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► **To cite this version:**

Socrat Ghadban, Maya Shames, Haifa Abou Mayaleh. Trash Crisis and Solid Waste Management in Lebanon-Analyzing Hotels' Commitment and Guests' Preferences. *Journal of Tourism Research & Hospitality, SciTechnol*, 2017, 6 (3), pp.1000169. <10.4172/2324-8807.1000171>. <hal-01611253>

**HAL Id: hal-01611253**

**<https://hal.archives-ouvertes.fr/hal-01611253>**

Submitted on 12 Oct 2017

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# **Trash crisis and solid waste management in Lebanon**

## **Analyzing hotels' commitment and guests' preferences**

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Submission date: June 09, 2017

## **Abstract**

Lebanon has witnessed in 2015 a severe trash crisis that had serious health and environmental impacts. Trash crisis has recently evolved, and is mostly related to inefficiency in networking, political leadership, strategic management system and information flow. Trash crisis can be avoided with effective crisis management plan and waste management strategies. The latter is gaining broader attention, especially in the developing countries, with waste management being not well implemented. Until now, no studies have been conducted to measure and evaluate the impacts of the trash crisis on the Lebanese tourism industry, which is a main income generator sector. Therefore, this research seeks to examine how tourism organizations, especially hotels as main producer of solid waste, are managing their waste to reduce the impacts of the crisis and to understand visitors' perceptions of solid waste management strategies adopted by hotels. 18 hotels' managers in Beirut were interviewed and 124 questionnaires were filled by hotels' guests, who were randomly selected in different areas of the capital. Results revealed that large hotels tend to effectively manage their solid waste which allowed them to overcome the crisis with minimal negative impacts. For the majority of respondents, selecting hotels is not primarily influenced by the implementation of solid waste management strategies. Moreover, results showed that 46% of respondents have hesitated to visit Lebanon during the crisis.

## **Keywords**

Trash crisis, hotels, Lebanon, solid waste management, crisis management, sustainable development.

**Abbreviations:** UNSD: United Nations Statistics Division; IHEI: International Hotel Environmental Initiative; OECD: Organization for Economic Cooperation and Development; HSWM: Hotel Solid Waste Management; NGO: Non-Governmental Organization, VFR: Visiting Friends and relatives.

## Introduction

Lebanon has a surface area of 10,452 km<sup>2</sup>. The country is endowed with a unique landscape and heritage and a mild climate that distinguish it from neighboring countries. Additionally, Lebanon is a well-known tourism destination in the Mediterranean region, with Beirut the capital of Lebanon, is the country's social, economic, political and cultural hub [1].

The Lebanese tourism sector is a primary source of income, which constitutes along with commerce and financial services 60% of GDP [2]. Mass tourism is the predominant type of tourism in Lebanon. Leisure tourism, business tourism, and nightlife tourism (mainly concentrated in Beirut), have grown rapidly in Lebanon within the last two decades [3]. Sustainable tourism has narrowed attention, and its implementation is limited to certain rural areas and protected sites in Lebanon [4].

In 2015, Lebanon has witnessed a trash crisis, as a result of closing “Naameh landfill” and not finding an alternative. “Naameh landfill” was the main receiver of Lebanon waste since 1997. This landfill was receiving 2.55 Million tons of waste annually [5]. According to the United Nations Statistics Division-UNSD [6], waste is the disposable, unwanted and unusable material, discarded after primary use, and is not found in the market but is the result of human activities.

A crisis can be natural or man-made. In most cases, a crisis cannot be determined or predicted. It is argued upon that three main elements can best describe a crisis: “*a triggering event causing significant change; the perceived inability to cope with the change; and a threat to the existence of the foundation of the organization*” [7].

Solid waste management is a controllable process, however, in the

Lebanese case, the solid waste problem is considered a crisis since it caused major negative impacts on the environment, the public health and the wellbeing of the Lebanese population. The root of this problem was the absence of effective solution to cope with these impacts [5]. Moreover, tourism sector might be affected by the trash crisis with a decreasing number of tourists' arrival.

Hotels are considered to be main generator of solid waste [8-10]. For instance, in 2002, the International Hotel Environmental Initiative – IHEI [11], estimated that on average, 1kg of waste was produced by one guest during one day stay in hotel which leads to thousands of tons of waste annually. This means that while hotels might be affected by the Lebanese trash crisis, they can increase its severity if they don't adopt sustainable waste management strategies and effective crisis management plan.

