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# Sustainability Commitment, New Competitors' Presence, and Hotel Performance: The Hotel Industry in Barcelona

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Academic Editor: Ian Patterson

Received: 9 May 2016; Accepted: 26 July 2016; Published: 4 August 2016

**Abstract:** The hospitality industry is facing major challenges, among them the new competition from novel forms of supply in the sharing economy. Airbnb, Homeaway, and Niumba, among other websites offering accommodations, are having an important impact in the sector, changing existing conditions and the market for the traditional hospitality industry. In this context, a strategy based in differentiation can help to prevent drops in revenues and profitability. The main objective of this paper is analyse if commitment towards sustainability has a positive impact on financial performance and can be considered a positive strategy in this new environment. The empirical data refer to a sample of hotels in Barcelona, one of the most important tourist cities in Europe. Our results suggest that there is no clear relationship between sustainability and better financial performance; however, sustainability commitment is associated with a minimum size, which can also have positive effects in terms of economies of scale and finally affect profitability. Hotels more committed to environmental issues are located in areas with a lower density of Airbnb apartments, and this geographical distribution can be more positive than a situation of massive tourist concentration in specific areas with negative externalities for neighbours.

**Keywords:** sustainability; hospitality industry; profitability

## 1. Introduction

The tourism industry is one of the world's most dynamic industries in terms of growth. According to the World Tourism Organization (WTO) [1] in 2016, international overnight tourist arrivals reached a record of 1148 million in 2015, the sixth consecutive year of growth. Tourism represents an important share of GDP in many countries. In Spain tourism accounts for almost 12% of GDP and international tourist arrivals have reached more than 60 million in the last year, according to the official statistical office in Spain (INE) [2]. This increasing number of tourists, however, can generate a variety of negative externalities in addition to generating economic growth. The phenomenon known as the Dutch Disease, a concentration of investment in tourism or real estate rather than other activities that can improve productivity, is one of them; another is the massive concentration of tourists in some areas with negative effects on neighbouring residents' quality of life. Impacts on the urban geography or the depletion of certain unique natural resources are other possible consequences of massive tourism. Sustainability has become a major concern among scholars; there is a social change related to our concerns in terms of sustainability, citizens are also acting more frequently regarding consumption decisions, including how their production or consumption is affecting their environment [3].

The tourism industry includes a wide range of activities but one of the most important in the package of services a tourist requires is accommodation. Although hotels are still the most important accommodation supplier, there are new forms of accommodations that are increasing at astonishing rate. The new supply sourced from the sharing economy or collaborative economy, represented by the exponential growth of Airbnb, Homeaway, or Niumba, among other similar websites, are changing the structure of the industry. The sharing economy is a new phenomenon with uncountable consequences. It is a new form of economic activity affecting the way consumers make their decisions, forcing some traditional industries to rethink their strategies to survive in an environment where new substitutes by the sharing economy can affect negatively profitability and finally, governments have to rethink how to regulate this new form of activity. According to Botsman and Rogers [4] this new form of economic activity, with clear social implications, need some previous conditions: a minimum critical mass of participants and a feeling of trust between participants. The sharing economy can be an alternative to increasing the efficiency of the economic system through the use of spare capacity. Car-sharing or apartment-sharing are clear examples of how to improve the welfare of participants through the use of spare capacity. One of the clear effects of the sharing economy is the disruption in the traditional industry, as Owyang and others authors have pointed out [5] the collaborative economy empowers customers and, in this context, industries more affected will be the ones with high-cost or easily-transferrable goods. Hotels are characterized by a cost structure where fixed cost play a major role and hotels that just offer accommodation and no any additional service can be hugely affected by apartments accommodation and the new trend among consumers to use collaborative economy when possible.

According to the official statistics for the city of Barcelona, hotels' revenues have dropped from 2008 to 2013 even in the context of growing demand. Although from 2008 the world has experienced one of the most significant economic crises, in the case of Barcelona the drop on national tourism has been compensated by the increase in demand by international tourists. The years 2008 and 2009 were when the demand experienced a sharp drop, but from 2010–2016 international tourism has experienced positive growth year by year reaching, in 2015, a new record with nearly 9 million tourist. From those, nearly 8 million chose hotels as the accommodation option. Why, in a context of growing demand, are hotels' revenues decreasing? One possible explanation is the huge increase in supply from these new forms of accommodation belonging to the sharing economy. In fact, some scholars have tried to figure out the impact on hotels' profitability by an increase in the number of shared apartments. One of the most important papers in this particular topic is the one from Zervas, Proserpio, and Byers [6]. To know how important Airbnb's, and similar websites', supply in the total accommodation supply is difficult because the lack of official data. However, according to some estimations [7] the total number of beds supplied in Barcelona by Airbnb in 2014 was approximately 50% of the supply of beds by the hotel sector. The weight of the accommodation supply by the sharing economy in Spain differs greatly geographically with a high concentration in the most important cities as Barcelona and Madrid. However, according to the industry [8], the number of beds supplied by Airbnb, Homeaway, and Niumba is as much as the hotel industry, with Airbnb and Homeaway offering a similar number of beds and Niumba playing a minor role. These numbers help to give an idea about how important the collaborative economy or sharing economy in the hospitality industry as a disruptive factor can be. Firms' differentiation will become a key strategy in this new environment.

