Impact of Hotel Guests’ Trends to Recycle Food Waste to Obtain Bioenergy

Wagih Salama 1,2,* and Essam Abdelsalam 3,∗

Abstract: Hotels face many issues related to food waste management, which is considered a serious environmental and socioeconomic issue in the 21st century. The improper disposal of food waste causes greenhouse gases emissions, consequently badly affecting the environment. This research aims to measure the impact of customer trends in changing the pattern of food waste disposal and recycling into bioenergy relating to hotel purposes and contributing to reducing hotel energy costs in Egypt. Two survey questionnaires were designed for hotel managers and guests, with 25 and 300 forms, respectively. The results indicated that hotel managers are highly willing to recycle food waste to produce bioenergy and hence play an effective role in environmental preservation. Such alternative energy sources are less expensive than conventional ones. This study revealed guests’ intentions to participate in the process of preserving the surrounding environment, as well as their preferences to stay in hotels that are practicing food waste recycling operations. Limitations can be seen in the lack of advertising for such hotels as well the high cost of staying in green and ecological hotels.

Keywords: recycling; hotel food waste; bioenergy; guests’ intentions

1. Introduction

Tourism activity has a strong positive impact on the society and economy of any country. However, if this activity is not properly managed, it may generate negative impacts on the destination’s environment [1].

The tourism industry is often viewed as the availability of a clean natural environment without pollution. On the other hand, the hospitality industry, due to its very specific function, operating characteristics, and provided services, consumes substantial quantities of energy, water, and non-durable products. The resulting environmental impacts of hospitality facilities are thus proportionately greater than those caused by other types of facility [2,3].

Increased demand on energy supply, an increased burden on solid waste management and the pollution of water bodies, soil and air are among the high level of negative environmental effects in the hospitality sector of the tourism industry [4]. Owing to these effects, substantial uncertainty exists regarding the long-term implications of such negative environmental impacts. Those relating to global climate change [5]. This increasingly calls for ‘greening’ of the hospitality sector and the creation of carbon-neutral accommodation at various destinations [4].

In recognition of the dangers of environmental degradation, governments, along with the green movement within the hospitality industry and travelers, have become increasingly aware of the need for more effective measures for environmental protection. To achieve noticeable improvement, the managers and operators of the hospitality industry should be willing to act in an environmentally responsible manner. They also need to have...
adequate knowledge of the environmental issues pertinent to their activities and sufficient funds to implement state-of-the-art environmentally sound practices [6].

Food waste (FW) is a serious environmental and socioeconomic issue in the 21st century [7–9] after the increased global concerns about fossil fuel depletion and global warming caused by the high emissions of greenhouse gases and other pollutants [10]. The global production of municipal solid wastes was estimated to be 2.01 billion tons of solid waste in 2016. A total of 32–50% of that waste is organic waste. By 2050, the production of such wastes is predicted to reach 3.4 billion tons [11].

FW is essentially generated from hotels, companies, restaurants, canteens, and families [9,12]. Food banks estimated the annual food loss to be 1.3 billion tons worldwide. This accounts for about 1/3 of the global food production and this quantity is increasing with the increase in the size of the population and economy [13]. According to food and agriculture organization (FAO) [14], a high amount of food (34%) is wasted across the Near East and North Africa (NENA) regions.

According to Waqas et al. [15], only 10–15% of municipal solid waste (MSW) is recycled in the Kingdom of Saudi Arabia (KSA), while the rest was disposed of in landfills. FW is surely a very complicated problem that requires different approaches for it to be solved. Furthermore, the generation of solid wastes in the KSA has increased significantly to 15 million tons (with an average rate of 1.4–1.75 kg/capita/day), exceeding that of most of countries in the gulf area [16]. In response, the KSA and FAO are working together to create laws and suitable schemes to achieve the goal of reducing and recycling FW [17]. The current study aims to explore customers’ intentions and beliefs regarding choosing to use a hotel that recycles its food waste over a conventional one. Furthermore, we examined hotel managers’ willingness to perform such waste management.

Guest Trends

With regard to the antecedents of this type of ethical behavior, Bohdanowicz [18] suggested that the increase in customers’ environmental awareness will force hoteliers to develop and implement better environmental practices. Hospitality and marketing researchers agree that changing customers’ positive pre/post-purchasing decisions as well as their preceding attitudes are the key to increasing customers’ preferences for green hotels [19].

Due to customers’ increasing awareness of the significance of sustainability, environmental concerns have become a matter of competitive advantage in the hospitality industry. Prior research has revealed that recycling, water conservation, eco-friendly management systems, and resource efficiency are key drivers in developing a competitive advantage [20]. Therefore, more attention should be given to environmental concerns to satisfy eco-minded consumers. Each of these certifications has its procedures, standards, objectives, and rating framework. Such global eco-labelling demonstrates that an increasing number of hotels are more likely to uphold the standards of sustainable hospitality [21].