Managing waste is the concept of reusing waste to protect the environment and its resources [12]. The traditional approach of crisis management defines three phases: before, during and after a crisis. Each phase is characterized by specific principals and indicators that guide in avoiding and overcoming a crisis [13].

Waste management is considered an environmental indicator of sustainability, a concept considered as crucial in determining hotel performance with regard to reducing its negative impacts on the environment [14-15]. According to Sutton (2004) [16], “*Environmental sustainability is the ability to maintain the qualities that are valued in the physical environment*”.

Since the beginning of the crisis, some waste management organizations and environmental institutions in Lebanon (municipalities, universities, recycling enterprises, etc.) have developed and disseminated guiding reports on the

importance of adopting and implementing waste management plans [17-18]. Publications on the crisis and its impacts on Lebanon and the public health were limited to online articles and reports [19-20]. However, to the best of the authors' knowledge, no studies were conducted to explore and evaluate the crisis impacts on the tourism industry within a sustainable framework, adopted mainly by the hotel sector as main generator of solid waste.

Consequently, this study attempts to explore and analyze the impacts of the trash crisis on the performance of Beirut hotels and the different solid waste management strategies adopted within the context of crisis management and sustainable development. It aimed also at studying the perceptions of visitors toward the importance of solid waste management strategies adopted by hotels, and how the trash crisis has affected their behavior and preferences. The contribution of this article is to examine how the implementation of solid waste management by the Lebanese hotels help in decreasing the impacts of the trash crisis, and if hotel selection by guests can be affected by the implementation of waste management strategies.

## **Theoretical background**

### **What can cause a trash crisis?**

According to Links (2006) [21], waste is classified into: medical waste, generated by health care activities; industrial waste or radioactive waste left over from a manufacturing processes; and municipal solid waste, which is the trash or garbage consisting of everyday items discarded by public. Solid waste is a sub-category of municipal solid waste, constituting of garbage, sludge, rubbish, tailings, and discarded materials produced from residential, commercial, institutional and industrial activities. Solid waste can be recyclable for a specific next use also known as resource recovery. Non-

recyclable is used for energy production, a process referred to as waste-to-energy [22-23].

The quantity of solid waste produced per capita was described by the Organization for Economic Cooperation and Development-OECD (2013) [24] as growing on a yearly basis, especially in the developing countries. Un-treated solid waste has many negative impacts on the environment, and the public health [25]. The ineffective planning, the lack of networking between the different stakeholders involved in waste management, and the lack of transparency, can lead to a trash crisis on a national level by threatening the daily life of people. Italy and Lebanon were victims of such deficiencies.

In Italy, the crisis was mainly associated with the inefficient political leadership and commitment, also the lack of technical expertise to deal with waste management [26]. Similarly, in Lebanon the lack of political commitment and inefficient political leadership were main initiators of the trash crisis. The main purpose behind this inefficiency was the absence of a Lebanese president for more than two years [27].

More specifically, in 2007 in Southern Italy, mainly Campania and Sicily, witnessed a crisis in waste collection and disposal. This caused negative impacts on the public health, due to the illegal disposal of toxic waste derived from dangerous industrial processes. Additionally, the economic sector in general suffered from this crisis, and the tourism industry witnessed a decrease in tourists' arrivals and overnight stays.

In both Campania and Sicily, waste treated in landfills reached a full capacity and the regional waste management plan failed to move from waste disposal to an industrial model. After two years of crisis,

temporary solutions included reformulating the waste management plan, creating incinerators, and reopening landfills [26].

In Lebanon, the municipal solid waste constitutes more than 80% of the total solid waste, generated mainly by households, commercial establishments, restaurants, hotels, street markets and street cleaning operations [28]. In general, the municipal solid waste is constituted of 50-55% organic waste, and the rest from plastic, glass, metals, papers... [17]. By end of 2011, 84% of the total municipal solid waste in Lebanon ended up in sanitary landfills and open dumps. Naameh landfill was the main receiver of solid waste since 1997, the plan was to use it for a specific period until finding another solution [29].

