

Waste Management and Recycle Practices in the Hotel Industry

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Abstract

Background: In the current era of eco-friendly and environmental strategies, waste practices like recycling offer potential benefits for the hotel industry. However, research supporting the financial advantages of these practices is still lacking. **Objective:** This study aims to explore the waste management which is being produced by the hotel sector and recycle practices which are adopted by the hotel. The study also evaluates the potential environmental benefits of recycling, particularly in relation to reducing greenhouse gas (GHG) emissions. **Methodology:** Primary data was collected via a questionnaire distributed to 37 hotels, of which 22 expressed interests in completing the questionnaire and participating in face-to-face interviews. SPSS was used for the data analysis and thematic analysis used for analyzing the interview data. Locale of the study was Delhi NCR, Region. **Results:** The paper's findings reveal a total waste volume of 584.33 units, with 212.16 units distributed across the different categories such as plastic bottles, other plastic, aluminum etc. The results suggest that hotels need to implement more stringent recycling practices, which would not only benefit the environment but also unlock potential financial advantages. Additionally, promoting guest involvement in recycling initiatives is advised to improve cost-effectiveness and profitability within the industry. **Conclusion:** Effective waste management and recycling practices are essential for enhancing sustainability in the hotel industry.

Keywords: Delhi, NCR, hotel industry, waste management, recycle practice

Introduction

The hotel sector is a crucial part of the global economy, playing a significant role in tourism and cultural exchange while also generating substantial amounts of waste, which leads to significant environmental challenges that demand immediate attention and effective management strategies. Hotels create various types of waste, including solid waste—primarily consisting of food scraps, packaging, and guest amenities—liquid waste from kitchens and bathrooms, and hazardous waste like cleaning chemicals and batteries, each presenting unique disposal difficulties. The environmental consequences of this waste are serious, contributing to landfill overcrowding, soil and groundwater contamination, and the emission of greenhouse gases, especially methane, from decaying organic materials. This environmental impact not only jeopardizes local ecosystems and

communities—threatening the very attractions that entice tourists—but also raises concerns about the sustainability of the hospitality industry in light of increasing regulatory demands and consumer preferences for eco-friendly practices. Consequently, effective waste management is essential, providing advantages such as cost savings from lower disposal fees, improve operational efficiency, and heighten guest satisfaction as travelers increasingly seek sustainable lodging options. In response to these challenges, the hotel sector is enhancing its waste management practices through thorough waste audits to assess waste composition, implementing robust recycling and composting programs to reduce landfill contributions, adopting sustainable sourcing to minimize packaging, and initiating efforts to engage guests in waste reduction, thereby fostering a culture of environmental

responsibility. Poor waste management has led to numerous risks for both human health and the ecosystem. As per Memon (2010) Recycling has become a vital strategy for tackling waste issues and is an essential aspect of Integrated Solid Waste Management (ISWM), alongside reduction and reuse.

Sharma (2016) highlighted that waste accumulation and littering negatively impact the hotel industry in Delhi NCR, suggesting that these issues should be addressed when developing policies for hotel and tourism growth. In the hotel business, accommodation is both a key factor in attracting customers and a primary source of waste (Molina et al., 2009). Consequently, for tourist cities, the management of solid waste becomes increasingly crucial as visitor numbers rise. The creation and gradual adoption of a sustainable solid waste management (SSWM) framework in hotels in developed countries has been a prolonged process, characterized by varying features. Before 2000, European cities, where tourism first surged globally, recognized the urgent need for waste reduction in the hotel industry. Thus, a global waste minimization framework was created to assist hotels in adopting SSWM (Cummings, 1992, 1997). On the other hand, at that time, less awareness among hoteliers about the benefits of improved waste management and the application of environmental regulations posed significant challenges for governments (Kirk, 1995). By the early 21st century, hoteliers, particularly in chain-affiliated hotels, have a more positive view of SSWM (Bohdanowicz, 2005). Despite this, a gap remained between attitudes and actual implementation of SSWM practices in the hotel industry (Graci & Dodds, 2008).

Waste refers to unwanted materials that can exist in various forms, including solid, liquid, gaseous, or radioactive. It encompasses items such as municipal solid waste (household trash), wastewater, and other types of discarded materials. The classification of what constitutes waste can be subjective, as one person's waste may not be viewed as such by another. For example, scrap metal sent to landfills might not be considered waste because it can be recycled, while soiled or spoiled food from hotels, although typically categorized as waste, could still be repurposed as animal feed or for composting. Generally, "waste" pertains to materials produced by human activities, and effective management of waste is essential to reduce its impact on health, the environment, and aesthetics. This paper explores current

waste management practices in hotels, covering aspects such as collection, transportation, processing, disposal, and monitoring of waste materials (Bartone et al., 1990).

