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Facing up to waste: how can hotel managers in Kerbala, Iraq, help the city deal with its waste problem?

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Abstract

Every year, religious festivals attended by around 20 million pilgrims, take place in the city of Kerbala, Iraq. Management of the large amounts of waste which are generated pose severe problems to city authorities due to the negative impacts on the environment, human health and the attractiveness of the city. Minimization of the generated waste is one of the most economical approaches and one in which the public plays a key role regarding its success. However, waste management system currently applied in Kerbala lacks the use of source separation as well as recycling. Therefore, this study aims to investigate hoteliers' knowledge and willingness to participate in waste source separation and recycling scheme during major festivals, which represent a new contribution to the knowledge. To achieve this goal, a survey was conducted with 150 respondents during one major religious event, over 20 days. Interviews and questionnaires were employed to collect the data. Questions were designed to collect information about knowledge of the environment, willingness to participate, preferred sorting alternatives and the actions that can motivate hoteliers and pilgrims to be involved in the program. The outcome of this research clearly indicates that the majority of respondents have poor environmental awareness. However, 68% were willing to participate in the WSS program. The provision of recycling containers was identified as the highest priority to encourage waste separation. Therefore, a set of actions has been proposed to support the Kerbala waste management authority adopt a waste separation plan during religious events.

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Keywords: Solid waste; MSW; waste management; environmental awareness; Kerbala; major events; recycling; Hoteliers.

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1. Introduction

Hotels are an essential component of the travel and tourism business. They also have an important role to play regarding environmental protection related to tourism destinations. The environmental impact of hotels are greater than impacts caused by other types of buildings of comparable size due to the nature of their function, characteristics and services [1]. Governments and travelers have become more conscious of the need for more efficient measures to address said issues. To achieve tangible improvements, hotel managers need to have an acceptable level of knowledge of the environmental issues related to their activities, as well as a willingness to operate in an environmentally friendly manner, and have enough assets to start environmentally sound practices.

One of the main reasons why tourists travel to an area is participation in a particular event. Former research suggests that all manner of events can have a positive impact on society, the local economy and for sustainable development [2]. However, events also have a negative impact on the local economy and environment. One of the economic effects of events is an increase in the real cost of waste collection, disposal and treatment [3]. Regarding the environment in general, events contribute to increased water, air and soil pollution [4], which in turn, increases the odds of serious impact on public health [5]. Thus, event managers apply considerable effort to control waste generation as well as to reducing waste collection and disposal costs [6].

Several pilgrimage events, attended by around 20 million pilgrims, take place in Kerbala city, Iraq each year [7]. The city experiences tremendous pressure on its Waste Management System (WMS) due to a substantial increase in its population during these religious gatherings. Regrettably, waste management in Kerbala is still in its infancy [8] and under such conditions, huge quantities of Municipal Solid Waste (MSW) are generated, as are their effect on the environment and human health. The increasing costs of waste treatment and disposal have increased the difficulties around management of this waste, specifically in the areas which attract tourists / pilgrims this also having the potential to impact on the attractiveness of tourist destinations [3].

These large volumes of MSW have impacted on solid waste collection and disposal, necessitating increases in landfill capacity and the negative environmental impacts of this expansion [9]. Inappropriate management of MSW can become a serious threat to the environment through increases in pollution of water, soil and air [4]. This subsequently raises the possibility of serious consequences on public health and safety [5]. Minimization of generated waste has been identified as one of the most economical approaches for dealing with these problems [10]. Similarly, recycling of waste materials has been demonstrated as a viable option to reduce the undesirable impact of the increasing quantity of MSW [11].

Despite the fact that more than half MSW can be recycled, a considerable volume of recyclable material is deposited in landfill along with other waste [12]. The public play a key role in solid waste management activities such as Waste Source Separation (WSS) and recycling, but developing countries such as Iraq are faced with a growing issue of waste management due to the absence of recycling schemes, the lack of public involvement in waste recycling and the obvious deficiency in funding for management projects [13]. According to Babaei et al. [11], around 60-80% of MSW is recycled and reintroduced to the market in European countries while only a small percentage of material is treated in this way in developing countries such as Iraq. In addition, almost all the MSW generated has been disposed of using unsanitary methods [13].

