Chapter 6
Improving Environmental Management Systems by ISO 9001 in the Spanish Hospitality Sector

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Abstract As the Knowledge Management discipline continues to evolve, socialisation, externalisation, combination and internalisation remain as key management practices for the creation of knowledge which enables organisations to successfully address environmental challenges. This paper examines the relevance and importance of an ISO 9001 certification as an enabler of Nonaka and Takeuchi's SECI model and the processes of reusing and updating the environmental knowledge of an organisation. These relationships are examined through an empirical study of 87 companies in the Spanish hospitality sector using repeated measures ANOVA validated by factor analysis. The study has direct implications for management practice as ISO 9001 represents a long-term programme to change, and a proactive way to improve knowledge management practices. Therefore, in order to consolidate knowledge management practices, companies need to provide and support organisational structures as ISO 9001.

6.1 Introduction

Increasing awareness of environmental problems brought about by business activity has led to greater political and social demands on firms to reduce their environmental impact. Managing the impact of the different business functions on the environment is now seen as a responsibility of all of its stakeholders: employees, managers,

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customers and the supply chain. Managers are held responsible for the design or adoption of strategies to protect the environment and the integration of such strategies in the operation of the firm. Environmental control requires new knowledge to be used to change attitudes towards efficiency, international cooperation and environmental challenges such as sustainability, emissions or waste management. In this study, 'environmental knowledge' refers to knowledge and awareness of environmental problems and strategies for their solutions (Zsóka, Szerényi, Széchy, & Kocsis, 2013).

Challenged by a new business context characterised by a global competition, rapidly shrinking product life cycles, more demanding customers and shorter response times, organisations need to pursue new competitive strategies. Higher product value is expected to drive improved levels of customer satisfaction. In this context environmental knowledge has become one the most important intangible assets for the business since it is accumulated through organisational learning and difficult to imitate (Leonard-Barton, 1992; Nonaka & Toyama, 2003; Cegarra-Navarro el al., 2013). Environmental management practices seek to improve and maximise the value of procedures and standards that regulate the processes through which goods and services are produced (Nonaka, 1994; Nonaka & Konno, 1998). This is achieved through different mechanisms that are effective in combining the socialisation, externalisation and internalisation of green business practices to reduce the environmental footprint and promote sustainability (e.g. Kaur, 2015; Oluikpe, 2012; Rai, 2011).

There are several environmental standards, which have allowed a few companies to become world leaders in the hospitality industry. Such guidelines support formal knowledge and technical projects within the organisation. Furthermore, employees' know-how used in the company's daily operations stem from such procedures and standards. ISO 9001 is one of the most widely used management tools in matters of quality. Procedures and standards derived from ISO 9001 successfully support the creation of environmental knowledge concerning the identification of sources of pollution or the development of preventive solutions (Wilson & Campbell, 2016). In other words, ISO 9001 has become a favoured system for many hospitality companies embarking on quality improvement, which in turn can support the implementation of environmental management practices (Wilson & Campbell, 2016). ISO 9001 can also be directly linked to knowledge through the realisation that an organisation's quality manual becomes the repository of its learned knowledge (Zeti, 2002). As Blackler (1995) noted, an ISO 9001 quality manual can be seen as a repository of 'encoded knowledge', which in turn can be used to gain the knowledge needed to enhance management practices (Lin & Wu, 2007). Therefore, ISO 9001 represents a guideline to build an efficient quality system and to provide learning effects (International Organization For Standardization [ISO], 2015; Lin & Wu, 2005).

Previous studies on ISO 9001 (e.g. International Organization For Standardization [ISO], 2015; Lin & Wu, 2005) have focussed on issues related to its implementation in organisations. However, not enough research has been reported on the relative influence of ISO 9001 on environmental management practices. Thus, it is not clear whether or to which extent ISO 9001 helps organisations in the implementation of

knowledge management initiatives that seek to improve their environmental management practices. In particular, questions arise over how knowledge management frameworks such as Nonaka and Takeuchi's SECI model for knowledge creation (Nonaka & Takeuchi, 1995) could benefit from ISO 9001 when organisations attempt to create and share knowledge for the ultimate purpose of protecting the environment. In line with the four ways to combine existing knowledge identified by the SECI model, this research has adopted four dimensions of knowledge conversion. These are tacit to tacit (socialisation), tacit to explicit (externalisation), explicit to explicit (combination) and explicit to tacit (internalisation). Broadly speaking, socialisation, externalisation, combination and internalisation take place continuously in what has been defined as a spiral of knowledge creation.

