knowledge agent”.

5. Conclusions

In in a dynamic context such as that where the Spanish hospitality sector has operated during the six-year period (2008-2014) covered in this study, it can be argued that awareness of and responsiveness to environmental issues have become an imperative for firms within the sector. Such organisations are now required to develop integrated knowledge frameworks that

inform their business models right from the start of their operation and throughout their life cycle. By studying this subject, this paper makes a contribution to the relevant literature in several ways, from the relationship between knowledge agents and environmental knowledge, to the potential effects of such knowledge on business performance. First, it analyses the relationship between knowledge agents and environmental knowledge for organisational performance. Its focus on the hospitality sector makes this research unique when compared to previous studies which have examined this problem in industrial contexts. Secondly, this study incorporates a longitudinal perspective to the study of the subject. We have focused on the changes in the environmental knowledge base of the firm along with the impact it has on its business performance over a six-year period within the most recent global financial crisis.

Based on the analysis of data collected from 87 organisations from the Spanish hospitality sector, this research has implemented a structural equation modelling strategy to test the research framework and related hypotheses. Results suggest that the effect of the presence of an environmental knowledge base in the organisation at a given point in time (t) on its future business performance (time $t + n$ years) by way of environmental knowledge at that future time ($t + n$ years) is statistically significant. A possible justification for this is that the environmental knowledge base that the organisation has built at a given time (t) needs to be updated by knowledge agents at a later time ($t + n$ years) in a process driven at least by the need for the organisation to deal with uncertainty.

Our research has also found that although environmental knowledge at the same time (t) becomes a factor for competitiveness, it does not guarantee the organisation's ability maintain such a competitive advantage over time. Since the environmental standards and regulations and their overarching principles are continuously revised by local, autonomous, national and international governments, it becomes an imperative for hotel managers to also update their strategies in line with such changes. In other words, the environmental knowledge base of an organisation requires continuous review and renewal to enable management to successfully respond to changes not only in the environment but also in the way businesses and society respond to these. As result of such processes, hotels are likely to gain and retain a long-term competitive advantage.

In terms of practical implications, the application of our line of research may lead hotel managers to implementing alternative mechanisms to attain a sustainable improvement of their business, while protecting the planet.

The findings reported herein are not exempt of limitations that will open new opportunities for research in this domain. Firstly, this study relates to its focus on the Spanish hospitality sector and specifically in hotels. In order to corroborate the generalisability of our findings to other service-related industries, similar analyses would need to include other organisations within the hospitality sector, other sectors which have an impact on the environment, and even organisations and sectors in different geographic and socio-economic contexts. This would also allow for an improved empirical understanding of this highly relevant subject.

Second, we have analysed Spanish hotels without establishing, for example, different clustering mechanisms (e.g. size, value etc.). This poses an opportunity for a future research that performs a more extensive manipulation of the data set.

Third, the survey was answered only by a manager of each hotel, it might be interesting to get more than one answer from the same hotel (e.g. shareholders, workers, chain operators, cleaner, tour operators or customer). Another limitation of the study is the relatively simple statistical method that has been used for the analysis. Business performance indices were measured only at time T+6 as this study was focused on the role of knowledge agents as key enablers of environmental knowledge management and thus potential drivers of future business performance. Therefore, future studies could analyse the role of knowledge agents on business performance over time. For example, in hind sight, information such as business performance in 2008 would have helped understand why some hotels were no longer in business or independent in 2014.

Future studies may also be able use a more varied spectrum of sources for data collection which not only include hotels but also other parts of the hospitality sector. Including other countries in this analysis could also be beneficial for the purpose of further developing this domain.

