

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/309316213>

# Open and green innovation in the hospitality industry

Article in *Environmental engineering and management journal* · July 2016

DOI: 10.30638/eemj.2016.159

---

CITATION

1

---

READS

522

3 authors:



**Francisco Jose Saez-Martinez**  
University of Castilla-La Mancha

48 PUBLICATIONS 380 CITATIONS

SEE PROFILE



**Laura Avellaneda-Rivera**  
University of Castilla-La Mancha

2 PUBLICATIONS 1 CITATION

SEE PROFILE



**Ángela González Moreno**  
University of Castilla-La Mancha

26 PUBLICATIONS 291 CITATIONS

SEE PROFILE



“Gheorghe Asachi” Technical University of Iasi, Romania



---

## OPEN AND GREEN INNOVATION IN THE HOSPITALITY INDUSTRY

Francisco José Sáez-Martínez\*, Laura Avellaneda-Rivera, Ángela González-Moreno

*Department of Business Administration, Faculty of Economics, University of Castilla-La Mancha, Albacete, Spain*

---

### Abstract

Hospitality is the main industry in the service sector in Spain, contributing to more than 10% of the gross domestic product and approximately 12% of all employees. Firms in this industry are beginning to adopt eco-innovations to reduce their environmental impact and optimize the use of natural resources. However, most companies do not have the necessary resources to tackle eco-innovation on their own and need to cooperate with different agents. The purpose of this paper is to examine how open innovation activities can be a source of green innovation in the hospitality industry in Spain. This study contributes to the literature on both open innovation and eco-innovation by focusing on the relationship between a firm's green orientation and its interactions with stakeholders. We develop a model to assess how a firm's relationships with its clients, suppliers, competitors, and research institutions influence its environmental orientation. We propose that the depth and breadth of relationships with stakeholders positively influence the development of eco-innovations. We test our model with a sample of 189 firms from the Technological Innovation Panel (PITEC) database. The empirical analysis reveals that the benefits derived from these relationships follow an inverted U-shaped curve.

*Key words:* green innovation, hospitality industry, open innovation

*Received: September, 2015; Revised final: June, 2016; Accepted: June, 2016*

---

### 1. Introduction

Ample literature on innovation in the hospitality industry has focused on technology adoption (Wang and Qualls, 2007), firms' innovative behavior (Orfila-Sintes and Mattson, 2009), and the sources of innovations (Enz et al., 2010). The hospitality industry can leave a considerable footprint on the environment (Hunter and Shaw, 2007), and as a result, environmental behavior in this industry is currently receiving a great deal of attention. For example, in the hotel industry, managers are trying to improve the environmental sustainability of their operations (Zhang et al., 2010), and researchers have analyzed the factors that drive the implementation of environmental management tools in this particular industry (El Dief and Font, 2010). Additionally, the demand for natural products (bio or eco) has greatly increased to ensure a quality taste and high security and traceability (Calina and Calina, 2015). Three

different terms are often used interchangeably in the literature to describe innovations that reduce the negative impact on the environment: “green-”, “eco-” and “environmental” innovations (Díaz-García et al., 2015). Kemp and Pearson (2007) define eco-innovation as “the production, assimilation or exploitation of a product, production process, service or management or business method that is novel to the organization and which results, through its life cycle, in a reduction of environmental risk, pollution and other negative impacts of resources us pared to relevant alternatives.”

Green innovation has attracted increasing attention from both practitioners and academics in recent years, and policy makers are now trying to make this type of innovation a priority (Sáez-Martínez et al., 2015). Environmental concerns related to innovation are driven by external pressures from stakeholders or regulation (González-Moreno et al., 2013) and/or from the recognition that innovation

---

\* Author to whom all correspondence should be addressed: e-mail: [Francisco.Saez@uclm.es](mailto:Francisco.Saez@uclm.es)

can lead to competitive advantage (Díaz-García et al., 2015). Most companies do not have the necessary resources to achieve eco-innovation on their own and need to cooperate with different agents to this end. The association or cooperation with intermediaries is one of the fastest and sometimes cheapest ways to innovate (Hagedoorn and Schakenraad, 1994), and companies can improve their efficiency and increase their profits by securing a wider range of resources and more diversified sources through cooperation (Kranenburg et al., 2004). Underlying this idea of cooperation is the open innovation concept, which has received increasing attention from researchers in business management in recent years (Chesbrough, 2006; Gassmann et al., 2010; Huizingh, 2010).