Factors affecting the change of intentions of hotel guests include their attitudes, perceived behavioral control, and subjective norms [21]. Environmental awareness, overall image, and moral obligation are the dominant factors in explaining hotel guests’ eco-friendly decision-making processes [22], while subjective norms are the key drivers of customers’ intentions. Despite prior research indicating that attitude has no significant influence on customer intentions, moral obligation and guests’ attitudes toward green hotels were the most significant variables for predicting intentions [23,24].

Ağag and Colmekcióglu [21] also indicated that intentions fully mediate the influence of perceived behavioral control on actual behavior. However, they found that actual behavior is directly affected by perceived behavioral control. This can be justified by the fact that consumers may use green hotels based on the strength of their perceived behavioral control even when they are willing to visit green hotels.

In the hotel industry, many global hotel companies are realizing the importance of environmentally responsible services in the field of hospitality, as their managers are
interested in developing programs such as for the disposal of solid waste and leftovers, which contributes significantly to reducing the cost of a hotel's operating energy [25].

2. Literature Review

2.1. Food Wastes of Hospitality Sector

The hospitality sector food waste is fast becoming a key concern since its contribution to food waste has been nearly 12% of the total waste in the recent past [26]. Furthermore, with the increasing trend of out-of-home dining, spurred by growth in incomes and tourism, hospitality waste has become a significant issue for both developed as well as developing countries [27]. Although the amount of food-related waste generated in this sector is frequently discussed in media, yet it does not have sufficient academic attention [28]. Other scholars have also acknowledged that the issue of food-related waste in this sector has been investigated less rigorously despite being recognized as a key challenge [26].

According to Waste & Resources Action Plan (WRAP) the UK hospitality and food service sector produces approximately 920,000 tons of food waste annually, of which 75% is avoidable and could have been eaten. The Scottish hotel industry produces approximately 79,000 tons of food waste annually, which is equivalent to one out of every six meals served being thrown out. Therefore, they managed to save a combined of £ 21,759, and 22.7 tons CO₂ equivalent, annually [29].

Understanding the causes of waste is important, as effective food waste management requires a deeper appreciation of the volume and origin of waste [30]. In general, the food wasted during preparation, serving, and consumption. Over-production, serving issues as well as plate waste were taken into consideration to ascertain related causes [31]. The key causes were the nature of the food menu, the production procedure, and the use of pre-prepared versus whole food products [32,33]. Romero-Guiza et al. [34] mentioned that food waste was segregated into different categories; (1) Plate waste, (2) Spoilage, (3) Preparation and (4) Prepared not served.

According to the World Bank report, by 2050 3.4 billion tons of waste per year will be produced worldwide, compared to the present value of 2.01 billion tons/year [11]. Hotels considered as leaders in tourism development have contributed to the waste problem in tourist destinations by producing huge amounts of wastes. This is due to the nature of their characteristics, functions, and services. Moreover, hotels tend to consume extensive amounts of water, energy, and non-durable products [35]. Typically, a hotel guest can produce 1 kg/day of waste, which accumulates to thousands of tons of waste annually according to the International Hotels Environment Initiative [36]. Therefore, the increase in the amount of food waste is a key concern for the hospitality industry. However, the rate of waste production depends on the type, size, and waste management facilities of the hotel [37]. Accordingly, the harmful impact of hotels on the environment has attracted customers’ attention. Additionally, over the past few decades, guests’ demands for environmentally responsible lodging have rapidly increased. Therefore, the hospitality and tourism sector has become increasingly concerned about its impact on the environment [38]. However, the lack of attention given to environmental responsibilities and FW management by small hotels has resulted in a lack of funds and knowledge and poor decision-making [36]. Accordingly, award-winning hotels in the future will not only offer the most amenities but also have sufficient waste management facilities. Therefore, each hotel will have a wide variety of energy-saving options, which can be decided after a serious energy audit and a cost–benefit study [39].

According to the study of Sandaruwani and Gnanapala [40], the hotel industry sector is considered the biggest energy consumer and food waste producer. Consequently, the rapid growth of the hotel industry has the ability to cause additional problems for environmental sustainability. The production of solid waste by hotels is categorized under food and non-recyclables (46.2%), cardboard (11.7%), paper (25.3%), glass (5.6%), plastic (6.7%), and metal (4.5%). Accordingly, a large amount of food waste is produced by the hospitality sector in comparison with other types of solid waste. This creates more challenges in the effective
use of such food stuffs and the disposal of waste. Hence, more efficient waste management can create significant savings depending on the waste management regulations in that sector. Other benefits of eco-friendly waste management include an improvement in the hotel industry image, reduced greenhouse gases (GHG) emissions from the decreased transportation of wastes, reduced costs due to smaller order requirements from suppliers, improved relations with stakeholders, reduced risks and liabilities, and health and safety benefits [41].