This study explores the interrelationships between ISO 9001 and the SECI model for knowledge creation. To such aim this paper presents an empirically tested SECI model which helps identify how ISO 9001 supports the Spanish hospitality sector in their efforts to implement successful environmental management practices. The proposed theoretical framework is presented in Sect. 6.2. Details of the survey which was used to collect appropriate data to test the model is presented in Sect. 6.3 and the results of testing the models are detailed in Sect. 6.4 which is followed by the conclusions of the research in Sect. 6.5.

6.2 The Conceptual Framework

6.2.1 Environmental Knowledge Management Practices

In order to determine which component of the SECI model could be improved by using ISO 9001, a model was developed using quantitative data collected from the Spanish hospitality industry. The research focused in particular on the section of the industry that deals with hotel operation and management. The hospitality industry is a key sector within the Spanish economy (Cadarso, 2005). It represents the second-largest foreign-tourist industry worldwide and the first in Europe (US$ 60 billion in) (United Nations World Tourism Organization [UNWTO], 2015).

As noted above, sustainable development is one of the priorities in the world's efforts to attain the well-being of mankind (Nouri, Karbassi, & Mirkia, 2008). Thus, the preservation of the environment becomes a crucial factor influencing hotel operations. Environmental regulations such as 2008/98/EC, updated on 14/07/2011, which aim to promote high quality recycling (Directive 2008/98/EC), and the recent increase in the number of hotels which have adopted certifications such as ISO 9001, Q quality and ISO 14001, are typical examples of such efforts. Moreover, the growing interest of tourists in sustainability and protection of environment has led to the emergence of so-called ecotourism or nature tourism, which in turn has helped hospitality companies to develop strategies that focus on the environment (Brockhoff, Chakrabarti, & Kirchgeorg, 1999).

In the last two decades the concept of environmental knowledge has been used to characterise the way in which organisations align their strategic goals to sustainable development (Wernick, 2003). This means that organisations with awareness of the importance of environmental knowledge will be more likely to be able to deal with environmental problems as they understand the benefits of environmentally responsible goals (Frick, Kaiser, & Wilson, 2004).

From a knowledge management perspective the above considerations could mean that hospitably companies may require an intensive use of different certifications (e.g. ISO 9001) to competitively operate in the current market conditions and satisfy its customer needs (Gómez-Loscos & González, 2014). In practice, however, the implementation of knowledge management strategies is not free from challenges (Lee & Choi, 2003) as it requires significant organisational and technological changes. In this sense, it can be appropriate for organisations to use management systems that have already been consolidated (Calvo-Mora, Navarro-García, & Periañez-Cristobal, 2015) such as those that focus on total quality and serve to support initiatives of knowledge management (Ju, Lin, Lin, & Kuo, 2006). These considerations led us to argue that ISO 9001 is a vehicle through which hospitality companies can generate, disseminate and use superior information on customers and competitors (Alegre & Sard, 2015; Erdogana & Baris, 2007).

Simultaneously, achieving and maintaining the ISO 9001 standards constitutes a process (Heng, 2001) which in itself becomes a source of new ideas and knowledge. Some of the information recorded by the ISO 9001 standard (e.g. environmental regulations) is not formulated or controlled by management within the organisation. Instead, such information is continuously created by employees. As staff move, groups dissolve and application wanes such information tends to be transformed and occasionally lost. In other words, the information provided by ISO 9001 can be a daunting asset to deal with and, for this reason, it is important to explore the knowledge flow processes that would enable organisations to retain and develop it (Lin & Wu, 2005). This process involves social interaction between sources of tacit and explicit knowledge and leads to knowledge creation, sharing and reuse (Cegarra-Navarro & Martinez-Martinez, 2010).

As Martelo and Cegarra-Navarro (2014) noted, knowledge in a firm emerges both from inside and outside the firm. In this process, the SECI model may play an important role in the creation of environmental knowledge. By its very nature, the SECI model has the potential to not only enable the transfer of knowledge between the organisation and its business environment, but also refine and improve the knowledge already available within the organisation. Furthermore, the model may have a positive effect on the success of knowledge search and retrieval strategies within the organisation and with its stakeholders. A key argument supporting this is that knowledge held by individuals is shared with other individuals and in the process it gets related to new knowledge (Nonaka, Toyama, & Konno, 2000).