Open innovation is “the use of purposive inflows and outflows of knowledge to accelerate internal innovation and expand the markets for external use of innovation, respectively” (Chesbrough, 2003). According to this paradigm, innovation will be easier and faster if firms use external knowledge, and the return on investment in intellectual capital and knowledge will be much higher if firms share their knowledge with others. Open innovation has received a great deal of attention in the business management literature, and research suggests that many innovative firms have shifted to this model, using a wide range of external actors (Gassmann et al., 2010; Laursen and Salter, 2006). Open innovation is commonly associated with fast-growing, technology-intensive industries, such as the information and communication technology sector or the pharmaceutical industry (Sarkar and Costa, 2008), and when firms are embedded in benefit-rich networks, they are likely to demonstrate greater innovative performance. The related literature tends to focus on large and multinational corporations (Chesbrough, 2003, 2006). There is, however, increasing interest in studying this phenomenon in both smaller firms and other, more traditional and mature industries, such as the hospitality industry.

Hospitality is the main industry in the service sector in Spain, contributing to more than 10% of the gross domestic product and approximately 12% of all employees. Firms in this industry are beginning to adopt the use of eco-innovations to reduce their environmental impact and optimize the use of natural resources. Recent literature has highlighted the relationship between environmental behavior in the hospitality industry and economic performance (Kim and Ham, 2010; Segarra-Ona et al., 2011; Tari et al., 2010). Nonetheless, despite the growing interest of environmental management research in this industry, many relevant topics, particularly at the micro level, still have not received sufficient attention. The role of stakeholders in spurring firms to adopt greener practices has been widely used in the literature (e.g. Kammerer, 2009). However, according to the purpose of this paper, this link seems to be not very well understood and is under-examined. Green innovation requires knowledge inputs from different

and heterogeneous sources. However, as Horbarch et al. (2013) recognize “[the] issue of sources of information and knowledge used in eco-innovative activities is rarely treated in the eco-innovation literature”. This paper intends to fill this gap. The “variance hypothesis” predicts that exposure to diverse sources of information provides the “requisite variety” of ideas and knowledge needed to create innovations (Owen-Smith and Powell, 2004). Nevertheless, a broad external search has an opportunity cost as it takes attention away from other activities internal to the firm and this fact has been less studied in the literature (Dahlander et al., 2016). The purpose of this paper is to examine how open innovation activities can be a source of green innovations in the hospitality industry in Spain. This study contributes to the literature on both open innovation and eco-innovation by focusing on the relationship between a firm’s green orientation and its interactions with stakeholders. Our central research question is: Can cooperation with external sources improve green innovation performance?

## 2. Theoretical framework

The open innovation model focuses on how firms use knowledge from external actors in their innovation processes (Chesbrough, 2003). Open innovators commercialize external ideas by deploying outside (as well as in-house) pathways to the market. This approach “redefines the boundary between the firm and its surrounding environment, making the firm more porous and embedded in loosely coupled networks of different actors, collectively and individually working toward commercializing new knowledge” (Laursen and Salter, 2006). With respect to environmental innovations, our approach is that firms could benefit from an open innovation mode in which the knowledge boundaries between the firm and its external environment become permeable. An important contribution to the fast-emerging research on open innovation is Laursen and Salter’s (2006) often-cited study. They consider two elements critical for increasing the firm’s innovation capacity: external search breadth, defined as “the number of external sources or search channels that firms rely upon in their innovative activities,” and external search depth, defined as “the extent to which firms draw deeply from the different external sources or search channels” (Laursen and Salter, 2006). Building on that work, we focus on the firm’s external search efforts and relationships for the development of eco-innovation. We analyze how different strategies for using external sources of knowledge influence green innovation performance in the hospitality industry in Spain. Our emphasis is on the sources of information, such as clients, suppliers, research institutions, and so forth, that companies use to search for eco-innovation opportunities. We focus on the various channels

firms use, analyzing both the breadth and depth of these channels.