Hotels have a strong influence on states’ commitment to preserving the environment. This approach could become a source of a competitive advantage in two ways. Firstly, hotels could work towards a long-term strategy to conserve the destination’s natural and built resources and hence achieve a competitive advantage (indirect performance impact); secondly, the environmental management adopted by hotels could reduce costs and increase revenues, thus generating improved performance levels (direct performance impacts) [42].

Huang et al. [43] confirmed that hotels are considered as the most energy-consuming type of building due to their multi-usage functions and continuous operation. According to their findings, most hotels’ energy use falls in the range of 200–400 KWh/m² yr, with the average energy use in the range 305–330 KWh/m²yr [44,45]. As a result, decreasing the energy consumption across the hotel often leads to lower operational cost and fewer environmental impacts. Al-Aomar and Hussain [46] showed that hotel supply chains are recognizably increasing their ability to make an environmental contribution via the reduction in their water and energy consumption in addition to lower production of solid waste. Moreover, coastal hotels were particularly interested in waste management (recycling and energy generation through food production and fertilizing hotel grounds) and alternative energy sources (solar, wind, and biogas energy sources).

2.2. Food Waste Management in Hotels

The recycling and consequent elimination of waste could significantly reduce the emission of GHGs and avoid further ozone depletion. Hence, it can reduce the rate of global warming and the production of pollution. The anaerobic digestion (AD) of food waste is considered an effective tool for energy production and could improve environmental conditions [31,47]. Moreover, the digestate, which is the residual of the AD process, could be utilized as a biological fertilizer instead of synthetic ones [13].

Reid et al. [48] investigated the desalination of reticulated water using “retrofitting diesel fired boiler with biomass gasifier” and heating systems based on biogas plants. Such innovative approaches have numerous economic advantages as well as sustainable outputs [49]. Such efforts are very inspiring to the hotel industry. The tourism industry is committed to being a green and sustainable industry to uphold its responsibilities toward the environment. The term “green” refers to arrangements that could decrease environmental hazards, such as the recycling of FW [50]. Such practices include saving energy and water, employing eco-friendly policies, and decreasing waste emission/disposal through utilizing approaches such as recycling projects and reducing operational costs [51]. Recently, several hotel brands have been proactive regarding their environmental performance and are now actively functioning in a green way [52]. Kuminoff et al. [53] discussed the differences between operating as a green facility to reduce the costs of water and energy consumption and the high costs that are initially needed in the adaptation process. The high cost of the adaptation process is considered a big obstacle for small hotel businesses [52].

Chan [54] stated that marketing a hotel’s environmentally friendly practices can increase its competitiveness by helping to position it differently in the competitive arena. More people are now willing to pay more for environmentally friendly products. Having a green image is believed to play a critical role in customers’ decision-making processes and their intentions to purchase. Manaktola and Jauhari [55] concluded that the image of a green hotel is positively affected by cognitive and affective images which can contribute to more favorable behavioral intentions. Han and Kim [56] further proved that a hotel’s
service quality, satisfaction, and overall image have a significant positive association with customers’ intention to revisit. The overall hotel image can likely be developed through effective green marketing strategies, from which a green image can be established.

The main objective of this study is to assess the intentions and beliefs of hotel guests about green hotels as well as to verify the opinion of hotel managers about the applicability of environmental practices, including recycling of food waste. The results of this research will stimulate further future studies that will focus on technical economic analysis for hotel food waste recycling to save energy and conserve the environment.

3. Methodology

Two survey questionnaires were designed for hotel managers and guests to determine the effectiveness of environmental and energy programs, including a food waste recycling program to produce energy. Twenty-five forms were distributed to the hotel managers of 25 five-star hotels which have capacity to implement environmental strategies. We obtained data via hotel visits and distributing survey forms to both managers and guests in the period prior to the suspension of international tourism movement due to the COVID-19 pandemic. It was difficult to obtain and use demographic data in such survey because of the confidentiality policies of most of the hotels involved in the current study. We obtained 22 valid forms of 28 five-star hotels in Cairo and Giza by 78.6% of total hotels for analytical purposes. Three hundred forms were distributed to the guests of five-star hotels, and 250 forms were deemed to be analytically valid by 83.3% of total forms. The two questionnaires were designed according to Wang et al. [57], where the Green Leadership and Innovation (GLI) contains lower-level indices and we group these indices together as they save energy through operation. Partner Synergy (PS) includes three indices that require cooperation with partners. Recycling food waste (RFW) includes three indices process of recycling food waste. Eirini et al. [58] refer to the intentions of customers to visit a green hotel.