References

- Armstrong, J. S., & Overton, T. S. (1977). Estimating Nonresponse Bias in Mail Surveys. *Journal of Marketing Research*, 14(3), 396. <https://doi.org/10.2307/3150783>
- Bansal, P., & Roth, K. (2000). Why Companies Go Green: A Model of Ecological Responsiveness. *The Academy of Management Journal*, 43(4), 717–736. Retrieved from <http://www.jstor.org/stable/1556363>
- Barclay, D., Higgins, C., & Thompson, R. (1995). The partial least squares (PLS) approach to causal modeling: Personal computer adoption and use as an illustration. *Technology Studies*, 2(2), 285–309.
- Barney, J. B. (1986). Organizational Culture : Can It Be a Source of Sustained Competitive Advantage ? Linked references are available on JSTOR for this article : Organizational Culture : Can It Be a Source of Sustained Competitive Advantage ?, 11(3), 656–665.
- Bell, G. G. (2005). Clusters, networks, and firm innovativeness. *Strategic Management Journal*, 26(3), 287–295. <https://doi.org/10.1002/smj.448>
- Boiral, O., Raineri, N., & Talbot, D. (2016). Managers ' Citizenship Behaviors for the Environment: A Developmental Perspective . *Journal of Business Ethics* , 1-15 . Theoretical Background and Hypotheses Corporate Greening Through Managers ' OCB, 1–15.
- Callan, S. J., & Thomas, J. M. (2009). Corporate Financial Performance and Corporate Social Performance : An Update and Reinvestigation, 78(February), 61–78. <https://doi.org/10.1002/csr>
- Cegarra-Navarro, J. G., & Martínez-Martínez, A. (2010). Managing environmental knowledge through learning processes in Spanish hospitality companies. *Spanish Journal of Psychology*, 13(2), 827–840. <https://doi.org/10.1017/S1138741600002481>
- Céspedes-Lorente, J., de Burgos-Jiménez, J., & Álvarez-Gil, M. J. (2003). Stakeholders' environmental influence. An empirical analysis in the Spanish hotel industry. *Scandinavian Journal of Management*, 19(3), 333–358. [https://doi.org/10.1016/S0956-5221\(02\)00034-9](https://doi.org/10.1016/S0956-5221(02)00034-9)
- Chang, S. J., Van Witteloostuijn, A., & Eden, L. (2010). From the Editors: Common method variance in international business research. *Journal of International Business Studies*, 41(2), 178–184. <https://doi.org/10.1057/jibs.2009.88>
- Chase, R. L. (2006). A decade of knowledge management. *Journal of Knowledge Management*, 10(1), null. <https://doi.org/10.1108/jkm.2006.23010aaa.001>
- Chien, M. K., & Shih, L. H. (2007). An empirical study of the implementation of green supply chain management practices in the electrical and electronic industry and their relation to organizational performances. *International Journal of Environmental Science and Technology*, 4(3), 383–394.
- Chin, W. W. (1998). The partial least squares approach for structural equation modeling. In N. J. L. E. A. Mahwah (Ed.), *Modern methods for business research* (Marcoulide, pp. 295–336).
- Chin, W. W., Marcolin, E., & Newsted, P. R. (2003). A partial least squares latent variable modeling approach for measuring interaction effects: results from a Monte Carlo simulation study and an electronic mail emotion/ adoption study. *Information System Research*, 14(2), 189–217.
- Churchill, G. A. (1979). A Paradigm for Developing Better Measures of Marketing Constructs. *Journal of Marketing Research*, 16(1), 64–73.
- Civre, Z., & Omerzel, D. G. (2015). The behaviour of tourism firms in the area of innovativeness. *Economic Research-Ekonomska Istraživanja*, 28(1), 312–330. <https://doi.org/10.1080/1331677X.2015.1043778>