The degree of openness of a firm depends on the breadth and depth of its relationships with different agents. Breadth refers to the number of collaborations and external channels the company uses, while depth refers to the extent to which a firm draws intensively from different sources of innovation. We could argue that the greater the openness the greater is the environmental orientation of the firm’s innovations (Fig. 1). Some empirical studies have shown the positive effect of openness on firm’s innovation performance (e.g. Mol and Birkinshaw, 2009). However, as well as Laursen and Salter (2006) show that there is an optimal level of breadth and depth of openness in terms of the importance of innovation-related information from different external sources, we will propose a similar relationship between openness and green innovation.

In most evolutions of an open innovation strategy, companies have a period of trial and error in which they learn how to gain knowledge from an external source and how many contacts are necessary to improve their performance and capacity to innovate. This period requires considerable effort in building up an understanding of the norms, organizational rules, and informal routines of the different channels. Firms diversify their search strategy to hedge against the risk associated with innovation search and breadth in information sources is associated with a high rate of successful innovations (Leiponen and Helfat, 2011). An increase in the breadth of a firm’s search strategy “adds new elements to the set, improving the possibilities for finding a useful combination” (Katila and Ahuja, 2002). Empirically, Rennings and Rammer (2009) have found that German firms search for eco-innovation impulses more broadly than other innovators. Similarly, Horbach et al. (2013) confirm that green innovative activities require more external sources of knowledge and information compared to other innovations. The multi-purpose nature of green innovations (production efficiency, environmental standards, etc.) often requires knowledge that is usually dispersed among different and various external knowledge sources. We argue that external search breadth is positively associated with eco-innovation performance. The greater the number of external sources, the greater are the chances of finding and developing an idea for an eco-friendly product or process. However, firms can also

“oversearch,” and this can have a negative impact on their green innovation performance. Katila and Ahuja (2002) argue that the interaction with a great number of external actors may cause a negative impact on the innovation process. There is a cost in the integration of knowledge that may from certain point on offset the benefit of the discovery of new knowledge. According to attention-based theory, decision makers need to “concentrate their energy, effort and mindfulness on a limited number of issues” (Ocasio, 1997). The attention of organizations is a scarce resource and any allocation of attention has an opportunity cost (Ocasio, 2011). This argument is based on the “bounded rationality” (Simon, 1957) of human beings. The capacity of manager to pay attention to and cognitively process many sources of information is limited. A large number of sources could introduce some “noise” in the firm’s ability to identify eco-innovation opportunities. It might also be problematic as a result of the difficulties in analyzing such a variety of sources. On the basis of these arguments, we assert that though greater breadth should lead to a greater environmental orientation of firms in general, there is also likely to be a point at which external search breadth becomes disadvantageous because the firm might not be able to cope with such a large number of sources. Formally, we propose the following hypothesis for our analysis:

*H1: External search breadth is curvilinearly (has an inverted U shape) related to eco-innovation in the hospitality industry.*

The diversity of external actors the firm interact with is an important dimension of external search strategy. However, open innovation is not just scanning a wide number of sources (breadth), it also implies drawing knowledge from these sources. Open innovation is, therefore, not only constrained to the decision to open up of different types of external parties, it is equally important to consider the depth of the relationships with different types of external parties (Bahemia and Squire, 2010). Following Laursen and Salter (2006) our concept of external search Depth is defined as the extent to which firms draw intensively from different sources of eco-innovate ideas. Bahemia and Squire (2010) consider a conceptual framework of inbound open innovation and determine the degree of openness along their dimensions.