In 2014, the waste at Naameh landfill has become into a trash mountain of over 15 million tons, causing bad odors and health concerns for people living in Naameh village and the surrounding areas. This was until July 17 2015, where the landfill was forced to shut down by local people. As a result, recyclable and non-recyclable solid waste ended up on roads all over Lebanon, or in non-sanitary landfills and open dumps, causing the trash crisis [5].

This crisis could have been avoided with proper waste management strategies. However, due to its high disposal costs, solid waste management in Lebanon and in most of the developing countries, is not well maintained and implemented [30]. On average, 8% only of Lebanon municipal solid waste is recycled each year [31]. The best sector that illustrates the challenges of waste management within the tourism industry is the hotel sector.

### **Hotels' solid waste management**

*“The hospitality industry includes hotels and restaurants, as well as many other types of organizations or institutions that*

*offer food, drink, shelter and other related services”* [32]. By adopting this definition, it is clear that the hospitality industry is a main generator of solid waste, since it consumes a large amount of energy resources every day [8].

By turn, hotels are mainly concerned with waste generation. They use different packaging materials, and produce industrial waste such as, asbestos and solvents [33]. In Lebanon, hotels are also considered main generator of solid waste, since they receive large number of visitors yearly. For instance, in 2014, the total number of Lebanon's visitors reached 1,354,647, among which 907,613 resided in Beirut' hotels, with 67% occupancy rate [18].

In 2006, Kasim [34] demonstrated that a typical solid waste production in a hotel is divided into 46 % food and non-recyclable materials, 25 % paper, 12% cardboard, 7% plastics, 5% glass and 5% metals. From which 47% can be recycled. Many strategies have been developed to direct hotels in reducing the quantity of waste generated.

Reduction, Reuse and Recycling waste is the “3R's strategy” used to minimize the volume of waste with minimal costs [35-37]. “Waste reduction” is a strategy that encourages environmentally friendly practices, such as using emails for internal communication [38]. Solid waste can be reduced also by re-using the same product several times, a process known as “re-using strategy” [39]. Hotels implement this strategy by donating old linen to charities.

Moreover, the well-known “recycling strategy” is very effective in sorting and processing recyclable products for another use [40]. The “hierarchy model” is a strategy that combines between different approaches. It goes from most favored option, which is preventing the production of waste to least favored option consisting

of disposing waste in landfills and incineration [41].

Last but not least, “waste mapping” involves the process of identifying and detailing waste resources and their different types, then estimate their costs. Its objectives are zero waste, developing sustainable products, through the strategy of mapping waste generation and management processes. Because of its effectiveness, this strategy has gained popularity during the last few years in many countries around the world, including India, Australia and Finland [41-43]. For instance, implementing this strategy by UK businesses has reduced their spending on waste management, by saving 1% of turnover, which constitutes in general 4% [44].

The implementation of one or more of these strategies is associated with various factors divided into: internal and external. The internal factors include, but not limited to, hotel financial and non-financial resources, attitudes, knowledge and skills of employees, the organizational culture, and the use of technology [45]. The external factors include: government laws, competitive environment that encourages hotel to implement better strategies [46], and the society awareness about the importance of waste management [47].

Researchers have reported additional variables in relation to solid waste management. The “Hotel size” for instance is an influential factor. In fact, large hotels have higher impacts on the environment and have more resources, thus, they are more likely to implement waste management strategies. The hotel location is another factor that encourages hotels to implement waste management strategies. For example, government involvement in waste collection and recycling within the hotel’ area, enhance the strategies adopted by hotels [48]. Waste management is also associated with the “Facility management”,

by releasing and implementing practices favorable or unfavorable to waste management, for instance, the types of purchases, use of new technology and decisions of sorting waste [49].

Besides, “Visitor expectation” about hotels is a variable that affects the preferences of guests in selecting their hotels. There is an increase in the number of guests that select hotels based on the hotel’s implementation of waste management strategies and their environmentally friendly practices [50]. Masau and Prideaux (2003) [51], showed that 67% of guests in Kenya are willing to allocate higher budget for such types of hotels.

Therefore, sustainable development is another challenge facing hotels and influencing their performance with regard to solid waste management. Two interrelated concepts, implying that for a waste management model to be sustainable it should include indicators related to respecting the aspects of the society, the valued aspects of the environment and the economic sector [52].

