

A REVIEW STUDY ON WASTE MANAGEMENT PRACTICES AND TECHNIQUES: ITS CHALLENGES TO THE HOTELS AND EMPLOYEE

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Abstract :

Purpose: Hospitality Industry is the one of the major industry which is produced various types of waste like food, beverage, metals, wood etc. This study is focused upon the various waste in hotels industry, their sorting, their management and better to know various waste management trends in current scenario with various aspects including new ideas, best practices and its benefits to hotels and environment by adopting new strategy of waste management.

Design/methodology/approach: In depth study secondary data covered from literature related to waste management in hotels as per requirement of study, practices, latest trends and challenges in waste management were collected through various research papers, articles, review papers, and websites.

Findings: The findings are presented that hotel industry have a lot of waste in their operations area and they all are dealing with various types of waste. Hotels can follow practices and strategies to maintain and manage the waste. In other way hotels also conduct some training program for their staff and create awareness amongst guest to develop the knowledge and awareness of waste management.

Keywords: waste management, practices, hospitality industry, strategy, training, awareness

Introduction

Waste management in hotels is important for creating a healthier planet, where sustainability and care for the environment are top priorities. This study looks at the key elements of waste management in hotels, focusing on protecting the environment and ensuring a good future for coming generations. Hotels, which are busy places offering comfort and services, have a special chance and duty to reduce their impact on the environment. In hotels from food services, housekeeping, maintenance, and guest activities, hotels produce a lot of waste, including organic, recyclable, and non-recyclable materials. If this waste isn't managed well, it can harm the environment, causing pollution, destruction of habitats, and depletion of resources. Therefore, a solid waste management plan is crucial to reduce these negative effects. As revealed by **Chandani, N., et.al, (2024)** Indian hotel industry is focusing more on sustainable waste management because of its impact on the environment and high resource use. Many hotels are taking steps like sorting waste, composting, recycling, converting waste into energy, and reducing waste to send less garbage to landfills. These efforts help protect nature, save money, and improve the hotel's image as an eco-friendly business.

The goal of waste management in the hotel industry goes beyond just following rules. It involves a commitment to eco-friendly practices, saving resources, and reducing waste. By leading the way with sustainable practices, hotels can also inspire guest to adopt similar habits in their daily lives. Moreover **Behera, A., & Jatav, S. S. (2022)** examines the challenges in small hotels faced in managing waste, mainly due to a lack of resources and financial investment needed for effective waste management.

Small hotels struggle with the high costs of infrastructure needed for waste management, such as transporting waste to recycling plants, building recycling facilities.

This study sets the stage to explore the many aspects of waste management in hotels, including new ideas, best practices, and the benefits for both the environment and the hotels. By adopting effective waste management strategies, hotels can help create a healthier planet, improve their image, lower costs, and ensure a better future for all.