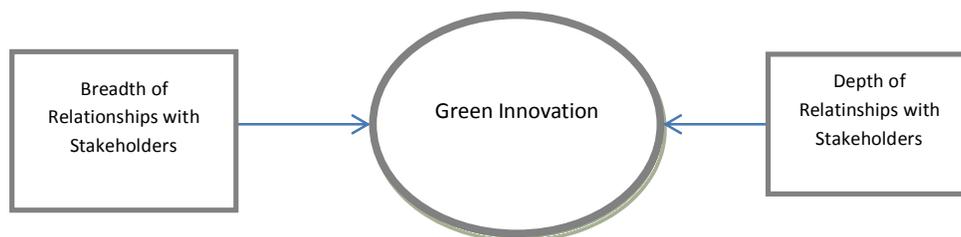


Fig. 1. Theoretical framework of firms innovations

They argue that the margin of managerial action is not only constrained to the decision to open up of different types of external parties (breadth dimension) but that it is equally important to consider the depth of the relationships with different types of external parties (depth dimension) and even the balance between the development of new and longstanding relationships. The repeated utilization of knowledge gained from the external actors can lead to a better understanding of the concepts that it involves and help the firm to adapt or expand its competences improving performance (Katila and Ahuja, 2002). The role of Depth of external contacts and its link to innovation performance was studied by Vahter et al. (2012) in Irish firms. They found that firms are able to benefit from deeper relationships up to a point and beyond that limit a negative effect show up for small firms.

Green innovators seem to perceive the lack of appropriate cooperation partners as an important innovation barrier (Rennings and Rammer, 2009). Therefore, a proper knowledge partner becomes a key asset to maintain. Our argument is that those firms that draw deeply from external sources will have a higher environmental orientation in their innovation processes as they will be more able to build and sustain collaborations with external agents. Nevertheless, we also expect that maintaining deep relationships with external agents will require coordination as well as internal resources and attention. There might be a point at which deepen the relationships would have a negative impact on eco-innovation. Deepening interaction with external knowledge sources may decrease green innovation performance due to the explicit and implicit costs of its management (Ghisetti et al., 2015). Hence, excessively deep knowledge sourcing may involve the firm a withdrawal of managerial energies from its eventual eco-innovative effort. Formally, we propose that:

*H<sub>2</sub>: External search depth is curvilinearly (has an inverted U shape) related to eco-innovation in the hospitality industry.*

### 3. Materials and methods

Spain is the world's fourth most popular tourist destination, after the United States, France, and China. In 2012, 57.7 million international tourists visited Spain (Instituto de Estudios Turísticos, 2013). The Spanish hospitality industry, which includes restaurants, accommodations, entertainment, and transportation, faces increasing competition and is a pillar of the Spanish economy. Spain's hospitality sector directly employs 1.2 million individuals, with an additional 454,000 people employed in the supply chain. The induced contribution is relatively large, representing 590,000 more employees. In total, therefore, the sector supports approximately 2.3 million jobs, which is

equivalent to 12.4% of the total workforce. This ranks as the sixth highest proportion of total jobs supported by the hospitality sector in Europe (Instituto de Estudios Turísticos, 2013). Moreover, the economic crisis has affected Spain's hospitality industry to a lesser extent than other industries. The evolution of employment has been positive in general, except from 2008 to 2010 and from 2012 to 2013, rendering this industry a true engine of the Spanish economy (Instituto de Turismo de España, 2015).

To test our model, we use a sample of 189 companies from the hospitality industry in Spain, from which we gathered information about their innovation activities. We obtained information from the Technological Innovation Panel (PITEC). This database, based on the Community Innovation Survey (CIS), has been employed in several other studies on different industries (e.g., Mondéjar-Jiménez et al., 2015).