Withiam (2013) [53] stated that, “there is an increase in the number of global hotel chain, such as Accor, Hyatt, IHG(Inter-Continental hotels), Marriott, Starwood, and Wyndham, that are reporting their sustainable performance using their waste management strategies as measurement tools”.

For instance, the Hotel Solid Waste Management - HSWM program implemented by nine hotels in Bali in 2000, illustrated how hotels can improve their sustainable waste management practices. These hotels moved to proactive and system oriented behavior, by increasing their spending on appropriate and improved waste management system, monitoring waste data, and adopting leadership approach in environmental and community

activities. The partnership approach guided the entire program [54]. Therefore, coordination and networking between stakeholders including the hotel managers, guests, employees, government, waste management institutions... are key factors for successful sustainable waste management within hotels.

### **Crisis management in a sustainable context**

To maintain sustainability, hotels must be able to identify and evaluate threats within the external environment, and manage changes. Crisis management is an effective tool to deal with these issues. In recent years, this concept has developed to integrate new theories that can strategically respond to new types of crisis.

McCool (2012) [55], stated that *“effective disaster management for hospitality firms entails the development of partnerships between the firm and external partners, such as government and non-governmental agencies, suppliers and the media”*. Moreover, researchers have emphasized on the importance of organizational management system and its strategic objectives in dealing with a crisis, by considering value creation instead of profits [56]. As well as, transparency, flexibility, needs’ satisfaction and creativity are key variables that should be integrated into the organizations’ philosophy [57].

Risk assessment, is also an effective tool in identifying and managing threats. For example, Zhang and Wang (2016) [58], developed and constructed a “risk early warning indexing” that helps the enterprises in evaluating their crisis management capabilities and be prepared for crisis. Campiranon and Scott (2014) [59] identified five main critical success factors contributing to effective crisis recovery in order to ensure hotels’ sustainability: crisis management plan,

market segmentation, marketing promotion, collaboration, and personal management.

To conclude, sustainability and crisis management are two connected approaches and are both related to the organizational strategic management system, the partnership approach and the concept of collaboration. Additionally, the above discussion enhances hotels’ capability in dealing with a crisis, and being more creative in crisis management, by developing their own management systems and being proactive in their decisions.

### **Methodology**

A mixed method approach was adopted in this research, combining between semi-structured interviews, researcher-administered questionnaire and online surveys. The purpose of using this approach is to enhance the confirmation between the results and the literature review and the comprehension of the topic [60]. Descriptive analysis was used to analyze the results. Additionally, the SPSS statistical software was used to analyze the questionnaire and interview data.

Beirut was selected as the study area. The selection of Beirut was guided by the fact that municipal solid waste in Lebanon is mainly generated in Beirut. For instance, in 2013, 60% of the 2 million tons generated in Lebanon were from Beirut and Mount Lebanon region [17].

Interviews were conducted with 18 hotel managers in different areas of Beirut. Hotels were selected having various size, star rating, locations and chain affiliations. The researchers have assumed that large hotels have more than 100 rooms, while those with less than 100 rooms are classified under small hotels.

Therefore, the sample included 9 large hotels (Radisson Blu Martinez, Crowne



Plaza, Staybridge, Raouche Arjaan by Rotana, Four Points by Sheraton, Hilton Alhabtoor, Four Seasons, Movenpick, and Gefinor Rotana hotel), and 9 small hotels (Mayflower, Le Vendome, Napoleon, Bliss Suite Hotel, Vie Boutique, Berkeley, Marbel Tower, Embassy and Casa D'or). To study the relation identified in the literature review between hotel size and implementing waste management strategies, a comparison between the two samples was done based on the results gathered from the interviews. Previous studies have demonstrated a relation between the two variables [38,61], it is then hypothesized that:

**H1:** the implementation of solid waste management strategies by the Lebanese hotels is dependent on the hotel size. Larger hotels tend to implement solid waste management strategies.

Regarding the trash crisis, since it had many negative impacts on the Lebanese people and on the environment, it is assumed that:

**H2:** The trash crisis has encouraged Lebanese hotels to develop and implement a crisis management plan.

Alternatively, in order to be able to study how the trash crisis has affected visitors to Lebanon and if they consider solid waste management strategies as affecting their hotels' preferences, a total of 109 questionnaires were filled. The sample was selected randomly in different areas of Beirut including Hamra, Verdun, and Sin El Fil. Additionally, 15 online surveys were filled using *Google forms*. Participants in the online survey were selected by tracking their reviews on different hotels in Lebanon.