The collected data were analyzed using the quantitative method of statistical analysis via Statistical Analysis for Social Sciences (SPSS, version 25). The aim of the statistical analysis was to evaluate the items of the questionnaires using factor analysis of managers and guests forms individually. The correlation and regression analysis between the variables of the study were also estimated.

All the variables were measured using Likert’s pentagonal scale, where 1 = strongly agree, 2 = agree, 3 = neutral, 4 = disagree, 5 = strongly disagree.

4. Results

Factor analysis was performed with one as the Eigen value to improve the strength of the factors. Then, three factors were extracted when the rotation converged in their iterations. The three factors were GLI, PS, and RFW and courtesy was used as another factor. The 12 items in the questionnaire were categorized as a measure of the impact of environmental practices, as shown in Table 1.

The analysis extracted a three-factor solution, each with Eigen values above one, which explains 84% of the total variance compared the to 16% that was explained by Swaminathn and Jawahar [59]. This indicates that more factors can affect GLI, PS, and RFW when more items are generated using expert opinions. Kaiser Meyer Olkin (KMO) was 0.610, indicating a good level and the study variables are high, with good measurement quality and suitable for examining the study variables. The Measurement of Sampling Adequacy (MSA) was found to be above 0.7 for all the 12 items based on the rotated component matrix.
Table 1. Factor analysis for the questionnaire given to managers.

| Variables | GLI  | PS   | RFW  |
|-----------|------|------|------|
| GLI1      | 0.967| 0.012| 0.196|
| GLI2      | 0.929| −0.390| 0.089|
| GLI3      | 0.925| −0.353| −0.270|
| GLI4      | 0.919| −0.383| 0.129|
| GLI5      | 0.957| 0.884| −0.105|
| GLI6      | 0.762| 0.810| −0.0145|
| PS1       | 0.346| 0.757| −0.225|
| PS2       | 0.755| 0.925| 0.055|
| PS3       | 0.304| 0.721| 0.248|
| RFW1      | 0.267| 0.587| 0.945|
| RFW2      | 0.174| 0.476| 0.531|
| RFW3      | 0.073| 0.346| 0.607|

4.1. Statistics Analysis of Managers’ Responses

According to the descriptive statistics, the dependent variable in the manager questionnaire—namely, Green Leadership and Innovations (Cronbach’s alpha value α = 0.883)—indicates a trend to implement all environmentally friendly practices. The questionnaire has shown to be reliable in field applications and to have a high degree of stability.

Table 2 shows that most hotel managers in the participating hotels agreed that hotel management always seeks to rationalize energy consumption through the usage of alternative and renewable energy sources to reduce the costs of using high amounts of energy. There is continuous support for programs aimed at environmental preservation and decreasing the dependence on hazardous energy sources. Hotel management encourages guests to always preserve their environment and engages in community awareness programs regarding the need to preserve the environment. However, most of their answers stated that they do not implement these policies.

By analyzing the Egyptian hotel manager questionnaires, statistical results were obtained, as shown in Table 2.
Table 2. Statistics of the hotel manager questionnaire.

| Variables                        | Means | STD  | Grade     |
|----------------------------------|-------|------|-----------|
| GLI1 Does the hotel implement energy-saving environmental programs? | 2.32  | 1.12 | agree     |
| GLI2 Does the hotel use energy from renewable sources? | 2.23  | 1.11 | agree     |
| GLI3 Are renewable energy sources on-site facilities or partnerships with local producers for the production of renewable energy? | 2.77  | 1.02 | Neutral   |
| GLI4 Does the hotel perform carbon emissions control and implement energy management? | 3.00  | 1.72 | Neutral   |
| GLI5 Does the hotel encourage the staff’s proposals and training plans for energy conservation? | 1.95  | 0.78 | agree     |
| GLI6 Does the hotel avoid the use of fossil fuels as much as possible? | 1.73  | 0.82 | Strongly agree |
| PS1 Does the hotel motivate guests to adopt green practices? | 2.05  | 0.99 | agree     |
| PS2 Does the suppliers follow mechanisms that adopt environmental strategies (green suppliers)? | 2.32  | 1.04 | agree     |
| PS3 Does the hotel participate in local activities for energy conservation (attending green activities)? | 3.36  | 1.04 | Neutral   |
| RFW1 Does the hotel perform any food waste management? | 3.36  | 1.04 | Neutral   |
| RFW2 Does the hotel management take care of recycling food waste to produce biogas for cooking and heating purposes? | 3.41  | 1.18 | Disagree  |
| RFW3 Does the hotel management take care of composting food waste to produce bio-fertilizers? | 3.91  | 0.81 | Disagree  |

The Impact of Managers’ Trends

The regression coefficient between Green Leadership and Innovation (GLI) as an independent variable and Partner Synergy (PS) as a dependent variable is shown in Table 3.

