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Sustainable Waste Management and the Impact of the Tourism Sector on Environmental Pollution

Darko KIŠ[1]
Nives JOVIČIĆ[2] (✉)
Sanja KALAMBURA[2]
Vlado GUBERAC[1]

Summary

Tourism is one of the most important economic activity in Croatia. At the same time tourism sector has a major impact on the environment, which is especially expressed through an increase in the amount of waste generated during the tourist season. Environmental pollution in tourist areas is a common problem due to the large number of people and due to the various activities. Inadequate disposal of waste from hotels and rest areas leads not only to environmental pollution but also to health problems related to pests and infectious diseases. The problem of sustainable waste management is a slight resistance and misunderstanding by entrepreneurs in tourism, due to the common popular opinion that the most important thing is to make a big profit. Environmental protection comes last, although there are many examples of corporate social responsibility and environmental investment in tourism. Such an example is the company Ilirija d.d. In the case study their business and their activities related to waste management were investigated. The goal of the paper is to analyze the amount of waste produced for one year and explore the extent to which Ilirija resort d.d. business is environmentally responsible. The aim is also to investigate the impact of the tourism sector on environmental pollution and the role of waste generated in the this sector in the ecological crisis. The quantities of waste produced in 2018 were monitored and analyzed throughout all twelve months compared to the number of overnight stays. The following data collection methods were used in this study: review of company documents, interviews, surveys and field observations. The results have shown that the increase in the number of tourists increases the amount of waste during the tourist season, as well as preparations for the new season. In conclusion, guidelines and proposed measures for waste reduction will be given.

Key words

environmental pollution, waste, tourism sector

[1] Faculty of Agrobiotecnical Sciences Osijek, The Josip Juraj Strossmayer University of Osijek, Ulica Vladimira Preloga 1, 31000 Osijek, Hrvatska

[2] University of Applied Sciences Velika Gorica, Zagrebačka cesta 4, 10410 Velika Gorica, Croatia

✉ Corresponding author: nives.jovicic@vvg.hr

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Introduction

Waste is defined as unwanted or undesired material. Waste is a direct consequence of the totality of activities in society and the amount of waste generated is often an indicator of the economic strength and development of a society (Tilley, 1999; Kučar Dragičević et al, 2006). In the summer season there are mass migrations of tourist flows of people from the continental area to the coastal areas. Due to the increase in the population of one place during the tourist season, the amount of waste increases. (Damjanić, 2016).

Waste affects the environment and the environment affects tourism (Bohdanowicz, 2005). Inefficient waste management leads to environmental pollution (Chan, 2001). With its unpleasant odors, messy and repulsive appearance, it is also an aesthetic problem. Mounting costs of resources and impacts of waste could affect the income, environmental performance and public image of the hotel sector (Trung and Kumar, 2005). Also, there is a possibility of fire with a risk of releasing hazardous gases (Puntarić et al, 2012). There is also a risk of disease transmission through insects and rodents which use waste as food and shelter (Puntarić et al, 2012).

The main sources of waste in tourism are accommodation and supplies, major events, the sporting goods industry, tour operators and airlines. The largest amount of waste in hotels is generated in kitchens, offices, restaurants and hotel rooms. Waste generated in restaurant and kitchens usually consists of leftovers from food and cooking (used oil, leftovers from vegetables, fruits, egg shells etc.) glass, plastic and metal packaging. However, it also includes food waste, i.e., waste that is a result of excessive food ordering by guests, errors in inventory management, errors in food preparation, and food safety practices (Okumus, 2020). Waste is also generated in offices and includes paper and e-waste like used toners for printers and copying machines (Bohdanowicz, 2005).

Materials and Methods

The case study investigated four hotels, a marina and a Park Soline campsite owned by the company Ilirija d.d., their operations and their activities related to waste management. This case study analyses the quantities of waste produced over a period of one year per month compared to the number of spent nights. The amount of the following waste categories was analyzed: waste paper and cardboard, waste plastic, metal packaging, glass, garden and park biowaste, bulky waste, soil and stones, biodegradable waste, waste printing toner containing hazardous substances, oiled wiping cloths and oil filters, engine, gear and lubricating oils, edible oil and fat and packaging containing residues of/or contaminated by hazardous substances. The research is limited in showing the quantities of some waste categories each month because some waste categories were collected only a few times a year, for example bulky waste. Therefore, the data for each individual month are shown for some categories of waste and in some only for those months when the collection was performed.

The company Ilirija d.d. was founded in 1957 with its headquarters in Biograd na moru. In their business all three segments of tourist offer are included: hospitality, nautical tourism and camping. It has been chosen for this case study investigation because it is currently one of the 15 leading tourist companies in Croatia that play an important role in the country's tourism development. In environmental protection, Ilirija invests significant effort and continuously strives to invest time and opportunities to adapt and apply EU standards, procedures and regulations in all aspects and objectives of waste management and environmental protection, which includes air protection, soil protection and protection of the sea and coast. The quantities of waste produced by the company in 2018 were monitored and analyzed throughout all twelve months compared to the number of overnight stays. The following data collection methods were used in this study: review of company documents, interviews, surveys and field observations.