- Cruz, A. D., Martinez, E. E. V., Hincapié, J. M. M., & Torres, F. R. (2016). Innovation in tourism companies, where are they and where are they going? An approach to the state of knowledge. *Intangible Capital*, *12*(4), 1088–1155. <https://doi.org/10.3926/ic.778>
- Dangelico, R. M., & Pontrandolfo, P. (2015). Being “Green and Competitive”: The Impact of Environmental Actions and Collaborations on Firm Performance. *Business Strategy and the Environment*, *24*(6), 413–430. <https://doi.org/10.1002/bse.1828>
- De Marchi, V., & Grandinetti, R. (2013). Knowledge strategies for environmental innovations: the case of Italian manufacturing firms. *Journal of Knowledge Management*, *17*(4), 569–582. <https://doi.org/10.1108/JKM-03-2013-0121>
- Dijkstra, T. K., & Henseler, J. (2015). Consistent and asymptotically normal PLS estimators for linear structural equations. *Computational Statistics and Data Analysis*, *81*, 10–23. <https://doi.org/10.1016/j.csda.2014.07.008>
- Durst, S., & Edvardsson, I. R. (2012). Knowledge management in SMEs: a literature review. *Journal of Knowledge Management*, *16*(6), 879–903. <https://doi.org/10.1108/13673271211276173>
- Font, X., Garay, L., & Jones, S. (2016). Sustainability motivations and practices in small tourism enterprises in European protected areas. *Journal of Cleaner Production*, *137*, 1439–1448. <https://doi.org/10.1016/j.jclepro.2014.01.071>
- Fornell, C., & Larcker, D. F. (1981). Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. *Journal of Marketing Research*, *18*(1), 39–50.
- Fraj, E., Matute, J., & Melero, I. (2015). Environmental strategies and organizational competitiveness in the hotel industry: The role of learning and innovation as determinants of environmental success. *Tourism Management*, *46*, 30–42. <https://doi.org/10.1016/j.tourman.2014.05.009>
- Frick, J., Kaiser, F. G., & Wilson, M. (2004). Environmental knowledge and conservation behavior: Exploring prevalence and structure in a representative sample. *Personality and Individual Differences*, *37*(8), 1597–1613. <https://doi.org/10.1016/j.paid.2004.02.015>
- Fryxell, G. E., & Lo, C. W. H. (2003). The influence of environmental knowledge and values on managerial behavior in China: a comparison of managers in Guangzhou and Beijing. *Journal of Business Ethics*, *46*, 45–69.
- Galpin, T., Whittington, J. L., & Bell, G. (2015). Is your sustainability strategy sustainable? Creating a culture of sustainability. *Corporate Governance: The International Journal of Business in Society*, *15*(1), 1–17. <https://doi.org/10.1108/CG-01-2013-0004>
- González-Benito, J., & González-Benito, Ó. (2005). Environmental proactivity and business performance: An empirical analysis. *Omega*, *33*(1), 1–15. <https://doi.org/10.1016/j.omega.2004.03.002>
- Han, X., & Chan, K. (2013). Perception of Green Hotels Among Tourists in Hong Kong: An Exploratory Study. *Services Marketing Quarterly*, *34*(4), 339–352. <https://doi.org/10.1080/15332969.2013.827069>
- Haron, S. A., Paim, L., & Yahaya, N. (2005). Towards sustainable consumption: an examination of environmental knowledge among Malaysians. *International Journal of Consumer Studies*, *29*(5), 426–436. <https://doi.org/10.1111/j.1470-6431.2005.00460.x>
- Hayes, A. F., & Scharkow, M. (2013). The relative trustworthiness of inferential tests of the indirect effect in statistical mediation analysis: does method really matter? *Psychological Science*, *24*(10), 1918–1927. <https://doi.org/10.1177/0956797613480187>
- Henseler, J., Hubona, G., & Ray, P. A. (2016). Using PLS path modeling in new technology research: updated guidelines. *Industrial Management & Data Systems*, *116*(1), 2–20. <https://doi.org/10.1108/IMDS-09-2015-0382>
- Imran, S., Alam, K., & Beaumont, N. (2014). Environmental orientations and environmental