Table 3. Regression coefficient between GLI and RFW.

| Model         | B     | Std. Error | Standardized Coefficients | t     | Sig. |
|---------------|-------|------------|---------------------------|-------|------|
| (Constant)    | 4.526 | 1.465      | -                         | 3.089 | 0.004|
| GLI           | 0.440 | 0.100      | 0.701                     | 4.391 | 0.000|

Dependent Variable: RFW.

By analyzing the regression coefficient between Green Leadership and Innovation (GLI) as an independent variable and recycling food waste (RFW) as a dependent variable, we found that a regression coefficient $\beta = 70$. Thus, whenever the capabilities are available to complete the processes of recycling food waste and generating energy, this will support the administration’s opportunities to rationalize energy consumption and reduce operating costs. There is a direct relationship between Green Leadership and Innovation (GLI) as an independent variable and recycling food waste (RFW) as a dependent variable. The correlation relationship between the study variables is shown in Table 4.
Table 4. Correlation matrix relationship between GLI, PS, and RFW.

|          | GLI      | PS       | RFW      |
|----------|----------|----------|----------|
| GLI PCA  | 1        | 0.648 ** | 0.701 ** |
| Sig. (2-tailed) | 0.000 | 0.000    | 0.000    |
| PS PCA   | 0.648 ** | 1        | 0.799 ** |
| Sig. (2-tailed) | 0.000 | 0.000    | 0.000    |
| RFW PCA  | 0.701 ** | 0.799 ** | 1        |
| Sig. (2-tailed) | 0.000 | 0.000    | 0.000    |

PCA: Pearson Correlation Analysis; the number of samples (n) = 22. ** Correlation is significant at the 0.00 level (2-tailed).

There is a strong correlation between the three study variables. A significant correlation at 1% suggests that hotel managers pursue green leadership; they can motivate guests to adhere to the adopted green policies. This can enhance the recycling food waste process to obtain vital energy and, hence, rationalize hotel energy consumption.

4.2. Statistics Analysis of Guests’ Responses

A factor analysis was performed with 1 as the Eigen value to improve the strength of the factors. Then, three factors were extracted when the rotation converged in their iterations. The three factors were intentions, beliefs, and courtesy. Of the 10 items in the questionnaire, all the items were categorized as a measure for guest trends, as shown in Table 5.

Table 5. Factor analysis for the questionnaire given to guests.

| Variables                                                                 | Intentions | Beliefs |
|---------------------------------------------------------------------------|------------|---------|
| 1. I am willing to visit a hotel that recycles food waste to produce bioenergy when travelling. | 0.899      | 0.342   |
| 2. I plan to stay at a hotel that recycles food waste to produce bioenergy when travelling. | 0.877      | 0.392   |
| 3. I will book to stay in a hotel that recycles food waste to produce bioenergy the next time I am travelling. | 0.851      | 0.432   |
| 4. Staying at these hotels makes me believe that I protect our environment by reducing GHG emissions. | 0.362      | 0.960   |
| 5. Staying at these hotels makes me more socially responsible. | 0.78       | 0.919   |
| 6. Staying at these hotels offers the experience of healthy, environmentally friendly guest rooms. | 0.740      | 0.950   |
| 7. My family (or relatives) think I should stay at these hotels when travelling. | −0.333     | 0.683   |
| 8. The location of these hotels needs to be convenient. | −0.888     | 0.944   |
| 9. Staying at these hotels is expensive. | 0.635      | 0.650   |
| 10. Finding these hotels when travelling takes time and effort. | −0.333     | 0.750   |

The analysis extracted a two-factor solution, each with Eigen values of above one, which explains 80% of the total variance compared with 20% for Swaminathn and Jawahar [59]. This indicates that there could be more factors influencing intentions and beliefs when more items are generated using expert opinions. The KMO was 0.650, indicating a good level of quality of the study variables is high and that the quality of measurement is good and suitable for measuring the study variables. The Measurement of Sampling Adequacy (MSA) was found to be above 0.7 for all 10 items based on the rotated component matrix.

According to the descriptive statistics (Table 1), the dependent variable—namely, intentions to visit a hotel that recycles food waste to produce bioenergy (Cranach’s alpha value a = 0.838)—indicated the moderate to high overall intentions of customers to visit these hotels. The beliefs about these hotels (alpha = 0.775) indicated clearly positive beliefs
about these hotels. By analyzing guests’ questionnaires, statistical results were obtained, as shown in Table 6.