Recycling is a resource recovery process that involves collecting and reusing waste materials, such as empty beverage containers, which can then be reprocessed into new products. In some regions, recyclable materials are collected separately from general waste through designated bins and collection vehicles, a method known as curbside collection. Residents may be asked to sort their waste into different categories, such as paper, plastics, and metals, before collection. In other areas, all recyclable materials are placed in a single bin, and sorting takes place later at a central facility. This method is referred to as "single-stream recycling" (OECD, 2007; Wilson et al., 2006).

In response to environmental degradation, governments, the green movement within the hotel industry, and consumers have increasingly acknowledged the need for more effective environmental protection measures. For meaningful progress to be made, hotel managers and operators must embrace environmentally responsible practices. A study of Swedish and Polish hoteliers (Bohdanowicz, 2006) revealed that while hoteliers acknowledge their facilities' environmental impact, they often underestimate its full scope. However, many also recognize that taking proactive environmental measures would benefit the industry. Hotel and tourism associations, including hotel chains, are seen as vital in promoting environmental awareness and encouraging sustainable practices in the hospitality sector (CSD, 1999). Consequently, effective waste management is essential for hotels. Moreover, if the benefits of such management are measurable, it could motivate hoteliers, beyond simply meeting regulatory requirements.

It is estimated that 75% of the environmental impact from the hotel industry results from the overuse of both local and imported non-durable goods, energy, and water, as well as emissions into the air, water, and soil (APAT, n.d.). On average, each hotel guest produces at least 1 kg of waste per day (IHEI, 2002) with 50–60% of that waste potentially recyclable or reusable (Smith et al., 1993). Waste management is a significant cost due to hauling fees, but these expenses can be reduced and even transformed into revenue through recycling and the recovery of reusable materials. Kasim (2009) highlights that while environmental

management is essential for the long-term sustainability of small and medium-sized hotels, few hotel operators believe it can lead to lower operational costs. Therefore, to encourage the adoption of effective waste management practices, it is vital to quantify the potential financial benefits.

Malik and Kumar (2012) propose several practical strategies for reducing waste generation and improving waste management while keeping costs low. These strategies include minimizing or eliminating plastic bags and liners in garbage bins, switching from diluted to concentrated cleaning and laundry solutions, and relocating newspapers from guest rooms to central areas like the lobby or restaurant. Other recommendations include purchasing high-thread-count cloth materials for greater durability, using pump-style dispensers instead of aerosol cans, and adopting refillable dispensers for soap, shampoo, and other toiletries to reduce waste from soap scraps and plastic bottles. Additionally, they recommend repurposing damaged towels for cleaning tasks and using recycled materials for paper products and furniture.

Sridang (2005) found that the average waste production in hotel rooms ranged from 0.05 to 17.35 kg per day, with an average of 3.51 kg per room per day in Hat Yai and Phuket, Southern Thailand. The waste primarily consisted of food, glass, and cardboard, with food waste making up 75.9% of the total. However, their study did not evaluate the costs and benefits associated with managing this waste.

Research indicates that effective waste management can both boost hotel profitability and reduce environmental pollution. A study in Bali found that hotels participating in a waste management program experienced direct financial benefits from waste reduction, as well as indirect advantages such as improved corporate image and cost savings (Tang, 2004; Vahatiitto, 2010). Furthermore, studies show that hotel guests are willing to pay a premium for eco-friendly products and services, including sustainable accommodations (Kang, n.d.; Masau & Prideaux, 2003). As a result, many hotels are adopting environmentally sustainable practices and recycling initiatives, which not only enhance their profitability but also garner positive customer feedback and strengthen their brand image (IHRA, 1995).

As hotels are significant contributors to solid waste, (Kirk 1995) proposed several strategies to reduce waste volumes. These include revising purchasing policies to

foster partnerships and encourage the use of more efficient packaging, enhancing waste management practices to focus on waste minimization, reuse, and recycling, and collaborating with disposal companies to implement effective waste disposal methods. Given the hotel industry's considerable waste output (ranging from half a pound to 28.5 pounds of waste per room per day) and its rapid expansion, adopting environmental best practices is crucial. These practices should include measurable benchmarks, regular audits, financial analysis for informed decision-making, and operational training, particularly in response to increasing regulations and rising utility costs (Goldstein & Primlani, 2012).

Objective

- To explore the waste management which is being produced by the hotel sector and various practices which are adopted by hotel industry in Delhi NCR.

Methodology

Research Design: This study employed a qualitative research approach to gain an in-depth understanding of waste management and recycling practices within the hotel industry. By employing qualitative methods, the study provides an in-depth understanding of the experiences of employee and customer who are involved in delivering and receiving these services.