There are many ways in which a firm can differentiate from others; in the hospitality industry, the customer is acquiring a service with a great impact on his entire experience as a tourist. As an industry that is providing a service that is mainly an experience, the perception about the quality of the service will affect the reputation of the firm, the willingness to pay a higher price, and the loyalty of customers to a particular brand. For these reasons, the academic literature has been focusing on how to measure quality in the hospitality industry and identifying the explanatory factors of quality service. Among these factors, the management of human resources [9], the leadership style [10], and the commitment to sustainability and environmental care [11] are some of the most cited.

The extent to which environmental commitment can positively impact hospitality profitability can be related to how much customers will be willing to pay for a service that has been provided under conditions that imply taking responsible action in terms of sustainability. Some authors argue that what consumers express in terms of how important they consider sustainability is not always followed up by purchase decisions in the same direction [12].

This paper analyses the possible correlation between financial performance and proactive attitudes towards sustainability in the hospitality industry. Previous studies have suggested that, in general, customers have no more willingness to pay just because a product has been produced by a firm committed to the environment, a situation that implies a gap between intentions, customers more concerned about the environment, and behaviour [12]. However, some authors have shown through their empirical work [13] that hotels which follow green practises have a competitive advantage; customers do not want to pay more but they prefer, *ceteris paribus*, to go to hotels that clearly apply green practices. This preference will positively affect occupancy rates and can have a positive effect on profitability. To measure if a proactive attitude towards sustainability implies better financial performance is important for scholars, but also for the decisions taken in the industry. The confirmation of such a relation would suggest that in the long run investing in a more eco-friendly management is profitable. To find ways to differentiate from the rest of the industry and helping to develop a competitive advantage, in a sector that is experiencing a huge increase by new forms of supply, is a topic of growing concern. Massive tourism is related with overconsumption of resources, but also has some positive and negative effects to residents' quality of life [14]. Positive effects include the economic growth or job creation induced by tourism activities. Negative effects are related to overcrowding some areas and the impact of massive tourist on the daily routines of residents. This paper has also considered if there is a different geographical pattern distribution of nearby apartments for hotels more committed to sustainability. A lower density of touristic apartments where sustainable hotels are located implies that the negative externalities associated to massive tourism are present to a lesser extent, suggesting a tourist policy that favours hotels more involved in sustainability practices.

The remainder of the paper is structured as follows: Section 2 provides a literature review, and Section 3 describes the data used and the variables selected to measure financial performance and sustainability; Section 4 summarizes the main results, and Section 5 discusses the most relevant conclusions, some of the limitations of this research, and future lines of research.

## 2. Literature Review

Sustainability has become the focus of attention in recent tourism research [15] for several reasons. Tourism is a growing industry; the demand for tourism services is increasing as a consequence of a rising population, a new middle class that demands these services in emerging economies, and the shift of preferences towards experiences rather than goods [16]. This growth is occurring in the context of scarce resources, and mass tourism in certain areas can cause resource depletion and compromise future generations' welfare [17,18]. The expansion of the hospitality industry in new destinations, and the infrastructures and other facilities related to the services provided to tourists, completely changes the urban geography of the main touristic areas [19]. The hospitality industry is a keystone in tourism services; tourists must have accommodation. Hotel services have an impact on many scarce resources; water is massively consumed in this sector, as well as chemical products and food [20]. Hall and Gössling [21] analysed the impact of using local food instead of food produced far away with environmental effects due to the use of transport services.