In general, visitors who are involved in environmentally friendly practices at their home select hotels that implement waste management strategies [62]. According to this relationship, it is hypothesized that:

**H3:** guests who incorporate environmentally friendly practices into

their daily life select hotels that implement waste management program.

## Findings

### How Lebanese hotels are managing their solid waste?

**Table 1** illustrates the results of the interviews conducted with the hotels' managers. As shown in table one, all large hotels (>100 rooms) are implementing solid waste management program. Crowne Plaza and Staybridge categorized under IHG hotels implement a "Green Engage Program". It includes the 3R's strategy, waste reduction and recycling strategies, by donating to charities and Non-Governmental Organizations-NGOs already used products such as linen, old furniture or by re-using the same product for other purposes.

"Recycling and Reusing Program" adopted by Four Points, Hilton Alhabtoor, Movenpick hotel and Four Seasons, has the objective of reducing waste before it is disposed, it also includes practices of sorting waste and donation. Hotels adopting the "Rotana Green Earth Program", implement the same strategies mentioned previously, in addition to food strategies related to decreasing the quantity of food disposed, while maintaining guest satisfaction. Last but not least, Radisson hotel with its "thinking of the Planet Program" is trying to reduce waste by donation, re-using and other strategies.

In contrast, out of nine small hotels (<100 rooms) interviewed, three only (Mayflower, Le Vendome and Napoleon) are managing their waste, by adopting recycling and re-using strategies, and the green engage program with supportive decisions from the management of the hotels.

**Table 1:** Evaluating the waste management strategies of the Lebanese hotels interviewed

Hotel name	Hotel size No. rooms	Waste management Program name	Green strategies			Influencing factors Challenges
			Yes	No	Date of implementation	
<b>Large hotel</b>						
Radisson Blu	185	Thinking of the planet	×		2003	Culture, staff awareness
Martinez						
Crowne Plaza	190	Green Engage	×		2012	Culture, staff awareness
Staybridge	121	Green Engage	×		2013	Culture, staff awareness
RaoucheArjaan by Rotana	175	Rotana Green Earth	×		2012	Culture, staff awareness
Four points by Sheraton	132	Recycling & Reusing	×		2012	Culture, staff awareness
Hilton Alhabtoor	400	Recycling & Reusing	×		2012	Culture, staff awareness
Four Seasons	230	Recycling & Reusing	×		2012	N/A
Movenpick	292	Recycling & Reusing	×		2013	Culture, staff awareness
Gefinor Rotana	159	Rotana Green Earth	×		2012	Culture, staff awareness
<b>Small hotel</b>						
Mayflower	83	Newspaper recycling	×		2014	Staff awareness
Le Vendome	73	Green Engage	×		2007	Culture, staff awareness.
Napoleon	70	Recycling & Reusing	×		2014	Staff awareness
Bliss Suite	66	N/A		×	N/A	Management, costs
Vie Boutique	35	N/A		×	N/A	Management, costs
Berkeley	45	N/A		×	N/A	Management, costs
Marbel Tower	53	N/A		×	N/A	Management, costs
Embassy	48	N/A		×	N/A	Management, costs
Casa D'or	83	N/A		×	N/A	Management, costs

To test the first hypothesis, a T-test was conducted. As shown in **Table 2**, the average size for the hotels implementing solid waste programs (12 hotels) is greater than the hotels not managing their solid waste (6 hotels). The T-test shows that the test value (4.205) is greater than the critical

value (1.782), so the null hypothesis that the waste management in hotels is independent of the size is rejected. Therefore, this test demonstrates that hotels implementing solid waste programs are larger in size.

**Table 2:** T-test for the relation between hotel size and the implementation of waste management program

Sample	Observation	Mean	Variance
Hotels implementing a HSWM program	12	175.8333	9324.515
Hotels not implementing a HSWM program	6	55	291.6
<b>T-test (two-samples assuming unequal variances)</b>	<b>Df</b>	<b>Critical value</b>	<b>Test value</b>
H <sub>0</sub> : $\mu$ implementing = $\mu$ not implementing	12	1.782288	4.205238
H <sub>a</sub> : $\mu$ implementing > $\mu$ not implementing			

All the hotels that have implemented a waste management program, are also adopting green strategies by integrating indicators of sustainability, such as,

minimum impacts on the environment, decreasing environmental pollution, stewardship of resources, etc. Almost all of them have implemented the strategies

between 2012 and 2014. This could be interpreted by the fact that during this period, there were many initiatives in Lebanon that aimed to encourage the development of effective sustainable development policy at national level and to improve the implementation of this concept by all the public and private bodies in Lebanon [63]. Therefore, these initiatives probably led these hotels to enhance a balanced relation with the environment.