Nonaka and Takeuchi (1995) suggested four dimensions for the SECI model, each playing a different but complementary roles in explaining how knowledge can be created in organisations. While sharing tacit knowledge between actors is considered a socialisation process, tacit knowledge becomes explicit through an

externalisation process. This conversion is due to a social process between groups and individuals (Nonaka & Takeuchi, 1995). Because of this social interaction, knowledge flows easily through different levels of the organisation (Kaur, 2015). There is tacit knowledge and explicit knowledge that revolve around this model. While explicit knowledge can be presented through verbal communication and written reports, tacit knowledge refers to knowledge, which is only known by an individual and is difficult to communicate to the rest of the organisation (Polanyi, 1966). In other words, tacit knowledge refers to attitudes, commitments, emotions and behaviour, and is difficult to communicate. In the SECI model, knowledge creation begins with socialisation (SOC), continues with externalisation (EXT), combination (COM), and internalisation (INT), before returning to socialization, although at a new level, this is the spiral of knowledge creation is created in the organisation (Nonaka et al., 2000).

The first phase, 'socialisation' (SOC hereafter) consists of the transfer of tacit to tacit knowledge, it offers an opportunity for experience sharing to create tacit knowledge and improve collaboration throughout a project life-cycle. It encourages individuals to spend time together in joint hands-on experiences, informal meetings, and work in the same environment to exchange personal or specialized knowledge (Andreeva & Ikhilchik, 2011).

The second phase, 'externalisation' (EXT hereafter) consists of the transformation of tacit knowledge into explicit knowledge, and therefore only considers the transformation of existing 'know-what' and 'know-how' among team members, without taking into account the combination of new knowledge existing within different teams (Tyagi, Cai, Yang, & Chambers, 2015). During this stage, the know-how is exposed in the form of concepts, ideas, images, hypotheses, analogies and models for explaining key facts to others through demonstration, comparison and experimentation. Therefore for these authors, the efficiency of this process depends upon the level of education and motivation of participants.

The third phase, 'combination' (COM hereafter) is a process whereby "explicit knowledge is collected from inside or outside the company and then processed to form more well-organised and explicit knowledge resources. Although this process is based on a social interaction between often experienced members of groups and departments, it also involves the less skilled or less experienced members of those teams through a number of organisational activities (Nonaka et al., 2000).

The last phase, 'internalisation' (INT hereafter) is the tacit adoption of the explicit knowledge that has been generated and disseminated (North & Kumta, 2014). The 'INT' reflects the transformation of explicit knowledge into tacit knowledge through continuous individual and collective interactions. In this process, the old explicit concepts obtained from 'COM' are updated, expanded, extended, transformed and then shared by the individuals of the organisation in their own tacit knowledge, according to their own styles and experiences, thus, starting again a new cycle. It is closely related to learning by doing.

In this context, the research questions that drive this research -discussed in detail in the following section, are:

1. How does the presence of ISO 9001 affect socialisation, externalisation, combination and internalisation processes?, and
2. Can ISO 9001 Enhance Knowledge Management Structures?

6.2.2 Development of Hypotheses

In order to evaluate the efficiency of ISO 9001, it is necessary to elaborate theories and models that take into account the performance of the organisation as well as the efficiency of the group-learning processes within the organisation and with its stakeholders. This research is going to link SOC, EXT, COM and INT with the degree to which the ISO 9001 is implemented within the organisation. As previously discussed, ISO 9001 is a widely accepted standard that provides guidelines, rules and characteristics for adopting green practices (Blackler, 1995; International Organization For Standardization [ISO], 2015; Lin & Wu, 2005; Zeti, 2002). Furthermore, the literature also includes evidence of relationships between quality management and knowledge management practices. These relationships have been analysed taking as a reference the ISO 9000 family of quality management systems standards (Honarpour, Jusoh, & Nor, 2012; Marcus & Naveh, 2005; Tang & Tong, 2007). When consistently applied, they help knowledge users to simultaneously achieve alignment and adaptability within environmental management practices (e.g. SOC, EXT, COM and INT).