Providing an appropriate solid waste infrastructure is essential for waste management; gaining an understanding of people's preferences and knowledge plays a vital role in the success of such a system [14]. The development of an efficient method to minimize MSW must include public education and provide encouragement to get involved in the recycling program as high public participation in WSS increases the success rate of recycling plans [15]. For that reason, it is essential to perform comprehensive surveys to measure the variables that affect public participation in waste management plans such as knowledge and willingness. The assessment of these factors has been conducted and reported in the literature [16] but most research studies have focused on these variables during normal activities [17]. Only a handful of studies have considered the effects of these variables on recycling programs during major events [15]. With the aim being to achieve an effective recycling plan and to solve major events waste problems, it is vital to know the pilgrims awareness and intention to practice waste separation in addition to the actions that motivates them to be involved in such system.

Waste management system currently used in Kerbala is still in its infancy as mentioned above. Source reduction, separation and recycling schemes of the municipal solid waste are not exist in this city or surrounding cities.

Previous researches regarding public reaction toward the application of a recycling program in Kerbala are not available especially during pilgrimage events. Therefore, as it has been mentioned before, the current investigation has been devoted to fill a part of this gap in literature. Where, this investigation deals with the estimation of public participation in waste recycling in addition it explore and identify which factors prevent or facilitate hotelier's involvement in WSS and recycling programs during such mega events. To achieve this aim, AL-Arba'een, the largest religious event in Kerbala with up to 20 million pilgrims [7], has been selected as a model event for this research.

2. Research Design and Methodology

2.1. Study event

Kerbala is considered one the most important holy cities for Muslims, after Macca and Medina, because it houses the shrine of the Imam Hussein. The city is located 100 km southwest of Bagdad, the Iraqi capital, covering a total area of 5023 km^2. According to the Republic of Iraq Ministry of Planning Central Statistical Organization [18], Kerbala has an estimated population of 1,003,516 residents. Kerbala city holds several religious events throughout the year. AL-Arba'een, the largest in the city as well as in the world, is lasting between 15 to 20 days and attracting up to 20 million pilgrims. Holy Shrines Authorities, the principal event organizer, report that around 848 hotels are fully occupied over the duration of this and every other event.

In 2014, 18 million pilgrims visited the city during the AL-Arba'een event, producing an estimated 37,554 tons of municipal solid waste. It should be noted that accurate numbers on overall waste quantities do not exist and have had to be estimated by the event organizers. The WMS used in the city during events is primitive. The event organizers provide various sizes of waste bins for waste storage and collection, these bins usually distributed in the event center and at all main entrances. The waste is collected from the event area and taken to several temporary transfer stations. Thereafter, these huge amounts of solid waste are transported to their final landfill destination without the application of any processing treatment.

2.2. Conducting the survey

An investigation was conducted to find out the hotel managers understanding of WSS and recycling and their intention to practice source separation. The sample comprised 150 hotel managers selected from city center hotels.

From the well-known standard means of surveying populations such as postal surveys, phone interviews and web-based surveys, the face-to-face method was chosen because of its high response rate. A comparable investigation – door-to-door - conducted by Vidanaarachchi et al. [19], yielded a 90% reliable response rate. A response rate of 95% was achieved in a public area study conducted by Zhuang et al. [20]. Studies conducted by post are not considered efficient or effective due to their low response rate, as seen when Curran et al. [21] achieved a response rate of only 32%.

2.3. Data gathering

A structured questionnaire was employed to gather the information needed comprising open-ended and close-ended questions. Hotel managers, in randomly selected hotels in the city center, were asked to fill in questionnaires about their understanding of the management of solid waste in addition to their personal information while the event was ongoing. The questionnaire was divided in to two distinct sections according to the type of data generated. Demographic information such as age, gender and level of education were included in the first part, the second involving 10 questions covering two categories of data. The first was made up of questions about environmental pollution, waste pollution, solid waste reduction, waste recycling and waste composting knowledge, the second including questions about willingness to participate as shown in Table 1. A group of interviewers was given an intensive course about survey ethics, reading the questions to participants and recording the responses on the questionnaire. All participants provided their consent to be part of this study.