Table 6. Statistics for the guest questionnaire.

| Variables | Means  | STD  | Grade |
|-----------|--------|------|-------|
| 1. Intenotions to visit hotels that use food waste recycling to produce energy |
| 1.1. I am willing to visit a hotel that recycles food waste to produce bioenergy when travelling. | 2.34  | 0.92  | agree |
| 1.2. I plan to stay at a hotel that recycles food waste to produce bioenergy when travelling. | 2.44  | 0.93  | agree |
| 1.3. I will book to stay at a hotel that recycles food waste to produce bioenergy the next time I travel. | 2.24  | 0.79  | agree |
| 2. Beliefs towards hotels that recycle food waste to produce bioenergy |
| 2.1. Staying at these hotels makes me believe that I protect our environment by reducing GHG emissions. | 2.22  | 0.87  | agree |
| 2.2. Staying at these hotels makes me more socially responsible. | 2.12  | 0.78  | agree |
| 2.3. Staying at these hotels offers the experience of healthy, environmentally friendly guest rooms. | 2.09  | 0.95  | agree |
| 2.4. My family (or relatives) think I should stay at these hotels when travelling. | 2.09  | 1.03  | agree |
| 2.5. The location of these hotels needs to be convenient. | 2.40  | 1.03  | agree |
| 2.6. Staying at these hotels is expensive. | 2.78  | 0.79  | Neutral |
| 2.7. Finding these hotels when travelling takes time and effort. | 2.88  | 1.33  | Neutral |

Eigen values = 80%, Cronbach’s alpha value α = 0.838.

In view of the previous table, which indicates the guests’ intentions, we can see that there are many guests who wish to visit hotels that aim to preserve the environment and generate energy through the recycling of food waste. Guests also showed great desire to travel to countries that use renewable energy sources aimed at preserving the environment and avoiding damaging it. By asking about the impact of the existence of such hotels, most of the guests emphasized the effect on their health from staying in such hotels as well as their desire to invite others from their family to visit them, despite their slightly higher cost. Those guests would like to have better access to such hotels.

The Impact of Guest Trends

The regression coefficient between beliefs about hotels that recycle food waste to produce bioenergy as an independent variable and intentions to visit hotels that use food waste recycling to produce energy as a dependent variable is shown in Table 7.

Table 7. Regression coefficient between intentions and beliefs.

| Model | B       | Std. Error | Standardized Coefficients Beta | t      | Sig.  |
|-------|---------|------------|--------------------------------|--------|-------|
| (Constant) | 9.911  | 0.858      | -                              | 11.554 | 0.000 |
| 2.1. Belief 1 | −1.111 | 0.304      | −0.393                         | −3.656 | 0.000 |
| 2.2. Belief 2 | 0.247  | 0.327      | 0.178                          | 0.756  | 0.000 |
| 2.3. Belief 3 | 0.376  | 0.153      | 0.144                          | 2.450  | 0.000 |
| 2.4. Belief 4 | 1.393  | 0.176      | 0.580                          | 7.934  | 0.000 |
| 2.5. Belief 5 | −0.608 | 0.168      | −0.254                         | −3.622 | 0.000 |
| 2.6. Belief 6 | −0.760 | 0.191      | −0.243                         | −3.985 | 0.000 |
| 2.7. Belief 7 | 467    | 0.109      | 0.251                          | 4.297  | 0.000 |

Dependent variable: intentions.

Our questionnaire analysis revealed an inverse relationship between guest intentions and whether they protect their environment by reducing GHG emissions as a dependent variable with a regression coefficient beta = (−0.39). This indicates a lack of complete familiarity with their environmental culture and is in agreement with the results of
Kamaruddin et al. [60]. They showed how people may be aware of various environmental problems but lack involvement. Their study attributed such a lack of involvement to the lack of time, interest, and awareness.

They encouraged more involvement from the community by strengthening the coordination between the local authority and the community. Nonetheless, Agag and Colmekcioglu [21] suggested more attention should be given to environmental concerns to satisfy eco-minded consumers. Each of these certifications has its procedures, standards, objectives, and rating framework. Such global eco-labelling demonstrates the increasing number of hotels that are likely to uphold the standards of sustainable hospitality.

Analyzing the regression coefficient between guest intentions as an independent variable and being socially responsible by staying at these hotels as a dependent variable consistently, our results showed a regression coefficient beta = 17. Our results are consistent with those of Indumathi and Raja [61], who showed that corporate responsibility has a positive impact on communities, employees, and the environment and eventually supports environmental protection. Goncalves et al. [38] revealed that guests’ demands for environmentally responsible lodging have been rapidly increased and hence the hospitality and tourism sectors have become increasingly concerned about environmental implications.

Analyzing the regression coefficient between guest intentions as an independent variable offers the experience of healthy, environmentally friendly guest rooms by staying at these hotels a dependent variable has a regression coefficient beta = 14.