Many of the most important hotel chains in terms of revenues have included the management of sustainability in its strategy [15]. Hilton, Intercontinental Hotel Group, and Marriot are some cases of well-known market participants that have committed themselves to a growth strategy that includes sustainability, to a certain extent. One of the reasons behind this attitude is the growing interest by customers on taking into account the effect of their decisions in terms of the effects on environmental sustainability [22,23]. The growing importance of sustainability from the customer's point of view can

be seen through the increasing number of hotels that provide information about their environmental commitment on their websites, as well as the existence of a specific eco-friendly hotel category on some of the most popular booking websites, such as TripAdvisor. In their report about sustainability in the hospitality industry, however, Ricourte, Verma, and Withiam [24] note that customers' behaviour is not consistent: although in surveys and questionnaires they appear to be increasingly concerned about sustainability, their purchasing decisions often do not take hotels' sustainability commitments into account. Han et al. (2011) [25] analysed consumers' attitudes about hotels becoming more environmentally involved using a questionnaire distributed to 422 hotel customers in the US. They found that the willingness to pay more for a "green" hotel is related to the level of hotel's commitment to sustainability. A gender difference was also found, with female customers more concerned and willing to pay to stay at a green hotel. Prud'homme and Raymond (2013) [26] conclude that customers' attitudes towards more responsible environmental practices depend on how they behave and how important it is in their daily life to take responsible decisions in terms of caring about the environment. In this context, a social change in how important citizens consider environmental issues can have a direct effect on sustainability policies adopted by hotels as it becomes a more important variable in customers' booking decisions. Based on the analysis of the top 50 hotel companies' corporate websites, Hsieh (2012) [27] analysed how much environmental information was provided; only 46% of them posted information related to environmental issues.

Hotels are more likely to include sustainability in the firm's strategy if adopting this approach can have an effect on the development of competitive advantages. This is why academic research has sought to identify the existence of a relationship between best practices in green hotel management and better economic performance. Chong and Verma (2013) [28] sought insight in how being an eco-certified hotel can affect hotel revenues; their main result was that there is no such relationship. One of the most cited studies analysing the relationship between sustainability policies and hotels' economic performance is the empirical work of Claver-Cortés et al. [29]. Hotels located in Alicante were classified in three categories according to their environmental strategy: proactive, intermediate, and reactive. Only 14% of the hotels in the sample have some environmental certification. Their results show no significant difference in economic performance for most of the variables used, such as occupancy rate or gross operative profit per room and day. A similar study, however, with a wide geographical scope, hotels in Spain, showed that economic performance was better among hotels considered proactive [30].

Rodriguez and Cruz (2007) [31] also analysed the relationship between environmental commitment and hotel performance. The analysis was conducted on 3–5 star Spanish hotels; the environmental attitude of the hotel managers was measured through a questionnaire, with 114 firms returning valid responses. With a regression to determine return on assets using the ROA of a previous period, the hotel size and the type of hotel, including environmental attitude, the explanatory capacity of the model improved and the environmental attitude resulted a significant variable with a positive impact on profitability.

One of the main challenges faced by the hospitality industry is the rapid expansion of a new group of substitutes: apartments offered in what has been called the sharing economy. Apartments offered by Airbnb and similar webpages are a cheaper alternative to hotels, and the existence of these alternatives can have a negative effect on prices, occupancy, and profitability in the traditional hospitality industry. The sharing economy represents a new form of economic activity that can change the economic system as we understood it today [32]. The concept of collaborative consumption was firstly developed by authors like Algar [33] and, Bostmand and Rogers [4]. The attitude of consumers towards these new forms of consumption is, in general, positive, around 70% of U.S. citizens consider that to share music on internet is positive and should not be forbidden [34]. The implications that the sharing economy will have in the future exceeds the purpose of this paper. The sharing economy is a disruption on the traditional industry and the past experiences where industry has fought trying to stop the growth of new forms has not worked [35]. The most important attempt to figure out how

Airbnb and other similar websites can affect the traditional industry has been the empirical work from Zervas, Prosepio, and Byers [6]. One of these authors' conclusions is that the drop in revenues would be lower for hotels offering a superior category service. We want to add a new variable, that is the commitment to sustainability, and see if hotels more committed to sustainability have better financial and economic performance.

Considering the previous literature review we proposed a model that links commitment to more sustainability and economic performance. A clear policy towards environmental practices by hotels' can help to improve occupancy rates, some authors have found evidence in favour of tourists more willing to go these hotels instead of hotels without that commitment [13]. Customers of hotels that apply green practices more consistently show higher levels of satisfaction [26] that can positively affect the hotel reputation. These two elements can constitute the basis of a comparative advantage. In the actual context of the industry, the disruption of the sharing economy is expected to have a negative effect on revenues, especially for hotels that offer a more basic service, just accommodation that can be afforded by other cheaper alternatives [6]. Hotels more committed to sustainability can have better economic performance and be less affected by the increase in supply that many cities are experiencing through sharing economy platforms; they offer a product clearly differentiated from just accommodations, appealing to a growing segment of the market, customers concerned about how their consumer behaviour affects the environment. These relations are summarized in Figure 1.