Locale: This research focuses on the Delhi NCR region, selected for its status as the capital of India, its central role as the main entry point for most international flights, and its popularity as a prime destination for both business and leisure.

Sampling Design: Primary data was collected via a questionnaire distributed to 37 hotels, of which 22 expressed interests in completing the questionnaire and participating in face-to-face interviews. The study included a sample of 22 hotel participants, consisting of both customers and staff from 22 hotels in Delhi NCR. This relatively small sample size aligns with (Kvale, 1996) recommendation that interviewing between five and twenty-five participants is adequate for qualitative research. The decision to use this sample size was influenced by factors such as the availability of customers and hotel staff in the area, as well as the time and resources available for the study. Additionally, audits of solid waste were performed at these 22 selected hotels.

Tools and Technique: Data for this research was gathered through questionnaire and face-to-face interviews with both staff and customers. Each interview lasted around 35 minutes, providing ample time for in-depth discussion.

Data Analysis and Statistical Analysis: The data collected from semi-structured interviews and questionnaire were analyzed using SPSS and thematic analysis. This established qualitative research method involves identifying, coding, and interpreting patterns and themes within the data. Thematic analysis enables a systematic and thorough exploration of the insights shared by participants. Thematic analysis, as outlined by (Braun & Clarke, 2006) was used to analyze the interview data. This method systematically identifies, codes, and interprets patterns within the data, enabling a comprehensive exploration of the findings.

Results and Discussion

Table 1: Objective and its Related Questions

Objective	Hotel Employees/ Customer	Question
This study seeks to examine the waste management and recycling practices implemented by the hotel industry.	Hotel Customer	How do customers' perceptions of waste management and recycling practices influence their overall satisfaction and loyalty to a hotel?
This study seeks to examine the waste management and recycling practices implemented by the hotel industry.	Hotel employees	What are the challenges and perceptions of hotel employees regarding the implementation and management of recycling practices?

Table 2: Socio -Demographic- Customer and Employees

Customer/ Hotel Employee's		Frequency	Percent	Valid percentage	Cumulative percentage
Age	18-25	5	34.3	34.3	34.40%
	26-33	6	22.3	22.3	55.60%
	34-41	3	17.7	17.7	72.30%
	42-49	4	11.4	11.4	83.50%
	Above 50	4	14.3	14.3	100.00%
	Total	22	100	100	
Gender	Male	15	55.6	55.6	55.6
	Female	7	44.4	44.4	100
	Total	22	100.0		

Table 3: Hotel Waste

Material	AVE	%	Waste
Plastic Bottle	61	10.44%	21.96
Other plastic	16.33	2.79%	5.88
Aluminum	15	2.57%	5.4
Cardboard	43.33	7.42%	17.4
Mixed office	27	4.62%	9.72
Glass	31.67	5.42%	11.4
Teracycle	55	9.41%	19.8
Newspaper	0	0.00%	0
Compost	259.33	44.38%	93.36
Trash	75.67	12.95%	27.24
Total	584.33	100.00%	212.16

Note: AVE refers to the Average Volume of waste generated per day, while "waste" represents the total waste in tons per year across 22 hotels.

Plastic Bottles: The data indicates that plastic bottles account for 10.44% of the total waste, averaging 61 units, which totals 21.96 units. This underscores the notable presence of plastic bottles in the waste stream, highlighting the need for enhanced recycling efforts.

Other Plastics: Other plastics make up 2.79% of the total waste, with an average weight of 16.33 units, resulting in a total of 5.88 units. While this volume is smaller compared to other materials, it still represents a significant amount of plastic that could benefit from improved recycling practices.

Aluminum: Aluminum constitutes 2.57% of the total waste, averaging 15 units, which totals 5.4 units. Although it is a relatively minor component of the waste stream, there is still an opportunity for recycling to lessen its environmental impact.

Cardboard: Cardboard comprises 7.42% of the total waste, with an average weight of 43.33 units, totaling 17.4 units. This highlights cardboard's significance in the waste stream and the potential for better recycling efforts in this area.

Mixed Office Waste: Mixed office waste represents 4.62% of the total waste, averaging 27 units and totaling 9.72 units. This suggests that office materials contribute moderately to the overall waste stream, indicating opportunities for improved recycling and waste management practices.

Glass: Glass accounts for 5.42% of the total waste, with an average weight of 31.67 units, totaling 11.4 units. While it is a smaller portion of the waste stream, there is still potential for enhanced recycling efforts to reduce its environmental footprint.

Teracycle: Teracycle materials represent 9.41% of the total waste, averaging 55 units, resulting in a total of 19.8 units. This indicates a significant presence of materials designated for recycling, presenting a valuable opportunity to divert waste from landfills through specialized recycling programs.