Table 1. Questionnaire structure.

Category		Question no.	Items
Solid Waste Management	Knowledge	Q_1	Environmental pollution
	Knowledge	Q_2	Relationship between solid waste and environmental pollution
	Knowledge	Q_3	Solid waste reduction
	Knowledge	Q_4	Source separation and recycling of solid waste
	Knowledge	Q_5	Backyard composting of organic waste
WSS willingness	Attitude	Q_6	Willingness to participate in WSS plan
	Attitude	Q_7	The goal of participating in WSS plan
	Attitude	Q_8	The reasons for not participating in WSS plan
	Attitude	Q_9	What is the option that encourage you to sort your solid waste?
	Attitude	Q_{10}	Pilgrims motivations for WSS and recycling of solid waste

Questions choices:
Q_1, Q_2, Q_3, Q_4, Q_5: Good, moderate, poor, not sure.
Q_6: Yes, no, maybe.
Q_7: Service development, city economic improvement, responsibility and others
Q_8: Absence of awareness, unavailability of proper municipality service and lack of incentives.
Q_9: Providing bins, staff training, law enforcement and financial incentives.
Q_{10}: Providing bins, educational programs, providing financial incentives (rewards and penalties) and municipality service development.

2.4. Statistical analyses

SPSS software (version 23; SPSS Inc., Chicago, IL) was used to perform the statistical analysis. The survey respondents' knowledge and separation willingness were examined using descriptive statistics. For normally distributed data, the mean and standard deviation were employed to express the quantitative variables; for skewed distributions, ranges were used.

The investigation reliability has been examined in terms of Cronbach's alpha (α). An alpha coefficient of 0.80 provides evidence that the questionnaire has sufficient reliability. Knowledgeable experts prepared the instrument in the current study, the precision of the resultant data confirmed by conceptual validity.

3. Result and discussion

3.1. Profile of the participants

Table 2 demonstrates the demographic variables of the respondents; education level, gender and age group. As can be seen from Table 2, most of the respondents had completed a higher level of education. One respondent was female (1%), the remaining 149 respondents were males (99%). This was expected because of the cultural norms of Kerbala. The majority of the respondents falls within the age 36 to 45 years.

Table 2. Respondent Demographics.

Groups	Groups	Observer's number	Observer's Percentage	Total
Education level	Completed higher education	113	75.3 %	150 (100%)
	Completed secondary education	33	22.0 %	
	Completed primary education	4	2.7 %	
Gender	Male	149	99.3 %	150 (100%)
	Female	1	0.7 %	
Age Group	18-25	9	6 %	150 (100%)
	26-35	59	39.3 %	
	36-45	68	45.3 %	
	>45	14	9.3 %	

3.2. Solid waste separation and recycling

The success of any solid waste management strategy depends almost entirely on the awareness and support of its users. The outcome of this study revealed that the participants have little knowledge about solid waste pollution, waste reduction and waste recycling, and backyard composting (12.7%, 15.3%, 14.0% and 7.3%, respectively). However, approximately 68% of the respondents were willing to take part in a solid WSS and recycling program because of a desire to help develop waste management services provided in the city during the events (84.3%), to improve the economic situation of the city (51.9%) and because it is their responsibility (16.6%) (Fig.1).