Review of literature

Spio-Kwofie, A. et.al, (2024) The study looked at how three 3-star hotels in Takoradi manage waste. Researchers used surveys to collect information from hotel managers, housekeeping, and kitchen staff. It indicates that hotel staff strongly believes that waste management is an important responsibility, guests should be educated on saving energy and water through signs. Recycling bins should be placed in guest rooms and public areas to encourage waste sorting. Hotels should use energy-efficient lighting and appliances to reduce electricity use. Environmental efforts should be clearly communicated through visible signs and other methods. Single-use plastics should be reduced, and reusable alternatives should be promoted. Hotels should follow waste management rules and support government policies that encourage eco-friendly practices. **Chawla, G et.al, (2022)** Food waste is a common problem in hotels, and changing how employees behave is key to solving it. Managers can encourage employees to adopt sustainable habits by setting a good example and creating workplace norms that support environmental responsibility. Training programs that boost confidence and hiring people who already care about sustainability can create a team dedicated to reducing waste. This study emphasizes the need for strong management support, employee empowerment, and teamwork to minimize food waste and promote sustainability in hotels. Moreover, **Zrnić, M. et.al, (2022)** stated that cutting down on food waste not only protects the environment but also supports sustainability. Proper waste management in hotels helps ensure food safety and protects customers' health. When hotels adopt good food waste practices, they set an example for others and encourage businesses to be more environmentally responsible. Hotel managers play a key role in reducing waste by tracking and categorizing it. Using technology and software for food waste management can be challenging but is necessary for long-term improvements. This study highlights the need for proactive waste management in the hospitality sector and its potential to drive positive change and encourage sustainability in other industries. Additionally, **Phu, S. P et.al, (2018)** This study examined hotels produced an average of 2.28 kg of waste per guest per day. Larger hotels with more rooms, higher prices, gardens, and restaurants generated more waste. Seasonal changes also affected waste types—garden and burnable waste increased during the wet season, while kitchen and plastic waste decreased. Hotel waste consisted of 58.5% biodegradable material, 25.8% recyclable items, and 15.7% other waste. Bigger hotels produced more biodegradable waste but recycled less compared to smaller hotels. Hotels made some progress in waste management: 76% sorted their waste, 29% reduced waste, Only 0.8% composted waste. Larger hotels performed better in waste management. The most effectively sorted waste items were chemical residues (93%), glass (77.5%), and plastic bottles (72.2%), though some mistakes were made with paper and burnable waste. Hotels faced several difficulties, including: Poor waste storage, lack of knowledge and training, time-consuming sorting processes and unsanitary waste-handling conditions. It can be improved by following few ideas like: Improve recycling and composting in hotels, develop clear strategies to reduce waste and overcome challenges by providing training, better resources, and improved waste facilities. This study provides useful insights into managing hotel waste in HAC and highlights how the hospitality industry can help address environmental issues. **Pandey, R. C., et.al, (2022)** researcher looks at how hotels in India manage waste, the types of waste they produce, and how green practices like recycling can improve sustainability and profits. Hotel industry faces few challenges in waste management like: Waste collection is inefficient, infrastructure for waste disposal is lacking, there is a shortage of technical knowledge, waste transport routes are not properly planned and

municipal solid waste is often underestimated, leading to poor management. Most waste in hotels is either biodegradable or recyclable, meaning it can be reused or processed again. Moreover, **Lagasi, F. E et.al, (2019)** examines how hotels in Bauchi State, Nigeria, manage solid waste, including the types of waste produced, disposal methods, and existing waste policies. These practices impact the environment like: Dumping waste around hotel premises causes pollution and poor waste disposal spreads diseases and creates an unpleasant environment. This can be improved by few steps lie: Hotels should create structured waste disposal rules to improve cleanliness, convert food waste into compost for plants and train hotel staff and management on proper waste management to protect the environment. The study highlights the urgent need for better waste management in Bauchi hotels to promote sustainability and public health. Inline **Chandani, N., et.al, (2024)** reveal that Indian hotel industry is focusing more on sustainable waste management because of its impact on the environment and high resource use. Many hotels are taking steps like sorting waste, composting, recycling, converting waste into energy, and reducing waste to send less garbage to landfills. These efforts help protect nature, save money, and improve the hotel's image as an eco-friendly business. Effective waste management depends on training and engaging staff, guests, and suppliers. Smart waste systems, better recycling methods, and a circular economy approach help reduce waste efficiently. Problems like irregular waste collection and poor waste treatment facilities still need improvement. Sustainable waste management has brought clear environmental benefits and cost savings. Additionally, **Zangmo, C. & Sharp, A. (2017)** examined the amount of waste sent to landfills, the current waste management system and the types of waste generated by hotels in Paro district. Details of the different types of waste like: **Organic waste** – 53%, **Glass** – 14%, **Paper** – 9%, **Metal** – 7%, **LDPE (low-density plastic)** – 7%, **Textiles** – 5%, **HDPE (high-density plastic)** – 3%, **Rubber** – 1% and **other materials** – 1%

It's been observed that Hotels do not properly separate waste before disposal and there is no detailed study on how waste management affects the environment. We can improve the situation by teaching the hotel staff and the public about waste separation, composting, and recycling. Set up waste management rules and track progress. Inline **Dalvi, M.V., et.al, (2022)** examined largely focuses on: Types of waste produced in hotels and restaurants and from where hotel waste comes. The negative effects of hotel waste on the environment and human health. Current waste management practices in indian hotels. It has been observed that most hotel waste can be recycled or composted. Waste management in hotels is not effective and needs improvement. Hospitality industry must adopt a better waste management system to improve handling, recycling, and composting. Proper waste management is necessary to protect the environment and public health from the harmful effects of hotel waste. Additionally, **Mohan, V. et.al, (2017)** reviews information from research on waste reduction and management in hotels. It highlights the importance of waste management practices in the hotel industry, particularly focusing on the 5Rs (Reduce. Reuse. Recycle. Recover. Refuse) Transition Strategy as an effective approach.