There is no clear consensus on the definition of environmental innovation. Often, it can be defined in two ways: by their effect on the environment and by the intention of the innovator. Research on the topic usually follows one of these lines. It is more difficult to verify an environmental motivation than an environmental result, although the latter may also prove challenging (Carrillo-Hermosilla et al., 2010). See González-Moreno et al. (2013) and Carrillo-Hermosilla et al. (2010) for a review of some definitions of this construct. For our purposes, we use a subjective measure of the motivational nature of the innovation. Although other measurement instruments could be considered more accurate (see Pujari, 2006) we use a reflective scale to measure eco-innovation. Our database contains the following information, which enables us to identify the impact of the innovation activities on the firm: "reduced materials and/or energy," "improved environmental impact or health and safety aspects," and/or "meet environmental regulations or standards." We use exploratory factor analysis to construct our dependent variable, "green innovation." Table 1 shows the results of this analysis. For this analysis, we used the Kaiser-Meyer-Olkin (KMO) and Bartlett's measures of sampling adequacy to assess the extent to which variables are appropriate for factor analysis. The KMO measures the sampling adequacy, which should be greater than 0.5 for a satisfactory factor analysis to proceed (Kim and Mueller, 1978). We also calculated Cronbach's alpha as a proxy for reliability of our measure. This scale has been recently used by Ghisetti et al. (2015), which give us some support about the reliability and validity of this measurement instrument.

For our independent variables, we included the *size* of the firm, measured as the log of the number of employees, a dummy variable reflecting whether the firm belongs to a *group* of firms, and the *age* of the firm measured as the year of creation. To quantify a firm's degree of openness, we included

two variables to measure the breadth and depth of the firm's relationships. *Breadth* measures the number of collaborations and external channels the company uses. It is constructed as a combination of the different agents the firm cooperates with for innovation purposes. These agents are (1) group firms, (2) clients, (3) suppliers, (4) competitors, (5) consulting firms and commercial laboratories/research-and-development firms, (7) universities, and (8) public research institutes. Initially, each of these sources of cooperation is coded as a binary variable, with 0 being no use and 1 being use of the given source. Subsequently, the eight sources are simply added up so that each firm receives a value of 0 when no cooperation exists and a value of 8 when it cooperates with all possible agents. Laursen and Salter (2006) use a similar measure. *Depth* is the extent to which a firm draws intensively from different sources of innovation. It is constructed in a similar manner as breadth. For each source mentioned, the importance the firm given to that particular source is coded from 1 ("no importance") to 4 ("very important"). We assessed depth by simply adding up the value each firm gave to the eight sources. Hence, the maximum score for this variable is 32.

#### 4. Results and discussion

We ran ordinary least squares regression models to test the relationships between green innovations and breadth and depth. We first introduced the control variables (size, group and age of the firm) in our base model. Next, we added our independent variables to test for direct effect. Finally, we included the square value of the breadth and depth variables to test for a curvilinear relationship. Table 2 shows the results of these analyses. Variance inflation factors –VIF- ranged from 1.050 to 1.232 for model 1. Obviously, these scores raised to 8.372 when we introduced the square terms.

Our findings indicate that firms that are more open develop more environmental innovations. The greater the number of relationships with stakeholders (breadth), the greater is the environmental orientation of the firm's innovations (Model 1; coef. .042;  $p < .05$ ). The wider the array of knowledge sources on which the firm draws, the greater its environmental orientation. Moreover, this environmental orientation is also positively and significantly related to the depth of the relationships with stakeholders (Model 1; coef. .102;  $p < .01$ ).

**Table 1.** Dependent variable factor analysis

<i>How important were each of the following objectives for the firm activities to develop innovations? (Likert scale)</i>	<i>Factor: Green innovation</i>
Reduce energy per unit output	.700
Reduce environmental impacts	.901
Improve health or safety	.898
Meet regulations or standards on environment, health or security	.890
Variance explained	72.489
KMO	.804
Bartlett's	502.707***
Cronbach's alpha	.873