According to Keramitsoglou and Tsagarakis [1], WSS and recycling behavior is affected by the availability of recycling opportunities and the knowledge of citizens about the topic. The hotel managers named several reasons why they were not willing to participate in solid WSS and recycling plans including a poor municipal recycling service (72.9%), unavailability of financial incentives such as penalties and rewards (12.5%) and lack of recycling awareness (77%). In response to these points, research published by Gonzalez-Torre and Adenso-Diaz [2] found that when waste recycling containers were located within easy reach of their household, citizens' willingness to participate increased. Similarly, a lack of awareness adversely effected citizens' participation in recycling programs. According to Grodzi´nska-Jurczak [3], 75% of the non-recyclers in Jaslo City, Poland, were not informed that recycling containers were located near their houses. Therefore, the most appropriate starting point as a means of introducing a waste separation and recycling plan is by supplying recycling containers and educational campaigns. Despite the absence of recycling programs, the hotel managers' in Kerbala city were positive about involvement in a waste separation and recycling plan (68%), to develop WMS during major events (84.3%) and to improve the economics of the city (51.9%).

3.3. Separated waste collection

Kerbala municipality use a curbside collection service in the city during major events. All the solid waste generated is packed in small bins or plastic bags and moved to the curb by those generating it. To increase the efficiency of this system, approximately 1000 stationary containers are placed in the main and side streets during events. All the hoteliers dispose of their by using these stationary bins.

With the aim of introducing a new waste separation and recycling plan during major events, cooperation between solid waste generators (hoteliers) and collection authorities (Kerbala municipality) is essential. Ascertaining hoteliers' preferences for WSS and recycling is therefore important. For this reason, hotel managers were asked to select the best option that would encourage them to practice solid WSS. Around 72.7 % of the participants asked for waste bins to start the process. 10% suggested that financial incentives (reward) would raise the potential for engagement. A minority (8%) proposed that staff training might increase the rate of recycling. Regrettably, some of

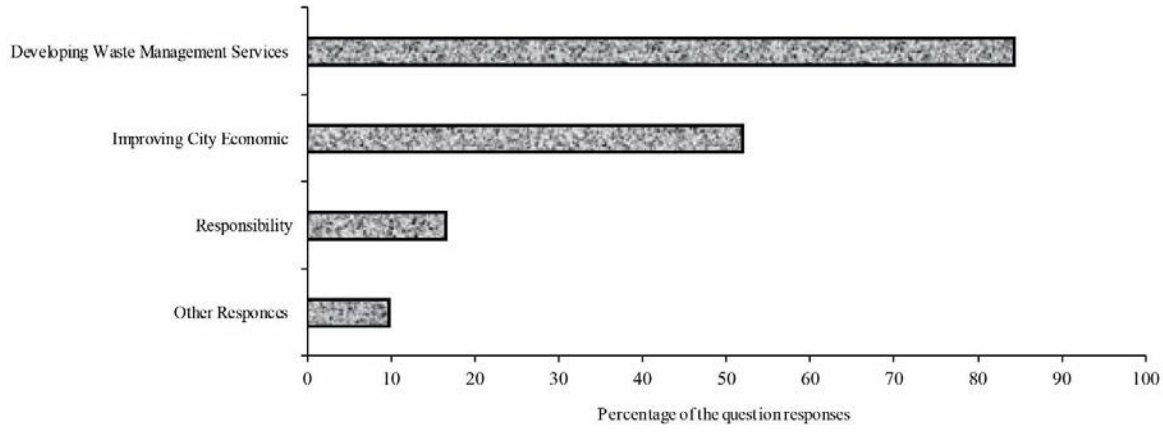

Fig. 1. Classified answers to the open-ended question "The goal of participating in WSS plan?"

the hotel managers (9.3%), declared that they would not participate in any recycling plan until it was legislated (Fig. 2). Some further suggestions to increase participation included: suppling recycling bins in the main entrances to the event (70%), initiating educational programs (60.6%), further developing the collection system implemented (22.6%) and implementing the principle of penalty and awards (18%) (Fig. 3). Therefore, as the majority of hoteliers were willing to participate in a recycling system (68%), the successful implementation of such a system could be as simple as establishing a common container system for recyclable waste and promoting pilgrims' awareness by educational programs throughout events.