It is also important to note that when information is fragmented within a company, environmental knowledge is hard to obtain, and as a result knowledge management practices suffer (Boiral, 2002, 2009). In this sense Fryxel and Lo (2003) argued that employee compliance with new practices becomes an imperative for the successful use of corporate knowledge across its business processes. A possible explanation for these findings may relate to the fact that ISO 9001 fosters search and retrieval of relevant knowledge from the repositories and enable stakeholders to apply this knowledge, for instance, in the prevention of pollution (Cordano & Frieze, 2000) or the development cleaner processes (Aggeri, 1999).

Another relevant aspect is that the ISO 9001 requirements are likely to change over time. When that happens, the organisation may need to exploit their prior guidelines, rules and characteristics and also update or replace such knowledge structures. So, whilst managers have to support the creation and management of knowledge structures so that employees remain up to date with the changes in ISO 9001 requirements (Carmona-Moreno, Céspedes-Lorente, & Burgos-Jimenez, 2004). To such aims, processes such as SOC, EXT, COM and INT help foster the development of new knowledge that could be valuable for updating the ISO 9001 requirements (Tyagi et al., 2015). Through SOC, EXT, COM and INT, employees are able to seek out those more experienced partners who could provide them with insights and guide on how to update the ISO 9001 requirements within the organisation. For example, employees and customers who worked with social networks often get together to exchange ideas about previously established standards for

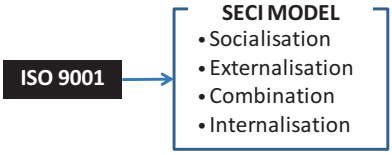

Fig. 6.1 Theoretical model

existing services and ideas for new services and, as a result, new guidelines and rules emerge (Chandana, 2001).

Taking the above consideration into account, this study proposes the theoretical model shown in Fig. 6.1 according to which a firm with an ISO 9001 certification holds a key capability for the updating of environmental knowledge through SECI model. Explicit and tacit knowledge are addressed by the ISO standard. To manage prior environmental knowledge effectively, firms could put in place a SECI model which enables employees to update their assumptions and then replace new or modified environmental knowledge. In this way, firms with a SECI model will be able to use environmental knowledge in their efforts to deal with challenges such as sustainability, emissions or waste management. Given the framework above, the following hypotheses have been proposed for this study:

H1: ISO 9001 is associated to the presence of Socialisation (SOC).

H2: ISO 9001 is associated to the presence of Externalisation (EXT).

H3: ISO 9001 is associated to the presence of Combination (COM).

H4: ISO 9001 is associated to the presence of Internalisation (INT)

6.3 The Empirical Study

Data Collection The focus of the data collection process was the Spanish hospitality industry. The unit of analysis for this study was the organisation, on the assumption that aspects relating to the creation of environmental knowledge affect the entire organisation. The criteria defining our initial sampling frame was that target companies were included in the CNAE-552 (the Spanish National Classification of Economic Activities 552) and had at least 10 employees. On this basis, a list of 560 Hotel Operators was obtained from the SABI[1] database (based on the statistics for the year 2006). However, once every CEO or business owner were contacted by telephone and invited to participate in the study, only 245 companies agreed to participate in the first instance. As a result, the final sample size was 245 companies.

[1] Sistema de Análisis de Balances Ibéricos (SABI database) contains financial information for 520.000 companies (480.000 from Spain and 40.000 from Portugal). This includes public and private, Spanish and Portuguese companies, with up to 10 years of data, updated daily.

Once the 245 organisations had agreed to participate, the data collection process started. Data sets were gathered in two phases, the first of which lasted two months, from early January to the end of February 2014. From a sample of 245 companies, 87 companies responded to a survey whereby participants were asked questions about environmental activities carried out by their hotels and the learning processes implemented to create and update environmental knowledge in a context of intensive innovation. This produced a response rate of 15.53% of the total. A comparison between companies which had provided a response and those that had not done so yielded no significant differences in relation to turnover, total assets or the number of employees, which suggests that non-response bias did not constitute a significant issue in this research (Armstrong & Overton, 1977).

Measures Churchill's (1979) approach to questionnaire development was used. Scales were combined from several other relevant empirical studies with new items to make an initial list of 13 items distributed as follows: $4 \times 3 = 12$ of these measuring knowledge management processes, and 1 item measuring ISO 9001. The survey was initially validated by academics with expertise in organisational learning from Universities of Murcia and Cartagena (Spain) during the period of June–July 2008.