\*\*\* Significant at 99%

**Table 2.** Ordinary least squares regression models on green innovation

	<i>Base Model</i>	<i>Model 1</i>	<i>Model 2</i>
Constant	-.192 (5.384)	2.326 (4.346)	2.238 (4.365)
Size (Ln employees)	-.017 (.025)	-.021 (.021)	-.018 (.021)
Group	.048 (.079)	.037 (.064)	.026 (.064)
Age (year of creation)	.001 (.003)	-.001 (.002)	-.001 (.002)
Breadth of Relationships		.042* (.018)	.172** (.065)
Depth of Relationships		.102** (.011)	.117* (.079)
Breadth x Breadth			-.018* (0.008)
Depth x Depth			0.001 (0.002)
R <sup>2</sup>	0.005	0.363	0.379
F	0.285	19.501**	14.749**
N	189	189	189

\*\*  $p < .01$ ; \*  $p < .05$ . Standard error in brackets

The chances of being a green innovator increase with the competences the firm acquires through deep interaction with its external knowledge providers.

In addition, the results of Model 2 show that there is an inverted U-shaped relationship between breadth and green innovations. H1 is thus confirmed suggesting that breadth may increase the firm's coverage of the multiple knowledge needs involved by the multi-dimensionality of eco-innovations up to a point where the positive effect decreases. Fig. 2 graphically depicts this relationship. With these findings, we can state that though greater breadth indeed leads to greater environmental orientation in the firms we examined, there is also a point at which external search breadth becomes disadvantageous because the firm is not able to cope with a large number of sources. Knowledge variety is required in order to develop green innovations, however, broadening the external search above certain level exposes the firm to redundant and inconsistent information signals, which deal to lower eco-innovation performance. As it can be seen in Fig. 2, the marginal effect of an increasingly broad sourcing attitude tends to decrease when *breadth* reaches a medium-high number of sources (6 out of 8). On the contrary, we cannot support H2. The variable *Depth*  $\times$  *Depth* is not significant and even more, the significance of the effect of *Depth* decreases when the quadratic terms are introduced in the model. Contrary to our expectations, deepening the relationships with external sources is very effective for green innovation performance and does not seem to be bounded.

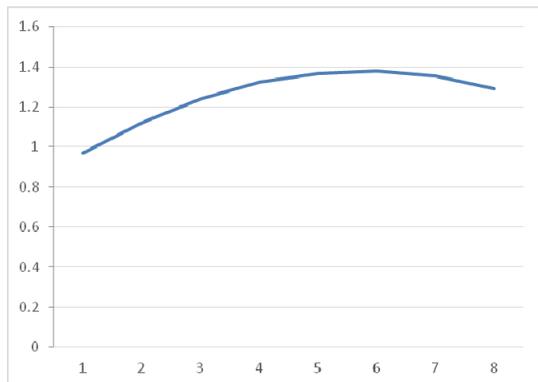


Fig. 2. Relationship between green-innovations (X axis) and the breadth of firm's relationships (Y axis)

## 5. Conclusions

This paper explored one aspect of openness in the organization of firm's innovation activities in the hospitality industry in Spain. In particular, how external linkages help shape environmental innovations. To deepen the understanding of how firms in the hospitality industry can introduce green innovations by drawing on knowledge from external sources, we examined the role of external search

strategies in shaping eco-innovation performance. We argue that firms that are more open to external sources are more likely to have a higher level of eco-innovation. Our findings show that open innovation positively affects the development of environmental innovations in the hospitality industry. This finding points to an additional sphere of environmental policy actions. Network and cluster policies as well as technology and knowledge transfer initiatives should be promoted to increase firms' environmental innovation. However, there is a point at which openness - specifically in terms of breadth - can negatively affect eco-innovation in these firms. The implications for management arise as our research suggests that external sources need to be managed carefully so that search efforts are not dissipated across too many search channels, as innovation search is time consuming, expensive, and laborious. Moreover, coordination efforts may hide the expected positive effect of cooperation. Therefore, network policies and technology and knowledge transfer promotion initiatives can have a positive social impact, as they would increase hospitality firms' environmental innovations. Nevertheless, this policy recipe is subject to restrictions, as these positive effects will decrease when green innovators face congestion problems from an excessive range of external knowledge sources.