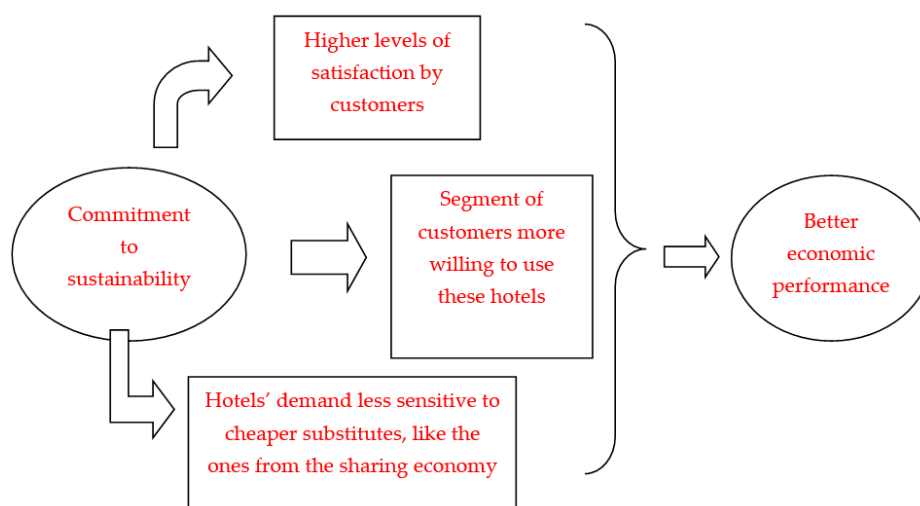


Figure 1. Sustainability commitment and profitability.

Based on the review of the existing literature, the present paper tests four hypotheses:

*H1. Hotels with a higher commitment to sustainability have better valuations when customers rate their experience at the hotel.*

The academic literature that has studied how sustainability affects consumer behaviour is not conclusive. From the first studies the idea of a gap between intention and action has been present [12]. Chong and Verma (2013) [28] found no evidence of a clear effect on revenues when a hotel become eco-certified, and the previous empirical research has not found evidence of customers willing to pay more for products just because they have been produced by firms more involved in green practices. However, some authors have found evidence of a positive impact in customers' satisfaction [26] or in the willingness to go to hotels committed to sustainability [13]. Today the way potential customers get information about hotels has changed thanks to websites like Tripadvisor or Booking.com, where past customers rate their experience. Our hypothesis is that hotels committed to sustainability rate higher in this past customers experience valuation, which is frequently used as way for future customers to reduce their lack of information. The confirmation of these hypothesis will have relevant consequences



for hotels management because can affect their occupancy, revenues, and the value of an important intangible asset such as reputation.

*H2. A minimum size is required to be capable of applying for sustainability certificates.*

There are different forms to measure commitment to sustainability; one of them is to get an external certificate; in our case, ISO 14001. The number of firms that apply for an ISO certificate has grown consistently in the last decades, with some authors [36] arguing that external certificates related to quality management improve the firm's economic performance, but when the decision is made, the management should be aware of the time it requires and the important amount of resources, financial and human, that are needed. To get an ISO certificate is a resources consumption process. When firms are asked about the reason for not implementing these or similar certificates and processes they argue the lack of information, cost issues, and the lack of resources [37] as the main reasons. Firms with a minimum size can take advantage of the economies of scales and even find it easier and cheaper to get the financial and human resources needed to implement these initiatives. In fact, many empirical studies studying the impact of ISO certifications take size as a control variable. Fryxell et al. [38] studied the implementation and effects of ISO 14001 for Chinese economies finding that most of the facilities that implemented the ISO have more than 400 employees, the number of facilities with more than 1000 employees was almost eight times the number with less than 50. A minimum size is a factor that will be difficult for small companies to apply for the ISO 14001 certificate. We will test this hypothesis for our sample of Barcelona hotels. If this hypothesis is accepted, the implication for policy-makers is clear in the sense of developing new ways better adapted to small firms to certify their commitment to sustainability.