Concerning the challenges faced by hotels in their implementation of solid waste management programs, the majority of small hotels interviewed reported high management costs, limited financial resources and unfavorable decisions from the management of the hotels. Interviewees of the large hotels at the opposite, reported that: the Lebanese culture of not sorting and recycling solid waste, the limited number of companies and NGOs in Lebanon that deal with waste management, in addition to the lack of staff awareness (managers have to conduct trainings for their staff, which will create additional costs) are all hindering the improvement and the development of more sustainable waste management programs.

**Trash crisis impacts on hotels interviewed**

All the interviewees reported not being affected by the trash crisis. This finding illustrates that: hotels which are

implementing solid waste management strategies, were proactive and relied on their strategies to survive the crisis with minimal costs. Though, for small hotels which do not implement solid waste programs, consider that they are not primarily concerned since the trash crisis is part of their uncontrollable environment and is the government responsibility.

Crisis management in terms of identifying threats, and encouraging creativity and value creation was not a key approach in the strategic management systems of all the hotels interviewed. Hence, the second hypothesis is rejected, since the trash crisis has not encouraged hotels to develop a crisis management plan.

**Profile of questionnaire respondents**

**Table 3** shows that the majority of respondents are Arabs (Egypt, Iraq, Gulf region, Syria, etc.) and only 26% are from other countries (Spain, Indonesia, America, Korea). These figures are consistent with the nationalities visiting Lebanon in the last few years [64], which was confirmed in the interviewees’ responses. Males represented 73% of respondents. The majority of the respondents were between 25 and 45 years old, while 29% were between 18 and 25, and only 18% were above 45 years old. 90% of respondents were educated with at least a bachelor degree.

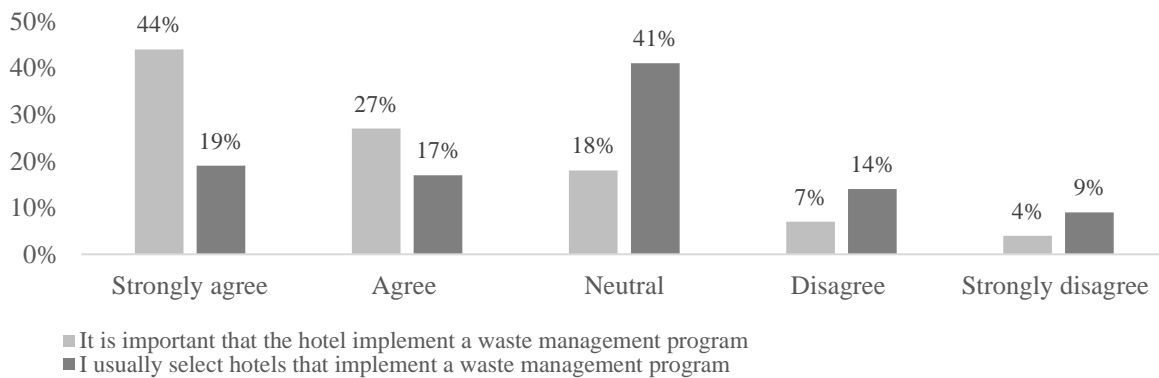
**Table 3:** Demographic characteristics of respondents

Variables	Categories	Count	Percentage
Nationality	Arab tourists	92	74%
	Other nationalities	32	26%
Gender	Female	34	27%
	Male	90	73%
Age	18-25	36	29%
	25-45	66	53%
	Above 45	22	18%
Level of education	Less than high school	1	1%
	High school graduate	11	9%
	Bachelor degree	67	54%
	Master	37	30%
	Doctoral degree	8	6%

### Hotel selection and guests' preferences

**Figure 1** shows that the majority of respondents were favorable with the statement "it is important that the hotel implement a waste management program" For 18% this is not a factor of interest, while 11% didn't accord any importance for hotels to implement waste management strategies, perhaps they consider that this is not the hotel's responsibility. Yet, the majority were neutral with the statement "I usually select hotels that implement a waste management program", means that it