However, analyzing the regression coefficient between guest intentions as an independent variable and family (or relatives) think they should stay at these hotels when travelling as a dependent variable resulted in a regression coefficient beta = 58. Such result could be due to five stars hotels’ interest in implementing environmental protection policies as suggested by Chang and Yeh study. [52] Recently, several hotel brands have been seen to be proactive towards their environmental performance and to be actively green functioning.

We observed an inverse relationship between guest intentions and the location of these hotels as a dependent variable with a regression coefficient = (−0.25). This may be due to the false perception of a few guests that hotels which implement environmental practices have convenient localities.

Moreover, there is an inverse relationship between guest intentions and the costs of those hotels, with a regression coefficient = (−0.24). Many guests believe that the growth of this type of hotel which maintains environmental policies has contributed significantly to reducing the cost of accommodation when compared to other non-environmentally friendly hotels. Many global hotel companies that have realized the importance of environmentally responsible services are entering the field of the hospitality industry [25]. Those hotels’ managers are interested in developing programs such as the disposal of solid waste and leftovers that can contribute significantly to reducing the hotel operating costs. Parpairi [39] indicated that each hotel would have a wide variety of energy saving options, which can be decided after a serious energy audit and a cost-benefit study. Ball and Taleb [41] demonstrated the other benefits of eco-friendly waste management that involves an improvement in hotel industry image, reduced GHG emissions from the decreased waste transportation, reduced costs due to smaller order requirements from suppliers, improved relations with stakeholders, reduced risks and liabilities, and ultimately health and safety benefits. Nevertheless, Enrique et al. [42] showed the positive correlation between hotel managers’ interest in measuring the progress achieved from the application of environmental commitment with the performance development and economic progress by reducing operating costs.

Analyzing the regression coefficient between guest intentions as an independent variable and finding these hotels when travelling takes time and effort as a dependent variable has a beta = 25.

Thus, there is a correlation between two variables of the applied study. A significant correlation at (1%) indicates that guests have a desire to stay in hotels that are concerned with environmental practices, including recycling food waste to generate bio-energy in order to rationalize energy use. Yet, they need to raise the level of environmental awareness towards
preserving the surrounding environment that is consistent with previous studies [54–56]. The results also indicate a strong feeling among guests of their responsibility to preserve the environment and support the establishments themselves. They also indicate their effective role in promoting this type of hotel, and their eagerness to have the advantage of staying in them, including the low price of accommodation. Table 8 shows the correlation matrix relationship between the study variables.

Table 8. Correlation matrix relationship between intentions and beliefs.

| Correlations | Intentions | Belief 1 | Belief 2 | Belief 3 | Belief 4 | Belief 5 | Belief 6 | Belief 7 |
|--------------|------------|---------|---------|---------|---------|---------|---------|---------|
| Intentions   | PCA        | 1       | −0.336 ** | 0.277 ** | 0.049 ** | 0.251 ** | −0.108 ** | −0.085 ** | 0.449 ** |
|              | Sig. (2-tailed) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Belief 1     | PCA        | −0.336 ** | 1       | 0.873 ** | 0.260 ** | 0.282 ** | 138 * | 0.104 ** | 0.060 ** |
|              | Sig. (2-tailed) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.001 | 0.000 |
| Belief 2     | PCA        | 0.277 ** | 0.873 ** | 1       | 0.109 ** | 0.266 ** | 0.148 * | 0.004 ** | 0.044 ** |
|              | Sig. (2-tailed) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Belief 3     | PCA        | 0.049 ** | 0.260 ** | 0.109 ** | 1       | 0.118 ** | 0.358 ** | 0.335 ** | 0.091 ** |
|              | Sig. (2-tailed) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Belief 4     | PCA        | 0.251 ** | 0.282 ** | 0.266 ** | 0.118 ** | 1       | 0.533 ** | 0.327 ** | 0.139 * |
|              | Sig. (2-tailed) | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 |
| Belief 5     | PCA        | −0.108 ** | 0.138 * | 0.148 * | 0.358 ** | 0.533 ** | 1       | 0.055 ** | 0.236 ** |
|              | Sig. (2-tailed) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Belief 6     | PCA        | −0.085 ** | 0.104 ** | 0.004 ** | 0.335 ** | 0.327 ** | 0.055 ** | 1       | 0.211 ** |
|              | Sig. (2-tailed) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Belief 7     | PCA        | 0.449 ** | 0.060 ** | 0.044 ** | 0.091 ** | 0.139 * | 0.236 ** | 0.211 ** | 1 |
|              | Sig. (2-tailed) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

PCA: Pearson Correlation Analysis. The number of samples (n) = 250. * Correlation is significant at the 0.05 level (2-tailed), ** Correlation is significant at the 0.00 level (2-tailed).