Hotels are realizing the importance of reducing waste to cut down on disposal costs, protect the environment, and build stronger relationships with guests. Effective waste management is crucial for protecting the environment and conserving resources in hotels. The article discusses non-hazardous waste and different ways to break down waste. 5Rs is most recommended and effective way for hotels to manage waste. Hotel management and staff need to be committed to follow these strategies for effective implementation of waste management. Hotels that focus on sustainability can attract loyal guests by showcasing their environmental efforts. A “green” hotel image can be a great marketing tool to keep guests coming back. It will help to earn more profit with the sustainable tourism promotions. Inline **Edoun, E. I. et.al, (2019)** looks at the challenges of waste in the hospitality industry, focusing on its environmental effects and assessing current waste management solutions. It highlights the growing concerns about excessive waste production as the industry rapidly expands. The hospitality industry plays a major role in the global economy, contributing 10.3% to the GDP and providing 234 million jobs, helping economic growth worldwide. Although the hospitality

industry contributes to the economy, it harms the environment by overusing natural resources and causing high pollution levels. Hoteliers are facing increasing pressure from the public to take more responsibility for their environmental impact, especially regarding waste, resource misuse, and pollution. While there have been efforts like 'greening' initiatives, they are not enough to fully address waste problems.

Karakas, M. (2021) revealed that three high-end hotels and explores the problems, strategies, and practices to reduce food waste. The main challenge is maintaining a 5-star guest experience while minimizing food waste. Major sources of waste include the kitchen (due to overproduction), breakfast buffets, and staff canteens (due to careless behaviour). These contribute more of food waste than conferences or à la carte services. Many luxury hotels have practices to reduce food waste, but only a few have fully implemented them. The hotels are still in the planning phase for expanding these practices, and while sustainability is important, there's a lack of proactive action in managing food waste. Some obstacles to better food waste management include difficulties in food donations, guest behaviour, and recycling. Disposing of food is often cheaper than reusing or donating it. Health regulations stop edible leftovers from being donated to people in need, and logistical issues make transportation hard. Moreover **Chachage, B. et.al, (2024)** researcher looked at how resources and employee training impact waste management in tourist hotels in Zanzibar, focusing on the Resource-Based View theory and the waste management hierarchy. Hotels regularly practiced on waste reduction and recycling saw positive environmental and operational results compared to those that didn't. Hotels with permanent staff had better waste management, especially in recycling, waste reduction, and incineration. Stable staffing helps maintain consistent waste management practices. Hotels with more seasonal workers were more likely to engage in recycling initiatives. Seasonal workers should be trained in sustainable waste practices to improve results. Hotels that don't practice waste reduction and recycling should prioritize these actions for environmental and operational benefits. Maintaining a stable, permanent workforce and providing targeted training for seasonal workers is essential. Financial incentives and structural changes could support these efforts. Training programs for hotel staff and local government personnel should be integrated into educational curricula, like at the State University of Zanzibar, to prepare future professionals for sustainability in tourism. Permanent staff, employee training, and waste management practices are crucial for sustainability in Zanzibar's tourism industry. Hotels need to focus on waste reduction and recycling for better environmental impact and operational efficiency.

Inline **Sonal Tawde and Gatha Sonawane (2019)** revealed urban solid waste includes household trash, street waste, construction debris, trade refuse, and organic waste. Poor waste management can cause health issues, environmental damage, and the spread of diseases. The hotel industry produces a lot of waste, especially food and green waste, which requires proper management, such as composting and waste reduction. Hotel owners are responsible for staff training, hiring employees, approving waste management plans, and buying waste collection vehicles. Most of the waste management tasks are carried out by hotel staff instead of experts and some tasks like removing bulky materials and maintaining vehicles are handled by contractors. Hotels produce the most waste, about 5-6 kg per 200-300 visitors. The major challenges are insufficient authority and equipment for waste management, also the lack of public cooperation is a significant issue in waste management. Many hotels recycle plastic, paper, and aluminium, some hotels compost waste, few practice waste segregation, and few hotels burn waste daily. The study emphasizes the need for better waste management practices in hotels in Ulhasnagar and Kalyan, as many are already engaging in some waste reduction efforts but face challenges like lack of authority, equipment, and public cooperation. Further improvements are needed in small and medium hotels. Additionally, **Pumpinyo, S., & Nitivattananon, V. (2014)** examined green economy era, strategies like recycling can bring economic benefits. The hotel industry, especially in urban areas like Bangkok, Thailand, produces a lot of waste. As the number of visitors grows, so does waste generation, with Bangkok producing almost 10,000 tonnes of waste daily. Only a small portion is recycled, while the majority ends up in