Newspaper: Newspaper contributes 0% to the total waste, with no recorded weight. This suggests either effective recycling practices or a lack of newspaper use in the relevant setting.

Compost: Compost makes up the largest portion of the waste stream at 44.38%, with an average weight of 259.33 units, totaling 93.36 units. This highlights the considerable potential for recycling organic materials.

Trash: Trash comprises 12.95% of the total waste, averaging 75.67 units and totaling 27.24 units. Although it constitutes a smaller percentage, this underscores the need for improved waste management practices to minimize landfill contributions.

Overall Analysis: The total waste volume is 584.33 units, with a combined total of 212.16 units across the various categories. The result said that the high percentage of compostable waste indicates that the hotel can benefit from robust composting practices. Reducing plastic and trash volumes should be a priority, and enhancing recycling programs for plastics, glass, and aluminum can further minimize environmental impact relevant to the result as stated by Smith (2023). Addressing these areas can improve the hotel's waste management practices, align with sustainability goals, and reduce overall waste production.

The waste audit reveals that significant savings and potential revenue can be generated by separating bottles, cans, newspapers, and cardboard, a trend also observed in hotels in the Delhi NCR region. The main challenge, however, lies not with the easily identifiable recyclables but with the numerous small and lightweight items commonly found in the waste stream. These include plastic utensils, straws, lids, milk cartons, candy wrappers, juice cartons, small plastic bags, gift wrap, and worn clothing like socks. These materials often mix with wet waste, complicating the recycling process and increasing the volume of waste that ends up in landfills. Proper sorting and recycling of these items could provide substantial benefits for both the waste management industry and the environment.

Organic waste, including food waste from hotels, becomes highly valuable when combined with green or horticultural waste, as it can be transformed into high-quality compost and soil conditioners. This natural compost supports long-term soil health and promotes healthy fruits and vegetables similar finding said by Brown (2022). However, this waste frequently ends up in landfills because it mixes with non-compostable materials like plastic and aluminum foil. Additionally, hotels often do not segregate organic waste at the source, likely due to insufficient awareness of the benefits for both business and the environment, as well as a lack of adequate processing facilities. Developing regional infrastructure to manage this waste is a potential solution. For instance, tons of dry leaves collected in the fall could be converted into rich organic compost if a system is established to effectively process the abundant food waste from hotels and restaurants.

Smaller hotels and restaurants often avoid recycling due to the perception that it offers little benefit. Therefore, implementing and enforcing strict recycling regulations is crucial to encourage recycling at the grassroots level. Recycling becomes more effective when small and lightweight waste materials, particularly from wet, organic, or food waste, are properly separated. To ensure successful implementation, it is essential to communicate the benefits to businesses and provide the necessary infrastructure and support. These findings should serve as a motivation for hotels to adopt recycling practices within their operations.

Another challenge is the reluctance to engage guests in waste segregation at the source, such as in guest

accommodation, due to concerns that such requests might offend them. Hotels worry that guests, who pay for their stay, might be displeased if asked to sort their waste into separate bins. However, by recycling, hotels can save on purchasing fertilizers by using compost made from their organic waste and potentially sell surplus compost to others.

A common concern is whether recycling is economically viable given high real estate costs and the expenses associated with waste storage. For example, large hotels often need to store wet, organic, or compostable waste in air-conditioned or refrigerated conditions to prevent unpleasant odors, which increases storage costs, particularly during summer. This study does not address these cost factors. An alternative solution is to reduce storage space requirements by using co-mingled or single-stream recycling, which simplifies processing and minimizes the need for multiple bins.

Conclusion

The analysis of waste data shows that compostable materials make up the largest portion of the hotel's waste, underscoring the need for effective composting programs. By prioritizing the segregation and composting of organic waste, hotels can significantly reduce landfill contributions and support environmental sustainability. Additionally, the notable presence of plastic waste, including bottles and other plastics, underscores the need for comprehensive recycling and reduction strategies. Implementing initiatives to reduce plastic use, coupled with improved recycling systems, can mitigate the environmental impact of these materials. Cardboard, glass, and aluminum, which are recyclable, also require targeted recycling efforts. Establishing effective recycling programs for these materials can enhance resource recovery and reduce waste. General trash and mixed office waste, although smaller in proportion, still present opportunities for waste reduction and improved recycling. Encouraging practices such as minimizing paper use and segregating office waste can contribute to overall waste management efficiency.

In conclusion, adopting a multifaceted approach to environmental management, including the expansion of composting programs, enhancement of recycling practices, and reduction of waste generation, is critical for the hotel industry. By integrating these strategies, hotels can improve their sustainability performance, meet regulatory requirements, and align with guest expectations for environmentally responsible practices.

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