*H3. Hotels with a higher commitment to sustainability are more profitable.*

This is a controversial topic in the academic literature. There are studies that have found evidence in favour of such a relation and others that conclude the inexistence of a significant relation. The studies differ on the variables used to measure profitability and also on the geographical location of the hotels studied. If we consider the results of Molina-Azorín et al. [30] and Rodriguez and Cruz [31], commitment to sustainability has a positive impact on the firm performance. Our contribution is to check this hypothesis for a the hotel industry of Barcelona.

*H4. Airbnb is negatively affecting hotels' financial performance.*

This is a topic that just has started to be considered by the academic literature with only a few attempts, with Zervas, Proserpio, and Byers [6] being the most cited. Our approach is new because we have considered not just how many apartments are in the city, we have measured if a higher density of apartments, no further than one kilometre away for each individual hotel, is negatively affecting the hotel profitability. This is a measure of the effect of the sharing economy in the hotel industry considering a geographical perspective. The hypothesis to check is if being nearer to suppliers is affecting the economic results of the firm. In the hospitality industry the location of hotels is one of the most important decision variables [39]; the distance to the city centre is still a quite significant variable in deciding where to locate a hotel [40]. Since tourism is a dynamic industry, the places and the areas tourist want to visit can change, and the supply of new apartments is also dynamic and more apartments will appear where profitability is expected to be higher. In this context, it is important to analyse if having a high density of nearby apartments will reduce profitability or, on the contrary, if the hypothesis is rejected, it is because the high density of nearby apartments is a measure of good location, a variable that will protect hotels' profitability.

### 3. Methodology

To test the hypotheses, a sample of hotels located in Barcelona is used. In 2013, Barcelona had 365 hotels. The distribution of hotels according to the star category system is as follows:

the low categories, one and two stars, represents 9.32% and 9.86% of the total number of hotels; the bulk of the industry concentrates in three and four star hotels, with 31.78% and 41.92%, respectively. Finally, the higher category, five star hotels, represents 7.12%, but it is the one that has grown at a higher rate. In December 2000 just six hotels were rated with five stars, in December 2013 the number reached 26 hotels. The supply has grown to meet a growing demand, with 365 hotels in December 2013 compared with 187 just 13 years ago. This rate of growth is consistent with the number of tourists, for the same period Barcelona has changed from 3.14 million tourists in 2000 to 7.57 million in 2013. This study samples 54 hotels, or 14.79% of the total population. Most of the hotels considered are four or five star hotels. Of the sample, 77.77% are four stars hotels, 11.11% have three stars, and 11.11% are five star hotels. Some of the variables we have considered to characterize the sample of hotels are: size measured (by total assets), number of employees, net turnover, profitability (measured as EBIT divided by sales), return on equity (ROE), and level of leverage (total debts divided by assets). These financial measures have been taken from the 2013 annual accounts registered at Sistema de Análisis de Balances Ibéricos (SABI) [41], a database for financial information about Spanish firms. To calculate the importance of the presence of close substitutes, we have considered two different variables: the number of nearby apartment suppliers within a 1 km radius (measured through Google Maps) and the number of available apartments on Airbnb, also within a 1 km radius. The average, maximum, and minimum values for these variables are shown in the Table 1 below.

**Table 1.** Hotels' main variables.

	Total Assets	Number of Employees	EBIT/Sales	ROE	Leverage	Google Apartments	Airbnb Apartments
Average	14,609,629	63.83	3.186%	12.42%	50.41%	50.23	1832
Maximum	39,120,578	316	19.28%	38.38%	96.21%	99	2850
Minimum	1,868,262	12	−35.67%	−9.48%	7.025%	3	117

Note: Own elaboration using information from SABI.

A higher commitment to environmental management has been measured using a binary variable. Hotels that were recognized with the ISO 14001, a well-known certificate related to the environmental practices and policies applied to the firm, has been considered as a variable that measures environmental commitment. Hotels with the certification are given the value of 1, and 0 otherwise. We also examined the changes in revenues from 2008–2013. The selection of these two dates is based in the fact that 2008 was the year when Airbnb was launched and 2013 the final year for which financial information was available from SABI. This is also a period where the financial crisis does not look to have had a massive impact, as the drop in national tourism has been more than compensated by the increase in international tourist arrivals, and the geopolitical instability of other Mediterranean cities have helped Barcelona that has consolidated its positions as the fourth city in Europe in terms of international arrivals. The rapid expansion of Airbnb has been a major challenge for the traditional hospitality sector. In the context of new competition faced by hotels, differentiation is one of the strategies that can help prevent a drop in revenues and profitability. Hotels offering a differentiated service will probably be less affected than hotels just offering accommodations. One of the differentiation options is the commitment to sustainability that can help the hotel attract customers willing to pay a higher price if they know the hotel is considering the impact of its activity in the environment. Considering our sample, 38.88% of the hotels have the environmental certification ISO 14001. The change in revenues for the period from 2008–2013 was −9.7%. Most of the hotels saw a significant drop in their revenues, and 77.77% of the hotels have revenues in 2013 below their 2008 levels. If there is a relationship between environmental commitment and major quality in the service provided, this major quality should be registered in the opinions guests express about the hotels and their experiences. To measure guests' opinions, the average marks for each hotel on Tripadvisor [42], one of the most popular websites for hotel information, according to data from 2 February 2016, has been collected.