landfills. Hotels mainly contribute organic and wet waste to these landfills. Hotels generate significant amounts of recyclable and organic waste. Recycling projects can offer both direct and indirect economic benefits, such as: Increased income from selling recyclable materials, savings from using biogas produced from organic waste, savings from using organic fertilizers made onsite instead of buying chemical ones, revenue from turning fruit waste into cleaning products, reduced costs for waste disposal. The study finds that recycling in hotels is economically feasible and suggests implementing better waste management systems to improve recycling efficiency and reduce reliance on landfills.

Additionally, **Behera, A., & Jatav, S. S. (2022)** examines the challenges small hotels face in managing waste, mainly due to a lack of resources and financial investment needed for effective waste management. Small hotels struggle with the high costs of infrastructure needed for waste management, such as transporting waste to recycling plants, building recycling facilities, and buying equipment like composters or biogas plants. Due to financial constraints, small hotels often prefer to dispose of waste rather than recycle, even though this has long-term environmental and financial consequences. The rise of small hotels in Dehradun is contributing to the city's waste problem, as most of them dispose of waste in landfills. However, if small hotels adopt recycling, waste reduction, and energy recovery practices, it could reduce the overall waste generated. Small hotels don't have the capital for waste management technologies, so encouraging staff and visitors to reduce waste and adopt waste prevention practices can help. Programs like linen reuse can reduce waste and save costs. The study calls for the Hotel Association of Dehradun to pool resources from its members for joint waste management projects and recommends organizing training programs for hotel managers to improve waste management practices.

Agesa, W. et.al, (2022) stated that how waste management practices impact operating costs in classified hotels in Nakuru County, Kenya. The study finds that waste management practices significantly affect hotel operating costs. Waste reduction and composting help reduce costs, while improper waste collection and disposal increase costs. Cooperation between stakeholders plays a crucial role in reducing operating costs. Hotels should focus on waste reduction, recycling, and composting to reduce costs. Policymakers should create policies that support effective waste management practices. The study highlights that proper waste management strategies can lower operating costs and improve sustainability in the hotel industry. **Oluwale, E. A., et.al, (2021)** revealed that waste management in lodging facilities in Minna, Niger State, and its environmental impact. The largest amounts of waste are produced by rooms, kitchens, and stores/warehouses. The most common types of waste are plastic, paper, organic, and water waste. A lot of the waste is either burned, sent to landfills, or dumped in water bodies without proper sorting, which is not environmentally friendly. The study points out that waste management practices are isolated and need to be integrated into the overall system. Lodging facilities should use proven waste management practices and transfer knowledge and technology to others as well. The government needs to create a solid waste management framework to help the hospitality industry shift towards more eco-friendly practices. The study emphasizes the need for lodging facilities to adopt more sustainable waste management practices to reduce their environmental impact.

Shivangi, S. et.al, (2019) examined that waste management in the hotel industry, focusing on its environmental and economic impact. It has been observed that in hotel different departments have different kind of wastages like in offices (paper, toner cartridge), in housekeeping (Towels, linens, soaps, bathroom chemicals), in Food & beverages (Food waste, oils, packaging materials, and disposable items like plastics and aluminium), in stores (Plastic packaging waste), in Engineering (Waste from maintenance materials like batteries and fire extinguishers). Waste generated includes paper (35%), plastic (22%), organic waste (17%), and textiles (6%). They can adopt waste management practices like **Reduce**: Limiting plastic use, using eco-friendly cleaning agents, and reducing paper waste. **Reuse**: Reusing toiletries, furniture, and leftover food. **Recycle**: Recycling plastics, e-waste, newspapers, and composting organic waste. Waste management is difficult due to

constant hotel operations. However, adopting green practices can save costs and improve guest satisfaction. Hotels are encouraged to adopt the "Waste Hierarchy" of Reduce, Reuse, and Recycle. In conclusion, the paper advocates for comprehensive waste management strategies to minimize environmental impacts, reduce costs, and improve sustainability.