- behaviour: Perceptions of protected area tourism stakeholders. *Tourism Management*, 40, 290–299. <https://doi.org/10.1016/j.tourman.2013.07.003>
- Jain, N., & D'lima, C. (2018). Green HRM - a study on the perception of Generation Y as prospective internal customers. *International Journal of Business Excellence*, 12(2). <https://doi.org/10.1504/IJBEX.2018.091916>
- Johannessen, J.-A. (2017). Knowledge management in future organizations. *Problems and Perspectives in Management*, 15(2–2), 306–318. [https://doi.org/10.21511/ppm.15\(2-2\).2017.01](https://doi.org/10.21511/ppm.15(2-2).2017.01)
- Kaplan, R. S., & Norton, D. P. (1992). The Balanced Scorecard Measures That Drive Performance. *Harvard Business Review*, 70(1), 71–79.
- Kim, T. T., & Lee, G. (2013). Hospitality employee knowledge-sharing behaviors in the relationship between goal orientations and service innovative behavior. *International Journal of Hospitality Management*, 34(1), 324–337. <https://doi.org/10.1016/j.ijhm.2013.04.009>
- Klassen, R. D., & McLaughlin, C. P. (1996). The Impact of Environmental Management on Firm Performance. *Management Science*, 42(8), 1199–1214. <https://doi.org/10.1287/mnsc.42.8.1199>
- Lee, J. S., Hsu, L. T., Han, H., & Kim, Y. (2010). Understanding how consumers view green hotels: How a hotel's green image can influence behavioural intentions. *Journal of Sustainable Tourism*, 18(7), 901–914. <https://doi.org/10.1080/09669581003777747>
- 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. <https://doi.org/https://doi.org/10.1016/j.tourman.2015.03.005>
- Lewis, K. (2004). Knowledge and Performance in Knowledge-Worker Teams: A Longitudinal Study of Transactive Memory Systems. *Management Science*, 50(11), 1519–1533. <https://doi.org/10.1287/mnsc.1040.0257>
- Li, D., Eden, L., Hitt, M. A., & Ireland, R. D. (2008). Friends, acquaintances, or strangers? Partner selection in R&D alliances. *Academy of Management Journal*, 51(2), 315–334. <https://doi.org/10.5465/AMJ.2008.31767271>
- Liao, S. H., Chang, W. J., & Wu, C. C. (2010). An integrated model for learning organization with strategic view: Benchmarking in the knowledge-intensive industry. *Expert Systems with Applications*, 37(5), 3792–3798. <https://doi.org/10.1016/j.eswa.2009.11.041>
- March, J. G., & Sutton, R. (1997). Organizational Performance as a Dependent Variable. *Organization Science*, 8(6), 698–706. <https://doi.org/10.1287/orsc.8.6.698>
- Martínez-Martínez, A., Cegarra-Navarro, J. G., & García-Pérez, A. (2015). Environmental knowledge management: A long-term enabler of tourism development. *Tourism Management*, 50, 281–291. <https://doi.org/10.1016/j.tourman.2015.03.006>
- Martínez-Martínez, A., Cegarra-Navarro, J. G., & Wensley, A. (2017). A long-term view of knowledge agents as key enablers of environmental knowledge. In *Proceedings of the European Conference on Knowledge Management, ECKM* (Vol. 2, pp. 632–632).
- Massingham, P. R. (2018). Measuring the impact of knowledge loss: a longitudinal study. *Journal of Knowledge Management*, 22(4), 721–758. <https://doi.org/10.1108/JKM-08-2016-0338>
- Mina, A., Bascavusoglu-Moreau, E., & Hughes, A. (2014). Open service innovation and the firm's search for external knowledge. *Research Policy*, 43(5), 853–866. <https://doi.org/10.1016/j.respol.2013.07.004>
- Mittal, S., & Dhar, R. L. (2016). Effect of green transformational leadership on green creativity: A study of tourist hotels. *Tourism Management*, 57, 118–127. <https://doi.org/10.1016/j.tourman.2016.05.007>