To test whether variables are normally distributed, the Shapiro-Wilks and the Kolmogorov-Smirnov tests were applied with similar results. With the exception of return on equity (ROE), no single variable considered follows a normal distribution. This condition affects the selection of the test that will check our hypotheses. The two tests that have been applied are the Mann-Whitney test, to verify if the difference in average for TripAdvisor valuation, the drop in revenues (2008–2013) and the profitability (measured by the ROE) are different for hotels with the ISO 14001 and those without it. We also test the correlation between the same variables and having the ISO 14001 certificate, for which we use Spearman's Rho correlation based on the lack of normality. The TripAdvisor value for each hotel is the percent of opinions that rate the hotel above a 4 in a ranking system from 1–5. A value of 85 indicates that 85% of the customers who evaluated the hotel scored it 4 or above.

#### 4. Results

Hypothesis 1 relates to the existence of a relationship between environmental commitment, considering that hotels with ISO 14001 certificates are committed to sustainability, and guest opinions, measured using the average values at Tripadvisor. Hotels without the ISO certificate have a higher average valuation at Tripadvisor, with an average value of 87.41, whereas hotels in the sample with the ISO certificate have an average value of 81.33. The difference is significant at the 10% level but not at the 5% level. To confirm that the relationship is negative, we calculated the Spearman Rho coefficient and found it to be  $-0.489$  and significant at the 5% level (correlation between the Tripadvisor valuation and having the ISO 14001). This result implies that, from customers' points of view, hotels committed to sustainability have no better results, probably because, as some authors have pointed out (Baber et al.) [12] customers express that sustainability is important but they do not take this as a relevant variable when deciding their consumer behaviour, in deciding how to value hotels other factors are becoming key in defining the final valuation. In fact, the most important websites in terms of visitors to get information about hotels, Tripadvisor or Booking.com, ask about service quality, cleaning, or hotel location; but there is no specific item for the eco-friendly attitude of the hotel.

Hypothesis 2 is related to whether there is a minimum necessary size to be able to manage the administrative process and all of the costs involved with an environmental certificate, here ISO 14001. We found that there is a positive correlation between size and having the certificate: the Spearman Rho coefficient is  $0.538$  and significant at the 5% level. Size was measured using the total assets according to the 2013 balance sheet.

The third hypothesis seeks evidence of a positive relationship between responsible environmental management and profitability measured using the return on equity (ROE). Hotels with the certificate have an average profitability that is slightly higher than that of hotels without the ISO, 10.58% versus 8.96%, respectively. According to the Mann-Whitney U test, the difference is not statistically significant. The Spearman Rho correlation is also not significant. These values imply that further research is needed, probably increasing the geographical scope of the sample, to find definitive evidence, statistically significant, in terms of a positive relation between commitment to sustainability and economic performance.

The fourth hypothesis concerns the existence of a negative effect of new forms of supply through the sharing economy on hotel profitability. There is no statistically significant correlation between the number of apartment suppliers (using information from Google Maps) or Airbnb apartments and profitability, measuring profitability through change in revenues from 2008 to 2013 or the ROE. Although Airbnb, Homeaway, and Niumba have changed the industry framework in terms of location, hotels with a high density of Airbnb apartments are usually located near to the touristic city attractions or main interest points, and customers are willing to pay for being near to what they want to visit, so hotels with a good location are less affected by the pressure of new forms of supply.

The results of these tests are summarized in Tables 2 and 3.



**Table 2.** Test results.

	Subsample with ISO 14001 Certificate	Subsample without ISO 14001 Certificate	Is the Difference Significant?
Tripadvisor valuation	81.33	87.41	Yes
Revenue difference (2008–2013)	−9.33%	−9.58%	No
Return on equity (2013)	10.58%	8.96%	No

Note: Own elaboration.