Omidiani, A., & Hashemi Hezaveh, S. (2016) stated that waste management in the Indian hotel industry, highlighting the role hotels play in waste generation and resource use. Hotels are facing challenges of poor waste management, lack of facilities, and technical expertise lead to inefficient waste collection. Many hotels fail to estimate waste generation rates, making waste management inefficient, most of the hotel waste can be recycled or composted, which can reduce pollution and increase profitability. Eliminating waste at the source and recycling can significantly cut down greenhouse gas emissions and help combat global warming. If hotels develop a comprehensive waste management plan and adopt strategies that protect the environment while ensuring long-term profitability. Public awareness and government intervention are essential to improve waste management in hotels. The study guides the need for better waste management to balance sustainability and profitability in the hotel industry. Moreover, **Rawal, Y., & Takuli, S. (2021)** revealed waste management in hotels, focusing on its social, economic, and environmental impacts. Hotels produce large amounts of waste, much of which goes directly to landfills. Better waste management practices and public awareness are needed to address this. Hotels can get benefit by recycling and reusing prevent valuable materials from ending up in landfills, saving energy and natural resources. Organic waste can be turned into fertilizer, which helps improve soil quality. Turning waste into energy offers a sustainable way to generate electricity. Using waste as a resource reduces environmental harm. The study calls for implementing sustainable waste management practices in the hotel industry to reduce waste, save resources, and improve the environment.

Objectives: -

- To study various waste produced in hotels.
- To study useful insights into managing waste in hotels.

Methodology: - In depth study secondary data covered from literature related to waste management as per requirement of study, practices and latest trends challenges in waste management were conducted through various research papers, articles, review papers, and websites.

Findings and Interpretations: -

Various waste produced in hotels:

After the completion of the literature review researcher found that hotel industry produced lots of waste in environment because this industry deals with food, wood, plastic, all materials which is used in daily requirements. In the review organic waste, glass, paper, metal, textile, plastic, rubber generated as a waste in supported study **Zangmo, C. & Sharp, A. (2017)** examined that waste generated by hotels like: Organic waste – 53%, Glass – 14%, Paper – 9%, Metal – 7%, LDPE (low-density plastic) – 7%, Textiles – 5%, HDPE (high-density plastic) – 3%, Rubber – 1% and other materials – 1%. We can improve the situation by teaching the hotel staff and the public about waste separation, composting, and recycling. Set up waste management rules and track progress. In continuation the common waste types are plastic, paper, organic, water. Author also stated **Oluwole, E. A., et.al, (2021)** examined waste management in lodging facilities and its environmental impact. The largest amounts of waste are produced by rooms, kitchens, and stores/warehouses. The most common types of waste are plastic, paper, organic, and water waste.

Useful insights into managing waste:

Poor waste management always leads to health issue and destroy the environment and also increases the disease stated by **Sonal Tawde and Gatha Sonawane (2019)**. Hotels staff believe that the waste management is too important in the hotels and also for the environment. Hotels follow the same strategies to manage the waste, strategy like: sorting of the waste it is a first step to manage the waste,