We call for additional in-depth studies to provide a better and fuller description of how firms in the Spanish hospitality industry become trapped in the position of under- or over-search. Another line of inquiry for further research is to understand changes on eco-innovation search strategies over time. Our approach focuses on one period, and this remains a severe limitation. Further research should examine whether search behavior changes over time and how the technological trajectory of the firm influences its eco-innovation performance.

## Acknowledgments

The research on which this paper is based is partially funded by the Spanish Ministry of Economy and Competitiveness under research grant ECO2015-70262-R. We are grateful for constructive comments by three anonymous reviewers. The usual caveat applies.

## References

- Bahemia H., Squire B., (2010), A contingent perspective of open innovation in new product development projects, *International Journal of Innovation Management*, **14**, 603-627.
- Calina A., Calina J., (2015), Research on the production of forage for the agro-touristic farms in Romania by cultivating perennial leguminous plants, *Environmental Engineering and Management Journal*, **14**, 657-663.
- Carrillo-Hermosilla J., Del Río P., Könnölä T., (2010), Diversity of eco-innovations: reflections from selected case studies, *Journal of Cleaner Production*, **18**, 1073-1083.

- Chesbrough H.W., (2003), The era of open innovation, *Sloan Management Review*, **44**, 35-41.
- Chesbrough H.W., (2006), *Open Innovation: A new Paradigm for Understanding Industrial Innovation*, In: *Open Innovation: Researching a New Paradigm*, 2<sup>nd</sup> edition, Chesbrough H.W., Vanhaverbeke W., West J. (Eds.), Oxford, UK: Oxford University Press, pp. 1-12.
- Dahlander L., O'Mahony S., Gann D.M., (2016), One foot in, one foot out: How does individuals' external search breadth affect innovation outcomes?, *Strategic Management Journal*, **37**, 280-302.
- Díaz-García C., González-Moreno A., Sáez-Martínez F.J., (2015), Eco-innovation: Insights from a literature review, *Innovation: Management, Policy & Practice*, **17**, 6-23.
- El Dief M., Font X., (2010), The determinants of hotels' marketing managers' green marketing behaviour, *Journal of Sustainable Tourism*, **18**, 157-174.
- Enz C.A., Verma R., Walsh K., Kimes S.K., Siguaw J., (2010), Cases in innovative practices in hospitality and related services, *Cornell Hospitality Report*, **10**, 6-26.
- Gassmann O., Enkel E., Chesbrough H., (2010), The future of open innovation, *R&D Management*, **40**, 213-221.
- Ghisetti C., Marzucchi A., Montresor S., (2015), The open eco-innovation mode. An empirical investigation of eleven European countries, *Research Policy*, **44**, 1080-1093.
- González-Moreno Á., Sáez-Martínez F.J., Díaz-García C., (2013), Drivers of eco-innovation in the chemical industry, *Environmental Engineering and Management Journal*, **12**, 2001-2008.
- Hagedoorn J., Schakenraad J., (1994), The effect of strategic technology alliances on company performance, *Strategic Management Journal*, **15**, 291-309.
- Horbach J., Oltra V., Belin J., (2013), Determinants and Specificities of Eco-Innovations Compared to Other Innovations—an Econometric Analysis for the French and German Industry Based on the Community Innovation Survey, *Industry and Innovation*, **20**, 523-543.
- Huizingh E.K.R.E., (2011), Open innovation: State of the art and future perspectives, *Technovation*, **31**, 2-9.
- Hunter C., Shaw J., (2007), The ecological footprint as a key indicator of sustainable tourism, *Tourism Management*, **28**, 46-57.
- Instituto de Estudios Turísticos, (2013), Tourism Balance. Performance of tourism activity in Spain (in Spanish), Spanish Ministry of Industry, Energy and Tourism, Madrid.
- Instituto de Turismo de España, (2015), Tourist Situation Bulletin (Boletín Trimestral de Coyuntura Turística) (COYUNTUR), **22**, II Trimestre 2015, Spanish Ministry of Industry, Energy and Tourism, Madrid.