A series of telephone interviews were then conducted involving managers from a pilot sample of two leading Spanish hotels. These respondents were asked to indicate the reasons why they implement environmental management practices. All responses were related to economic reasons such as conservation of materials or energy, adherence to industry codes or legislative requirements, decreased costs, process and product innovation. In fact, it was found that such initiatives were also being used by businesses as communication tools to demonstrate their commitment to preventing issues which could have a negative impact on the environment. As a result of this pre-testing, we made some minor modifications based on the suggestions received.

The final measures relating to the existence of knowledge management processes consisted of three items adapted from a scale designed by Lee and Choi (2003) to measure the constructs of knowledge socialisation, externalisation, combination and internalisation. Specific issues relating to the development of the questionnaire and its related constructs are elaborated below (see Appendix for a list of items).

- Consistent with the findings of Lee and Choi (2003), items that addressed knowledge socialisation were interwoven with issues related to encouraging individuals in the organisation to track changing markets and share market intelligence with external agents.
- Also consistent with Lee and Choi's (2003) findings, items that addressed knowledge externalisation were interwoven with issues related to the encouragement of selected individuals in the organisation to transform their tacit knowledge of customers or experts into other forms which were easy to understand by others.
- Knowledge combination items described the process of formalising and storing concepts into a knowledge system, such as databases and knowledge bases so that reconfiguration of existing information through sorting, adding, combining, and categorising explicit knowledge could be used to create new knowledge (Lee & Choi, 2003).

Table 6.1 Factor loadings of reflective constructs

	SOC14	EXT14	COM14	INT14
SOC_1	***0.90***	0.61	0.60	0.55
SOC_2	***0.90***	0.47	0.50	0.59
SOC_9	***0.81***	0.39	0.41	0.45
EXT_1	0.55	***0.88***	0.40	0.51
EXT_2	0.30	***0.80***	0.34	0.31
EXT_3	0.56	***0.90***	0.52	0.45
COM_1	0.41	0.42	***0.91***	0.34
COM_2	0.59	0.48	***0.94***	0.48
COM_3	0.56	0.46	***0.93***	0.44
INT_1	0.47	0.44	0.39	***0.87***
INT_2	0.59	0.47	0.38	***0.90***
INT_3	0.58	0.44	0.48	***0.91***

Each indicator contributes to the respective construct and all the loadings are significant at 95%

- Knowledge internalisation items were focused on the use of knowledge about environmental issues for the development and implementation of business plans (Lee & Choi, 2003).
- In order to have a reference point about the presence of ISO 9001. They had to indicate whether (1): they had ISO 9001 or (0): they didn't have ISO 9001.

Measurement Model The evaluation of psychometric properties in each of the measurement scales used for different constructs is based on the methodological suggestions developed by Churchill (1979) and was validated for convergence and discrimination (Anderson & Gerbing, 1988; Lehmann, Gupta, & Steckel, 1999). The results of the confirmatory factor analysis and the reliability of the scale using PLS-Graph software version 03.00 Build 1058 are shown in Table 6.1 (Chin, 2003). Table 6.1 shows the relationships between the different constructs and their indicators, the latent model perspective was adopted, in which the latent variable is understood to be the cause of the indicators. With regard to the measurement model, we began by assessing the individual item reliability (Table 6.1). The indicators exceed the accepted threshold of 0.7 for each factor loading (Carmines & Zeller, 1979).

From an examination of the results in Table 6.2 it can be argued that all of the constructs are reliable. The values for both the Cronbach's alpha coefficient and composite reliability are greater than the 0.7 required in the early stages of research and also greater than the stricter value of 0.8 for basic research (Nunnally, 1978). The AVE should be greater than 0.5, meaning that at least 50% variance of the indicators should be accounted for (Fornell & Larcker, 1981). All the constructs of our model exceeded this condition (Table 6.2). To assess the discriminant validity, we compared the square root of the AVE (the diagonal in Table 6.2) with the correlations between constructs (the off-diagonal elements in Table 6.2). On average, each construct relates more strongly to its own measures than to others.