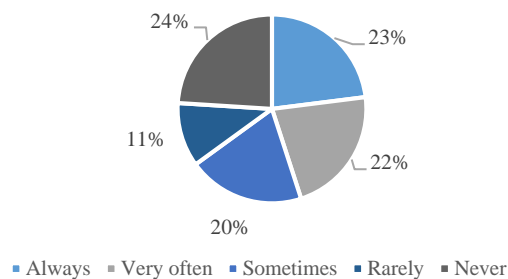
depends if they select or not hotels based on managing waste. 36% strongly agree and agree with this statement, and 23% strongly disagree or simply disagree. These results reveal that there is no direct relation between the level of importance for guests and their decision when selecting hotels. In other words, the majority of respondents considered waste management strategies key factors in the management system of the hotel, but at the same time this majority is neutral toward selecting hotels based on the fact that they are managing their waste.



**Figure 1:** Results of guests' degree of importance and selection regarding waste management within hotels

**Figure 2** shows that the majority of respondents have the attitude of sorting and waste, with 45% always and very often practice environmentally friendly activities, and 20% sometimes manage waste. In contrast, 35% of the respondents rarely or had never sorted waste at their home. These results show that the majority of respondents are green travelers and have the knowledge of waste management and its benefits on the environment.

Comparing these results with those in **Figure 1**, it is interpreted that the type of guests in terms of being green traveler is not a primarily factor that influence the selection of hotels. Therefore, the third hypothesis is rejected, sine the majority were neutral about selecting hotels based on their waste management program, the relationship between guests who incorporate environmentally friendly practices into their daily life and hotel selection cannot be proved.



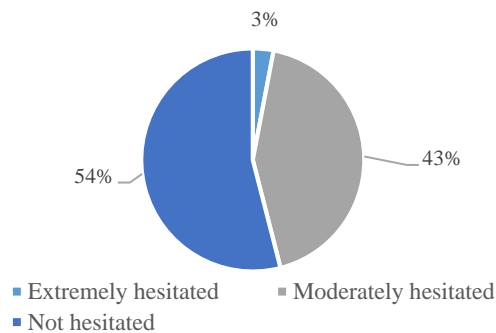
**Figure 2:** Frequency of daily life waste management reported by the respondents

### Trash crisis and visit hesitation

Respondents were asked about their level of hesitation to visit Lebanon during the trash crisis.

**Figure 3** shows that only 3% of the respondents had extreme hesitation to visit Lebanon during the crisis and 43% moderately hesitated while 54% didn't hesitate at all. On the whole, the 46% of

respondents who have hesitated to visit Lebanon during the crisis shows its negative impacts on Lebanon tourism industry and its potential contribution to a



huge decreased number of tourists' arrivals.

**Figure 3:** Level of hesitation of respondents to visit Lebanon during the trash crisis

The above findings, identified a possible relation between the type of traveler and the level of hesitation. In order to test statistically the relation between these two variables, a chi square test was conducted. **Table 4** confirms that at 10% level of significance, the chi square test demonstrated that there is a certain pattern between the type of traveler and the level of hesitation. In fact, the chi square test showed that the test value is greater than the critical value, thus, the null hypothesis was rejected. For instance, 57% of business travelers have hesitated to visit Lebanon due to the trash crisis, while only 37% of both VFR and Leisure travelers had some hesitation.

**Table 4:** Chi square test for the relation between level of hesitation and type of traveler

Hypothesis	A	DF	Critical value	Test value
H <sub>0</sub> : No relation	0.10	2	4.61	4.69
H <sub>a</sub> : There is a relation				

<sup>1</sup> Alfa ( $\alpha$ ) is the level of significance set at 0.10 by considering that 10% of the results can be obtained by chance and 90% level of confidence

## Discussion

Findings in this research regarding factors influencing the implementation of solid waste management by Lebanese hotels (hotel size, internal culture, staff awareness, facility management, etc.) coincide with those represented in the literature review. For instance, the location of Mayflower, Le Vendome and Napoleon hotels in Hamra and Corniche-Beirut has encouraged them to develop and implement solid waste management programs. This complements the theory of Swami and Sharma (2011) [65] who suggested that hotels would implement solid waste management program to satisfy guests, and gain competitive advantage. However, concerning the hotel location as an influencing factor in terms of government involvement in waste collection and recycling, results in this paper demonstrated that despite the absence of an effective national waste management plan, and the ineffective role of the Lebanese government in collecting and recycling waste, large hotels succeeded in developing and maintaining their own strategic waste management system.