**Table 3.** Spearman's Rho correlation.

	Correlation Coefficient	Level of Significance
Tripadvisor and ISO 14001	−0.489	5% level
Size and ISO 14001	0.538	5% level
Google apartments and change in revenues	0.41	Not significant
Google apartments and ROE	0.276	Not significant
ROE and ISO 14001	0.10	Not significant

Note: Own elaboration.

These findings are similar with others previously obtained and discussed in published empirical research [24–26]. There is no evidence of a relationship between better financial performance and environmentally-oriented management. There is a growing concern among customers surrounding environmental responsibility but, although this process has already started, the effects on hotel profitability remain unclear.

To check if the characteristics of hotels committed to sustainability are different to the ones without such a commitment, we compared the average values for most of the variables included in our study using the Mann-Whitney U test is not significant for the variables analysed. Although the average values are different from a statistical point of view, the difference is not significant; however, the differences observed are interesting. Hotels with ISO 14001 certificates are larger in size, considering the number of workers or total assets; they have higher gross profit in terms of sales, a variable that is used to measure efficiency in the operations performed by the firm, and the ROE is higher than for hotels without the certificate. In terms of competence and pressure from the supply of accommodation provided by the sharing economy that has been measured by number of Airbnb apartments within a 1 km radius, hotels with the ISO 14001 experience lower pressure. Airbnb apartments are highly concentrated in the more tourist-heavy areas, with some negative externalities for the neighbours living in these areas. The environmentally-responsible hotels are less geographically concentrated in these areas, with positive effects in terms of economic activity, but less pressure on ordinary life for citizens of Barcelona. These data are summarized in Table 4.

**Table 4.** Differences in the sample.

	Hotels with ISO 14001	Hotels without ISO 14001
Number of workers	109.8	52.85
Total assets	27,164,673€	9,953,639€
Airbnb presence	1304	2064
Gross Profit as a % of sales	8%	4.89%

Note: Own elaboration.

## 5. Conclusions

This paper has reached similar conclusions to other studies regarding the lack of evidence concerning the relationship between financial performance and commitment to sustainability [24,25]. The geographical scope and size of the sample do comprise limitations, so additional empirical studies,

increasing the size of the sample and considering more than one touristic city, are needed to support the results found in this work.

The first hypothesis related to hotels meeting ISO 14001 having a higher customer valuation, by past customers that rate them at Tripadvisor, than hotels without the certificate has been rejected. Hotels with the environmental certificate have a lower average valuation by customers; this result implies that hotels committed to sustainability maybe have to rethink how they communicate this commitment to their customers. The effort they make in considering the impact of their activity on sustainability is not translated in higher valuation by customers that can result in higher prices, loyalty, a higher demand that improves occupancy, or more value for the intangible that represents reputation. This result is similar to those from previous research [12]. Using an experiment to measure the willingness to pay, they found that there is no a positive difference in favour of environmental products. The difference between the opinions expressed by customers in favour of sustainability and the lack of a proactive attitude is known as the action-gap, and our results reinforce its existence. If consumers are not willing to pay more for environmentally-managed hotels, the differentiation based on this element will not produce better financial results. Some previous results have shown a relation between customers' satisfaction and commitment to green practices [26] or customers' preference for sustainable hotels [13]. Our results do not support this idea, and it can be explained because the overall valuation by customers included many other things rather than just commitment to green practices, from room cleanliness to the quality-price binomial. More research is needed to assess to what extent commitment to green practices affects consumer behaviour, without other possible factors affecting the overall customers' valuation. One last option is related to how we have measured environmental commitment, i.e., through online reviews posted to the most visited and popular websites for finding hotels' information. Meeting ISO 14001 is probably less important than what environmentally responsible consumers are writing about the hotels they have stayed in. An interesting future line of research can be to focus on how, in this new technological era, customers find information about hotels, how they make their purchase decisions, and what aspects are really relevant in making the decision. Are there other ways in which a hotel can communicate more efficiently their commitment to sustainability rather than an ISO certificate, and having a real effect on the consumer behaviour?

Our second hypothesis has been accepted. Hotels require a minimum size to apply for ISO 14001; this finding is consistent with the existence of the administrative and operational costs necessary to earn the certificate. To get an ISO certificate is a long process that requires defining many of the operations performed and to reach this state financial, and also human, resources are needed. Small hotels do not meet the resources or the capacity to enlarge them to fit these new needs.