Table 6.2 Descriptive statistics and correlation matrix

	Mean[a]	SD	CA	CR	AVE	1	2	3	4	5	6
1. ISO9001	0.48	0.50	n.a.	n.a.	n.a.	**n.a.**					
2. SECI	6.99	1.50	n.a.	n.a.	n.a.	0.22	**n.a.**				
3. SOC	6.93	1.77	0.84	0.90	0.76	0.33	0.83	**0.87**			
4. EXT	6.16	2.06	0.80	0.88	0.72	0.23	0.80	0.53	**0.84**		
5. COM	7.07	1.84	0.89	0.93	0.81	0.10	0.78	0.57	0.49	**0.90**	
6. INT	7.79	1.83	0.87	0.92	0.79	0.02	0.79	0.61	0.49	0.45	**0.88**

Notes:
[a]*Mean* the average score for all of the items included in this measure, *S.D.* Standard Deviation, *CA* Cronbach's Alpha, *CR* Composite Reliability, *AVE* Average Variance Extracted, *n.a.* not applicable
[b]They represent the dimensions of each second-order construct. The bold numbers on the diagonal are the square root of the Average Variance Extracted. Off-diagonal elements are correlations among construct

6.4 Results

In order to determine the differences in environmental management practices in relation to whether or not ISO 9001 was present, the system repeated measures ANOVA was used. This method proves the explanatory power of only one factor or independent variable, not metrics in our case (ISO=1 and no ISO=0), on a set of dependent variable metrics (i.e. SOC, EXT, COM, and INT). Mauchly's test of sphericity tests the null hypothesis that the error covariance matrix of the orthonormalized-transformed dependent variable is proportional to an identity matrix. As the Mauchly's test of sphericity is significant $\chi^2 = 11.52$ with a significant level of ($p<0.05$) we can assert that the dependent variables are related. The Box's M test of equality of covariance matrices is significant with an F value of 2.29. Therefore, we support that the observed covariance matrix of the dependent variables is not equal across groups.

As shown in Table 6.3, the multivariate contrast analysis shows that the Lambda of Wilks is of 0.84 with a significant level of ($p<0.01$). Furthermore, the partial Eta squared is of 0.15 and the observed power is of 0.90. In consequence, ISO 9001 has an explicative power on dependent variables (SOC, EXT, COM, and INT). Tests of within-subjects effects show an F value of 23.18 at a level of ($p<0.01$). Therefore, we can assert that there are some differences among means of SOC, EXT, COM, and INT. The effect size for each independent variable was of (0.21), with an estimated power of (1). The interaction *SECI*ISO* shows an F value of 3.45 at a level of ($p<0.05$). Therefore, there are also differences among means of the interaction *SECI*ISO*. In this case, the effect size for each independent variable was of (0.04) with an estimated power of (0.77).

Testing of between-subjects effects shows an F value of 47.00 at a level of ($p<0.01$). Therefore, we can assert that there are differences depending on whether or not there is the presence of ISO. The partial Eta squared is of 0.35, and the observed power is of (1). If we analyse the univariate tests, it can be observed that the meaningful differences are found concretely in SOC and EXT. Table 6.3 shows

Table 6.3 ANOVA ISO 9001 factor (individual variables)

Variable	ISO 9001	Mean	Std. deviation	N	F	Partial Eta Squared	Observed power
	NO	6.36	1.91	45			
SOC	YES	7.54	1.38	42			
	TOTAL	6.93	1.77	87	10.825[a]	0.11	0.90
	NO	5.69	2.08	45			
EXT	YES	6.67	1.93	42			
	TOTAL	6.16	2.06	87	5.137 [b]	0.06	0.61
	NO	6.88	1.72	45			
COM	YES	7.27	1.96	42			
	TOTAL	7.07	1.84	87	0.969[ns]	0.18	0.16
	NO	7.75	1.68	45			
INT	YES	7.83	2.00	42			
	Total	7.79	1.83	87	0.047[ns]	0.03	0.05
Wilks' Lambda (0.84)					5.04[a]	0.15	0.90
Tests of within-subjects effects …….. SECI					23.18[a]	0.21	1.00
Tests of within-subjects effects …… *SECI*ISO*					3.45[b]	0.04	0.77
Test of between-subjects effects …… SECI					47.00[a]	0.35	1.00
Box's M			24.384	F=2.29[b]			
Mauchly's Test			$\chi^2_{(5)}$=	11.52[b]			

[a]<0.01; [b] p<0.05; [ns]not significant

that ISO 9001 had a positive influence on SOC. It was significant with an F value of 10.82 with a level of (p<0.01). Table 6.3, again, shows that ISO 9001 with an F value of 5.137 at a level of (p<0.05) had a significant effect on EXT. This analysis supports partially support H_3 and H_4 and strongly support H_1, H_2 respectively.