- Molina-Azorín, J. F., Claver-Cortés, E., Pereira-Moliner, J., & Tarí, J. J. (2009). Environmental practices and firm performance: an empirical analysis in the Spanish hotel industry. *Journal of Cleaner Production*, 17(5), 516–524. <https://doi.org/10.1016/j.jclepro.2008.09.001>
- Mundbrod, N., Kolb, J., & Reichert, M. (2013). Towards a System Support of Collaborative Knowledge Work. In S. P. La Rosa M. (Ed.), *Business Process Management Workshops. BPM. Lecture Notes in Business Information Processing, vol 132*. Berlin, Heidelberg: Springer.
- Nieves, J., & Haller, S. (2014). Building dynamic capabilities through knowledge resources. *Tourism Management*, 40, 224–232. <https://doi.org/https://doi.org/10.1016/j.tourman.2013.06.010>
- Nunnally, J. (1978). *Psychometric theory*. New York: McGraw-Hill.
- Ogbeide, G. (2012). Perception of Green Hotels in the 21st Century. *Journal of Tourism Insights*, 3(1), 1–8. <https://doi.org/10.9707/2328-0824.1032>
- Omotayo, F. O. (2015). Knowledge Management as an important tool in organisational management : A review of literature. *Library Philosophy and Practice (e-Journal)*, 1238, 1–23. Retrieved from <http://digitalcommons.unl.edu/libphilprac/1238>
- Park, J., Kim, H. J., & McCleary, K. W. (2014). The Impact of Top Management’s Environmental Attitudes on Hotel Companies’ Environmental Management. *Journal of Hospitality & Tourism Research*, 38(1), 95–115. <https://doi.org/10.1177/1096348012452666>
- Po-Shin, H., & Li-Hsing, S. (2009). Effective environmental management through environmental knowledge management. *International Journal of Environmental Science & Technology*, 6(1), 35–50. <https://doi.org/10.1007/BF03326058>
- Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*. American Psychological Association. <https://doi.org/10.1037/0021-9010.88.5.879>
- Rahman, I., & Reynolds, D. (2016). Predicting green hotel behavioral intentions using a theory of environmental commitment and sacrifice for the environment. *International Journal of Hospitality Management*, 52, 107–116. <https://doi.org/10.1016/j.ijhm.2015.09.007>
- Reinartz, W., Haenlein, M., & Henseler, J. (2009). An empirical comparison of the efficacy of covariance-based and variance-based SEM. *International Journal of Research in Marketing*, 26(4), 332–344. <https://doi.org/10.1016/j.ijresmar.2009.08.001>
- Reinhardt, J. C., Schmidt, B., Sloep, P., & Drachsler, H. (2011). Knowledge worker roles and actions results of two empirical studies. *Knowledge and Process Management*, 18(3), 150–174. <https://doi.org/10.1002/kpm>
- Singjai, K., Winata, L., & Kummer, T.-F. (2018). Green initiatives and their competitive advantage for the hotel industry in developing countries. *International Journal of Hospitality Management*, 75, 131–143. <https://doi.org/https://doi.org/10.1016/j.ijhm.2018.03.007>
- Su, L., & Swanson, S. R. (2017). The effect of destination social responsibility on tourist environmentally responsible behavior: Compared analysis of first-time and repeat tourists. *Tourism Management*, 60, 308–321. <https://doi.org/10.1016/j.tourman.2016.12.011>
- Tee, M., Abdullah, R., Din, J., Abdullah, S., & Wu, L. (2017). Green SD adoption using knowledge mangement facilitation – A motivational perspective. *Journal of Theoretical and Applied Information Technology*, 95(17), 4291–4303.
- Wernick, I. (2003). Environmental Knowledge Management. *Journal of Industrial Ecology*,

- 6(2), 7–9. <https://doi.org/10.1162/108819802763471735>
- Wheeller, B. A. (2005). Tourism and Sustainability: Development and New Tourism in the Third World. *Annals of Tourism Research*, 32(2), 499–501. <https://doi.org/10.1016/j.annals.2004.08.001>
- WTO. (2010). UNWTO World Tourism Barometer. *Developments and Challenges in the Hospitality and Tourism Sector*.
- WTO. (2016). World Tourism Barometer. *Unwto*. <https://doi.org/10.18111/wtobarometereng.2015.13.4.1>
- Zientara, P., & Zamojska, A. (2016). Green organizational climates and employee pro-environmental behaviour in the hotel industry. *Journal of Sustainable Tourism*, 0(0), 1–18. <https://doi.org/10.1080/09669582.2016.1206554>

Appendix: Questionnaire items

Indicate the extent to which each of the agents indicated below has capacity to influence on the hotel's environmental performance (0= no capacity and 10= high capacity):

KA_1: Employees
KA_2: The hotel manager
KA_3: Competitors
KA_4: Suppliers

Environmental knowledge (0= high disagreement and 10= high agreement):

EK_1: Does the hotel use less polluting industrial processes and products?
EK_2: Has the hotel developed a green program? (waste management, control of effluents, inventory of pollution sources)
EK_3: Has the hotel developed an environmental emergency plans and measures?

Business Performance (0=much worse than last years and 10=much better than last years):

BP_1: How is your growth rate of sales?
BP_2: How is your growth rate of profits?
BP_3: How is your profitability rate on total assets?
BP_4: How is your productivity?