- Katila R., Ahuja G., (2002), Something old, something new: The longitudinal study of search behaviour and new product introduction, *Academy of Management Journal*, **45**, 1183-1194.
- Kemp R., Pearson P., (2007), Final report of the MEI project measuring eco innovation. UM Merit Maastricht, On line at: <http://www.merit.unu.edu/MEI/>.
- Kim J.O., Mueller C.W., (1978), *Factor Analysis: Statistical Methods and Practical Issues*, Thousand Oaks, CA: Sage Publications.
- Kim Y., Ham H., (2010), Intention to pay conventional-hotel prices at a green hotel: A modification of the theory of planned behavior, *Journal of Sustainable Tourism*, **18**, 997-1014.
- Kranenburg H., Hagedoorn J., Pennings J., (2004), Measurement of international and product diversification in the publishing industry, *Journal of Media Economics*, **2**, 87-104.
- Laursen K., Salter A., (2006), Open for innovation: The role of openness in explaining innovation performance among U.K. manufacturing firms, *Strategic Management Journal*, **27**, 131-150.
- Leiponen A., Helfat C.E., (2010), Innovation objectives, knowledge sources, and the benefits of breadth, *Strategic Management Journal*, **31**, 224-236.
- Mol M.J., Birkinshaw J., (2009), The sources of management innovation: when firms introduce new management practices, *Journal of Business Research*, **62**, 1269-1280.
- Mondéjar-Jiménez J., Segarra-Ona M., Peiró-Signes A., Payá-Martínez A., Sáez-Martínez F.J., (2015), Segmentation of the Spanish automotive industry with respect to the environmental orientation of firms: Towards an ad-hoc vertical policy to promote eco-innovation, *Journal of Cleaner Production*, **86**, 238-244.
- Ocasio W., (1997), Towards an attention-based view of the firm, *Strategic Management Journal*, **18**, 187-206.
- Ocasio W., (2011), Attention to attention, *Organization Science*, **15**, 5-21.
- Orfila-Sintes F., Mattsson J., (2009), Innovation behaviour in the hotel industry, *Omega*, **37**, 380-394.
- Pujari D., (2006), Eco-innovation and new product development: understanding the influences on market performance, *Technovation*, **26**, 76-85.
- Rennings K., Rammer C., (2009), Increasing energy and resource efficiency through innovation. An explorative analysis using innovation survey data, *Czech Journal of Economics and Finance*, **59**, 442-259.
- Sáez-Martínez F.J., Ferrari G., Mondéjar-Jiménez J., (2015), Eco-innovation: Trends and approaches for a field of study, *Innovation: Management, Policy & Practice*, **17**, 1-5.
- Sarkar S., Costa A., (2008), Dynamic of open innovation in the food industry, *Trends in Food Science & Technology*, **19**, 574-580.
- Segarra-Ona M.V., Peiró-Signes A., Verna R., (2011), Environmental management certification and performance in the hospitality industry: A comparative analysis of ISO 14001 hotels in Spain, *Cornell Hospitality Report*, **11**, 6-13.
- Simon H., (1957), *Models of Man, Social and Rational: Mathematical Essays on Rational Human Behavior in a Social Setting*, New York: Wiley.
- Tarí J.J., Claver-Cortes E., Pereira-Moliner J., Molina-Azorín J.F., (2010), Levels of quality and environmental management in the hotel industry: Their joint influence on firm performance, *International Journal of Hospitality Management*, **29**, 500-510.
- Vahter P., Love J., Roper S., (2012), *Openness and innovation performance: Are small firms different?*, DRUID 2102, June, Copenhagen, Denmark.
- Wang Y., Qualls W., (2007), Towards a theoretical model of technology adoption in hospitality organizations, *International Journal of Hospitality Management*, **26**, 560-573.
- Zhang J.J., Joglekar N., Verma R., (2010), Developing measures for environmental sustainability in hotels: An exploratory study, *Cornell Hospitality Report*, **10**, 6-20.

Copyright of Environmental Engineering & Management Journal (EEMJ) is the property of Environmental Engineering & Management Journal and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.