Regarding our third hypothesis, neither the return on equity nor the drop in revenues show a better performance, with statistical significance, for the subsample of hotels with ISO 14001 certification. The percentage of hotels with the certificate is low, which can be explained by the lack of an immediate effect of the certificate on revenue. Using data from 3000 eco-friendly hotels, Chong and Verma (2013) [28] found no evidence of impact on revenues. However, hotels with ISO 14001 have a higher average ROE, though not statistically significant, and the use of a higher sample including more cities and more control variables could help to solve the debate about sustainability and better results. Additionally, it is important to consider that profitability is affected by many other variables; internal variables, like the level of leverage or the location, have been confirmed by many studies [43] as explanatory factors for profitability.

Our fourth hypothesis was the effect of Airbnb on hotels' profitability, but taking a geographical perspective. Instead of looking to the data sector, we checked the number of apartments advertised on Airbnb near to each hotel. The correlation between apartment density and return on equity or change in revenues was, in both cases, positive, but not significant. The supply of Airbnb and other similar websites would probably grow in the most attractive areas for customers', near to the city centre or where tourists want to visit. Density of apartment supply near to hotels could be used as a measure of

how attractive a location is. On the other hand, some issues arise from a policy perspective; a model of high concentration and agglomeration of supply have clear negative effects on the quality of life of residents.

Some results do encourage future studies. Hotels with a greater environmental commitment are located in areas with less tourism pressure. In our sample the number of Airbnb apartments is lower on average for this category of hotels. This could be an important factor in terms of the overall effect of their activity. These hotels contribute to economic growth but in a more sustainable way, reducing the negative effects associated with a massive concentration of tourists in a particular area. On the other hand, although more data are needed to validate these results, hotels with the ISO certificate have a higher ROE and higher gross profits, on average. Previous analyses of profitability and environmental commitment have not shown clear results as the literature review summarises. The further confirmation of the hypothesis of a positive effect of sustainability on profitability is important because, in the actual context of new supply from the sharing economy, building a mechanism that reinforces profitability is critical for the traditional hospitality sector. Academic literature that has analysed economic performance has used many different variables from return on investment (ROE and ROA) to gross profit per room, and revenue per available room, among others. The results achieved depend on the indicators selected [6,11,26–30]. Future studies should take a wide range of variables but they should also make an effort in understanding the mechanism that explain how more commitment to sustainability is affecting the firm, in many various aspects, from the process of making decision, to the excellence in the service provided, and to what is really relevant: how this affects the customers' perception.

Sustainable hotels make a positive contribution in terms of economic growth, employment, and other positive effects related to the hospitality industry. The fact that these hotels exhibit more responsible consumption of production factors, and as our results suggest, that they are located in areas with lower tourism concentration, means that the negative externalities associated with their activity are reduced by this specific type of hotel. A suggestion for future research could be to analyse the effects of tourism comparing different geographical models, cities where tourism is massively concentrated in some areas against others that have made an effort in a more equal distribution of rooms' supply from a geographical perspective. This conclusion opens the door for a more proactive industrial policy towards reinforcing the supply of eco-friendly hotels.

There are several future lines of research that could provide deep insight into sustainability and the hospitality industry. For example, it is important to analyse the relationship between sustainability-oriented management and other desirable characteristics that can help hotels provide better service in terms of quality, such as more service-oriented management to provide support, the right leadership for human resources, or the capacity to innovate and remain flexible under constantly changing market conditions. A second line of research could be to analyse the many different ways in which greater commitment to the environment can be measured, and finally, an exploration of what makes consumers take into account environmental sustainability factors into their travel decisions.

The possibility that commitment to sustainability can provide firms that apply this strategy with better financial performance in a new environment of more competitive pressure from near substitutes implies that a strategy with positive social effects, in terms of reducing the negative externalities, can also have a positive impact from the owners' perspective. The confirmation that a minimum size is needed to apply for these environmental certificates implies the need to rethink the policies promoting and helping medium and small firms. Finally, for the past decade, as the WTO [1] points out, tourism activity is increasing, but with a high concentration in some areas, with positive effects in terms of economic activity, but causing pressure in the use of some resources that thinking from an intergenerational perspective must be considered when tourism activity is regulated.

**Acknowledgments:** The authors want to thank Llorenç Bagur-Femenías for his comments on a previous version of this paper. We also want to thank Leandro Urbano, Inés Losada and Xavier Camarasa for their valuable help as research assistants.

**Author Contributions:** Galiana was responsible for the revision of the literature review. Alba Rocafort was responsible for performing the statistical tests. Aznar and Sayeras worked together in the analysis of the results and on writing the final version of the paper.

**Conflicts of Interest:** The authors declare no conflicts of interest.

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