4. Conclusion

A better living environment begins with local authorities providing the MSW infrastructure and it finishes by the public putting the separated MSW into the right bins. Therefore, exploring and understanding public reaction towards a proposed management system development is extremely important as they play a key role regarding its success. As a WSS system for solid waste is not available in Kerbala city, at present the public are unable to do much.

The results of the current study confirms that of previous research that regardless of community willingness to participate in solid WSS and recycling programs, the majority of participants had insufficient awareness of such schemes. In addition, it provides an estimation to the percentage of hoteliers that willing to participate in the WSS plan and offers actions that motivates hoteliers to practice source separation. The vast majority of the hoteliers were willing to be involved in solid WSS and recycling implying that the implementation of such a system in Kerbala during major events might be successful. Supplying the community with an MSW infrastructure in addition to raising the publics' awareness about solid WSS and recycling programs appears to be essential. However, before any cooperation between hoteliers and management authorities to develop a recycling program, more studies on this issue need to be undertaken to clearly understand the variables affecting recycling. This would involve the use of educational programs and consideration of financial incentives.

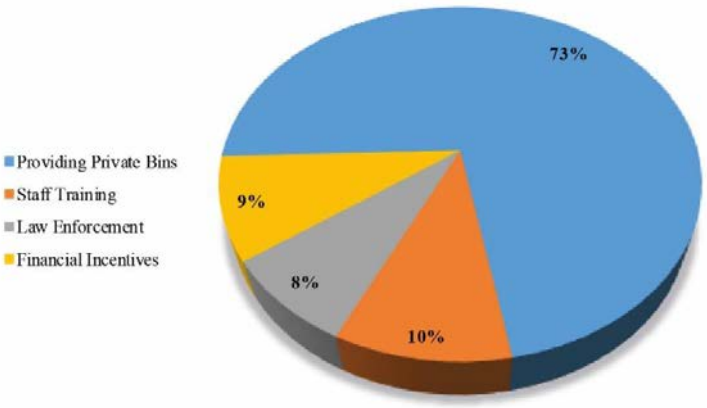

Fig. 2. The answers (N = 150) to the question "the option that encourage you to sort the solid waste in your hotel?"

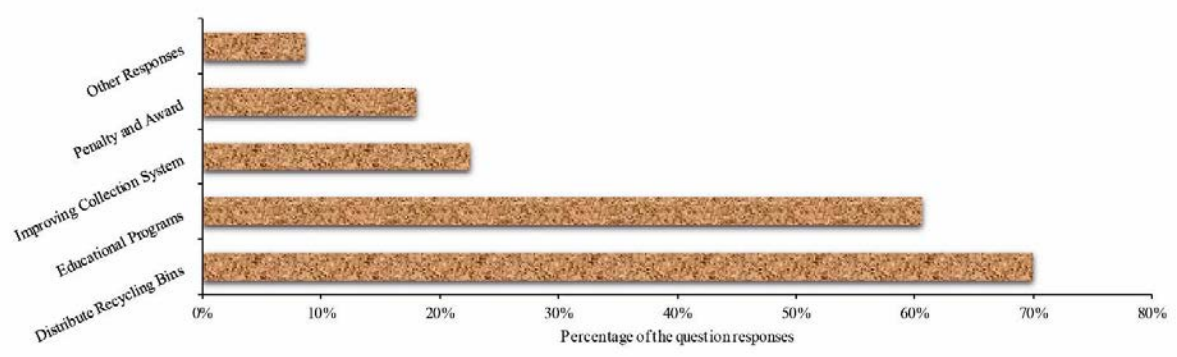

Fig. 3. Classified answers to the open-ended question. "Pilgrims motivations for WSS and recycling of solid waste?"

5. Limitations and Future Research

As there are several major events in Kerbala each year, one limitation is that the survey was conducted at only one major pilgrimage event and may not be generalizable to events throughout the year. Expanding the study regionally within the Middle East during similar events should be considered. Another limitation is the use of expressed recycling intention. Consequently, further studies should be conducted on practical recycling behaviour. An accurate evaluation of expressed waste recycling intention and real behavior could then be considered.

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