6.5 Conclusions

A common framework is required to effectively implement environmental management practices within the hospitality sector. This would enable organisations within the industry to address environmental challenges such as the identification of sources of pollution or the development of preventive solutions for the purpose of sustainability or to manage waste or emissions. In this sense, standards, guidelines, rules and characteristics resulting from the process of implementing ISO 9001 represent an important source of information. Therefore, a key practical contribution of this research is its capacity to inform decision makers on how ISO 9001 can enhance environmental management practices within the organisation and with its stakeholders. The adoption of ISO 9001 exercises a moderating effect on environmental management practices, and the process of implementing ISO 9001 constitutes in

itself a prior step to the implementation of green practices in the hospitality companies that we have studied.

Another key practical contribution of our research derives from the proposed theoretical model. The model highlights the fact that although both SOC and EXT are directly influenced by the adoption of ISO 9001 in the organisation, the effect of ISO 9001 on COM and INT is statistically insignificant. A plausible explanation for this can be found in the need for hospitality companies to attract new guests by offering green services and increasing practices such as recycling, donating perishable foods and using corn key cards. This is particularly valid for in a turbulent context such as that where the Spanish hospitality sector has operated during the period that we have examined. In order to reach these goals, processes such as SOC and EXT, oriented towards attracting potential new customers, are a necessary tool for learning and improving the efficiency of hotels on providing these new services. In other words, hospitality companies are focused on gaining new customers through SOC and EXT rather than retaining clients by COM and INT.

The third significant contribution made by this research consists of the questioning of the importance of 'time' in the relationship between ISO 9001 and environmental management practices. This paper has been able to provide only a snapshot of ongoing processes and not measures of the same process over time. However, the literature shows that hospitality companies in general and hotels in particular need 'time' in order to take advantage and exploit the standards, guidelines, rules and characteristics resulting from the implementation of ISO 9001 (Lin & Wu, 2007; Tang & Tong, 2007; Martínez-Martínez, Cegarra-Navarro & García-Pérez, 2015). For example, actions such as recycling or using new corn key cards may take time to be understood and transformed into value by employees across the company. In line with previous research by Din, Abd-Hamid, and Bryde (2011), our results confirm that while SOC and EXT structures may not necessarily require a long time, it may take longer for the organisation to realise the benefits of implementing INT and COM. Therefore, future research should examine how time influences ISO 9001 when implementing INT and COM processes.

Despite a number of significant contributions to theory and practice, this research has some limitations worth noting. Firstly, the focus of our empirical study has been the Spanish hospitality companies. Future research could examine the adoption of the SECI model with effective implementation of ISO 9001 in other sectors. Secondly, this study considered the implementation and adoption of one standard, namely ISO 9001. The study of other standards, guidelines and rules, different from those related to ISO 9001 could help organisations understand other mechanism for supporting environmental management practices. Future studies could examine the feasibility of providing specific standards, guidelines or rules that facilitate INT and COM processes rather than SOC and EXT practices. Finally, further research could use other methodological research approaches to study this phenomenon, enabling triangulation of data resulting from observational case studies.

Appendix: Questionnaire Items

Socialization of knowledge (1= high disagreement and 10= high agreement):		
SOC_1: Our company stresses gathering information from suppliers and customers.		
SOC_2: Our company stresses building databases on products and service.		
SOC_3: Our company stresses planning strategies by using published literature.		
Externalisation of knowledge (1= high disagreement and 10= high agreement):		
EXT_1: Our company stresses the use of deductive and inductive thinking.		
EXT_2: Our company stresses the use of metaphors in dialogue for concept.		
EXT_3: Our company stresses exchanging various ideas and dialogues.		
Combination of knowledge (1= high disagreement and 10= high agreement):		
COM_1: Our company stresses building up environmental materials by gathering management figures.		
COM_2: Our company stresses building databases on products and service		
COM_3: Our company stresses planning strategies by using published literature, computer simulation and forecasting.		
Internalization of knowledge (1= high disagreement and 10= high agreement):		
INT_1: Our company stresses forming teams as a model and conducting acquisition from databases, and sharing results with entire departments.		
INT_2: Our company stresses enactive activities with functional departments by cross-functional development teams		
INT_3: Our company stresses sharing and trying to understand management visions through communications with fellows.		
ISO 9001	☐ Yes	☐ No

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