5. Discussion

These results indicate the willingness of hotel managers to recycle food waste to produce bioenergy in an effort to preserve the environment as well as using alternative energy sources that are less expensive than those that are currently used. This is consistent with Enrique et al. [42], who investigated hotel managers’ interest in measuring the progress achieved from the application of environmental standards and its relationship to the performance development and economic progress resulting from reducing costs. The results indicated the emergence of guests’ intention to participate in the process of preserving the surrounding environment, as well as their desire to stay in hotels that are involved in this approach.

The results indicate that tourists travel to hotels that apply environmental policies, in agreement with Eirini and Antonia’s study [58]. They demonstrated a direct relationship between the intention of hotel guests to visit green hotels and their beliefs with the prior knowledge of them. Guests are more willing to visit this type of hotel as they assume that they may be safer than others. These guests may have a higher awareness about their choice. Eirini and Antonia’s study was applied on a small scale in Greece and on a type of
more conscious customer with the application of modern marketing strategies, which led
to a positive relationship between the intention of hotel guests and their beliefs about green
hotels. Meanwhile, Gronau and Brohlburg [62] concluded that only about 1.2 of Greece’s
hotels are concerned with environmental aspects.

In agreement with the opinion of Han et al. [22], who indicated the importance of
overall image in customers’ decision-making, in the green intention-generation process
of hotel guests, the overall image of a product played a vital role in reducing guests’
switching intention. In the tourism context, diverse cognitive factors (e.g., image, eco-
concern, ascription of responsibility, social norm) trigger a sense of obligation to take
eco-friendly actions in the form of pro-environmental intentions. If travelers’ overall image
of a company is favorable, they tend to be tolerant of minor mistakes and keep purchasing
the company’s product/service because of their positive attitude towards the firm. On the
contrary, if a company’s image is unfavorably perceived by travelers, then repeat patronage
decreases, as their attitude is not likely to be positive.

Today, the prevailing trend in the world is to use environmentally friendly practices,
and this is consistent with the study of Jarossová and Knošková [63]. The latter indicated
that green hotels are environmentally friendly properties whose managers are eager to
institute programs that save water and energy and reduce solid waste according to the
green hotel association in the USA. Green hotels are tagged with an eco-friendly label for
recycling and reusing durable service items to protect the Earth.

Cleverdon and Kalisch [64] indicated that in the past, guests did not prefer to travel to
eco-hotels. Global tourism pattern development shows that 54% of Americans prefer to
travel to countries that apply standards and are interested in programs that achieve a clean
environment and use alternative energy sources, such as bioenergy from recycling food
waste. Many guests around the world now believe that hotels interested in implementing
ecofriendly measurements are the best. However, self-standards and behavioral control
standards affect attitudes and intentions—for example, elderly women prefer to stay in
these hotels, while others who are younger do not. Recycling food waste to generate
bioenergy and obtain clean energy free from any pollutants is among the priorities of many
hotels now. Choi [65] indicated the environment of a hotel affects the health risk perceptions
of consumers, thereby affecting their attitudes and behavioral intentions. The sanitary
conditions of hotels are crucial for business because health risk perceptions influence both
attitudes and behavioral intentions. Consumers have become more sensitive to health risk
perceptions when staying at a hotel, so the sanitary environment should always meet or
exceed the public health code. Furthermore, providing appropriate education to employees
in the industry is needed, along with supervision from management. The hospitality
industry needs to consider the importance of sanitation practices without underestimating
health risk.

Our results disagree with those of Jackson et al. [66], where there is an inverse rela-
tionship between guests’ attitudes and beliefs about environmental practices. The former
study showed that a gap exists between intentions and actual behavior, such as environ-
mental practices. The fruitful results that achieve the desired research objectives are not
the main subject, but rather the attitude behind it. The prevailing beliefs about important
environmental issues and practices and their dependence on the direct benefit provided
to the guests by decreasing accommodation prices and reducing hotel operating costs are
the major focus in judging guests’ attitudes towards travelling to hotels that are concerned
with environmental practices.

6. Conclusions

The large quantities of food that are wasted worldwide is a serious economic and
environmental problem in the 21st century. The main sources of FW include restaurants,
canteens, families, companies, and hotels. The hotel industry contributes to the food waste
problem due to its functions, characteristics, and services. Eco-friendly hotel operations
which implement comprehensive environmental practices for creating positive contribu-
tions to protect our Earth are receiving increased attention from hoteliers. The idea of making use of food waste instead of disposing of it by recycling it to produce bioenergy in hotels should be introduced in the tourism community. Therefore, this study emphasizes the necessity of including modern marketing plans aiming to announce practices that are implemented or established by eco-hotels, including activities such as recycling food waste and converting it into alternative energy sources. Supporting community participation will increase the community’s awareness towards preserving the environment and reduce hotels’ operating costs via the usage of cheaper self-generated energy sources.

Therefore, future studies will focus on technical economic analysis to recycle hotel food waste to save energy consumption and preserve the environment.

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