As opposite to the findings of Ogbeide (2012) [50] and those of Millar and Mayer (2013) [62], results in this study have demonstrated that not the implementation of waste management by hotels, nor the visitors' daily involvement in waste management, are main factors affecting visitors' preferences in selecting hotels. Other variables could influence their choices. This may include but not limited to: price and budget constraints, hotel's location (in the city center, close to the business event for business travelers) visit pattern (alone, with friends, family and relatives, etc.), loyalty programs.... The 36% of respondents, who select hotels based on their strategies of waste management, illustrates an increasing awareness about environmentally friendly practices.

Furthermore, no previous studies have been conducted on the effects of the type of traveler and his/her hesitation to visit a country during a trash crisis. Results identified by this research, demonstrated that there is a relation between the two variables. For leisure and VFR visitors, their low level of hesitation may be associated with their nationalities, being Arab visitors they know more about the country and its beauty, and they have a high level of knowledge about the crisis before visiting the country, so the crisis did not affect their decisions to visit Lebanon during the crisis. However, for business travelers, their high level of hesitation could be also associated with their nationalities, where the majority was Europeans and Americans, who are in general more involved in waste management [66-67]. Moreover, business travelers prefer to stay safe while traveling [68] is a factor that explains their hesitation to visit Lebanon during the crisis.

### **Management implications**

In order for hotels to overcome challenges of waste management, they have to develop and sustain a strong partnership approach. In this case, it is recommended to apply the model of Friedman and Miles developed in 2002 (in Angella, n.d.) [69] it consists of mapping out the stakeholder configuration and associating strategic actions. This model helps hotels in identifying the different types of participation of each stakeholder, especially within a crisis situation. At the same time, identifying and evaluating the nature of connections, provides hotels a clear idea about who will be involved in the sustainable management plans. This model is useful because it visualizes stakeholders who can bring additional values for the organization especially for waste mapping. For instance, some stakeholders can provide financial aid for small hotels that consider the limited financial resources as their main barrier for managing waste. It is

also recommended to increase guests' awareness and to encourage them to reduce waste generation during their stay.

Pojasek (2007) [70] points out the importance of risk management practices to achieve good corporate governance, by maintaining sustainability and meeting the organization's social, economic and environmental responsibilities. So, it is suggested to reformulate the strategic management system of hotels who lack a sustainable performance, and develop an appropriate corporate governance framework by integrating risk management as key component of business planning.

At the time of writing this article, the visible trash crisis reached its end, and garbage was collected and disposed in a new landfills and open dumps. It is not a permanent or even efficient solution for the situation. Based on the current fact, the crisis may reinitiate at any time and the absence of a crisis management plan risks the long-term performance of hotels. Applying the five success factors identified by Campiranon and Scott (2014) [59] to the case of Lebanese hotels, will help hoteliers to be more effective and efficient dealing with any upcoming trash crisis.

### **Limitations and future research**

The limitations of this research can be examined in future studies. These may include, the employees' involvement in solid waste management within hotels, as being the main service provider and are in direct contact with guests. This study is limited to the hotel sector located in urban areas, results could also be tested on different sector of the hospitality and tourism industry, by examining more the impacts of the trash crisis on tourists' arrival, while comparing between urban and rural areas in Lebanon, or even between local and other developed countries.

Additional sustainable tourism indicators in relation to waste and crisis management should be developed and studied with regard to further researches. For instance, the impacts of the trash crisis on the sustainable economic and social strategies adopted by hotels, with a cost-benefit analysis. Factors that may influence the visitors' preferences in selecting hotels could be further measured and analyzed in future studies. Relation between the level of hesitation to visit a country during a trash crisis and the purpose of travel could be further explored with larger sample and different statistical tests. Finally, domestic tourism is also a variable that can tackle the impacts of the trash crisis on hotels, since local residents are less sensitive to the day-to-day instability and can be relevant targets for hotels during a crisis [71].

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