after sorting can analyse the waste category and manage them. we can place recycle bin/dustbin for all category waste for sorting and in second step hotels needs to save energy by using the lighting appliances which consume low electricity and also use the solar system to save the energy in hotels. supported with the study of **Spio-Kwofie, A. et.al, (2024)** Recycling bins should be placed in guest rooms and public areas to encourage waste sorting. Hotels should use energy-efficient lighting and appliances to reduce electricity use. Environmental efforts should be clearly communicated through visible signs and other methods. Single-use plastics should be reduced, and reusable alternatives should be promoted. Hotels should follow waste management rules and support government policies that encourage eco-friendly practices. Training program can be also helps to manage the waste, training can increase the manage skills amongst the staff for sorting, collecting and managing the all types of waste. Supported study by **Chawla, G et.al, (2022)** Food waste is a common problem in hotels, and changing how employees behave is key to solving it. Training programs that boost confidence and hiring people who already care about sustainability can create a team dedicated to reducing waste. This study emphasizes the need for strong management support, employee empowerment, and teamwork to minimize food waste and promote sustainability in hotels. Training and awareness always help to management the waste and staff can management the all waste in a systematic and professional way and import a positive benefit in the industry. Moreover, study also supported **Chachage, B. et.al, (2024)** stated training programs for hotel staff and local government personnel should be integrated into educational curricula, like at the State University of Zanzibar, to prepare future professionals for sustainability in tourism. Permanent staff, employee training, and waste management practices are crucial for sustainability in Zanzibar's tourism industry. Hotels need to focus on waste reduction and recycling for better environmental impact and operational efficiency. Hotels also can used practice like recycling, composting, which can improve the sustainability and profit of the hotels. Also stated by **Mohan, V. et.al, (2017)** that the 5Rs strategy to manage the hotels waste 5Rs cover reduce, reuse, recycle, recover, refuse also revealed that this strategy effective way to manage the waste moreover waste can manage by sorting, collection, and disposal, selling recycling products, landfills, produced biogas from organic food, stop over production and guest can be also ware about the waste and motivated them to reduce the waste to save the environment.

Challenges faced in managing waste:

Waste management can be also a challenge for the hotel industry because most of the hotels are economically running and lack of technology, lack of awareness. So, many hotels will stop food waste in hotels due to these challenges. Moreover, poor storage, lack of knowledge, time constraint, not proper training to staff which supported with study of **Phu, S. P et.al, (2018)** examined the types of waste and how it is managed. Hotels produced an average of 2.28 kg of waste per guest per day. Hotels faced several difficulties, including: Poor waste storage, lack of knowledge and training, time-consuming sorting processes and unsanitary waste-handling conditions. Waste transportation route not planned, lacking of infrastructure can also be a challenge for the hotels. If the hotels dump the waste in surrounding it will cause pollution effects on environment and increase the disease. **Author Lagasi, F. E et.al, (2019)** also stated hotels manage solid waste, including the types of waste produced, disposal methods, and existing waste policies. These practices impact the environment like: Dumping waste around hotel premises causes pollution and poor waste disposal spreads diseases and creates an unpleasant environment. In other side lack of public corporation is a big issue to manage the waste. Small hotels are always struggle for equipment, infrastructure, transportation due to financial issues, supported study with **Behera, A., & Jatav, S. S. (2022)** examines the challenges small hotels face in managing waste, mainly due to a lack of resources and financial investment needed for effective waste management. Small hotels struggle with the high costs of infrastructure needed for waste management, such as transporting waste to recycling plants, building recycling facilities, and buying equipment small hotels don't have the capital for waste management technologies, most of the hotels are fail to manage the waste due to these challenges cannot update the operations and save the hotel profit and environment.

Suggestive keys:

Waste management is the very crucial issue in the hotels and also a big challenge to manage. Hotels need to schedule training programs for the staff members. So, that they will be aware about the waste and its management practices along with guest can also be aware about the waste management.

Hotels can use dustbin in different areas of the hotels to sorting the waste and should follow the 5Rs of waste management which can apply according to nature of the waste. Leftover food can be composting and turn in to biogas, textile item can be recycled or reuse in operations, plastics can be resale to the garbage handler.

By using these practices and strategies hotels can save the cost, improve the quality and boost the operations to maximize the revenue and also support the sustainability.

Conclusion: - The study summarised with that the hotel industry one of the growing industries and provide all food and accommodation services to the guest. In operations of the hotels there are lots of waste produced in various form which researcher already discussed like food, plastic, paper, glass, metal, textile etc. these all are the waste can be major global challenge, cause major disease and effects on the sustainability so, as study reviewed there is 5Rs strategy like reduce, reuse, recycle, recover, refuse which solving these problems and every hotel needs to adopt these practices and also take some efforts in the organisation for enhance the awareness amongst staff and guest. Hotel are using training programs to create awareness and also develop some waste management systems to manage the waste. Hotels also need to do work in team and with the collaboration of municipal committee and other garbage authority to manage the waste and maintain effective waste management system.

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