Results

Ilirija draws considerable attention to the waste management in all its facilities. Due to its business dynamics, the list of generated types of waste is revised every few months and this waste is disposed of until the arrival of the authorized waste collection company. All documentation on the generation and flow of waste is continuously filled in and monitored.

Throughout the year, and especially during the tourist season, different types of waste are generated: paper and cardboard, plastic, glass, biowaste, textiles, etc. Some waste categories are collected every month, and some only two or three times a year. Therefore, in some graphs the data for each individual month are shown, and in some only for those months when the collection was performed as is the case with, for example, the collection of bulky waste.

Fig. 1 shows the quantities of paper and cardboard in 2018, sorted by months in which they were exported.

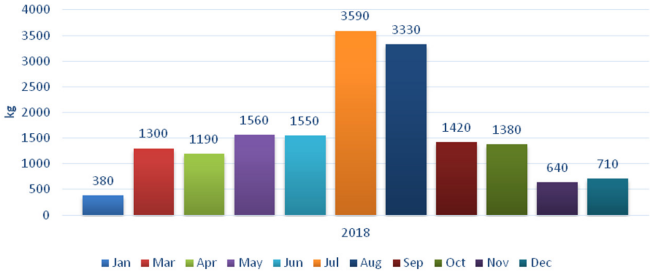

Figure 1. Waste paper and cardboard (six-digit code for the waste: 15 01 01)

It can be seen that in 2018 the company Ilirija d.d. generated 17,050 kilograms of waste paper and cardboard, of which 380 kg in January, 1,300 kg in March, 1,190 kg in April, 1,560 kg in May, 1,550 kg in June, 3,590 kg in July, 3,330 kg in August, 1,420 kg in September, 1,380 kg in October, 640 kg in November and 710 kg in December. Also, Figure 1 shows that the largest quantities of waste paper and cardboard were generated in July and August, i.e. during the tourist season when the largest number of overnight stays was recorded.

Fig. 2 shows the amount of plastic waste in 2018 per months in which they were exported.

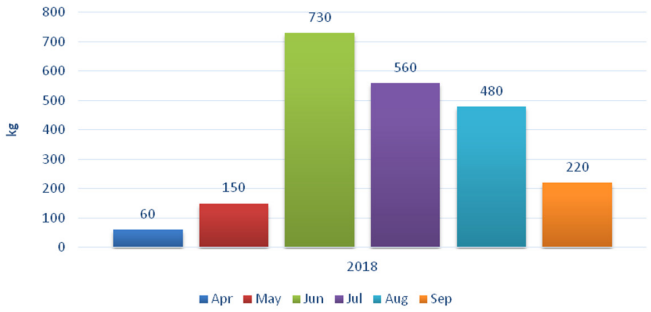

Figure 2. Waste plastic (six-digit code for the waste: 15 01 02)

In 2018, 2,200 kg of waste plastic came out from Ilirija (Fig. 2). The amount of plastic is also increased during the tourist season compared to the winter months. In one study by BRITA UK, it was noted that 70% of businesses were currently looking to cut down on single-use plastics, like straws and water bottles.

In the same period 628 kg of metal packaging came out from the company, 400 kg in May, 160 kg in July and 68 kg in August (Fig. 3).

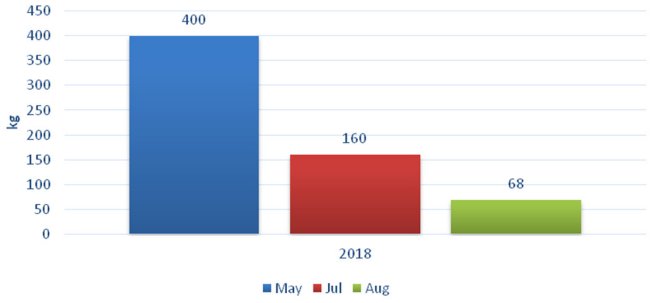

Figure 3. Metal packaging (six-digit code for the waste: 15 01 04)

Fig. 4 shows the amount of waste glass in 2018 by months in which it was exported. In 2018, 775 kg of waste glass came out. The biggest amount was in July (425 kg).

In 2018, 10,000 kilograms of biowaste came out from the company (Fig. 5). More than 50% was taken in April and December (6,000 kg).

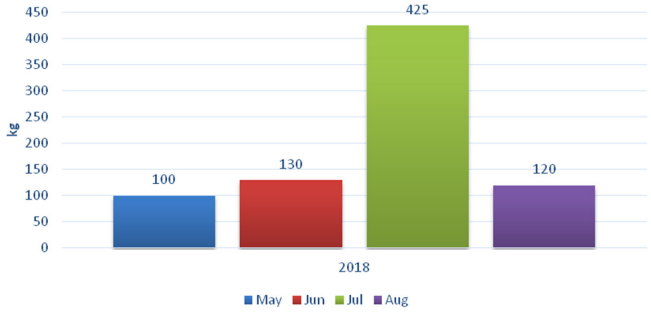

Figure 4. Glass (six-digit code for the waste: 15 01 07)

These data suggest that the quantities of this category of waste are increased before the season and after the season, while during the tourist season, smaller amounts of garden and park biowaste are generated.

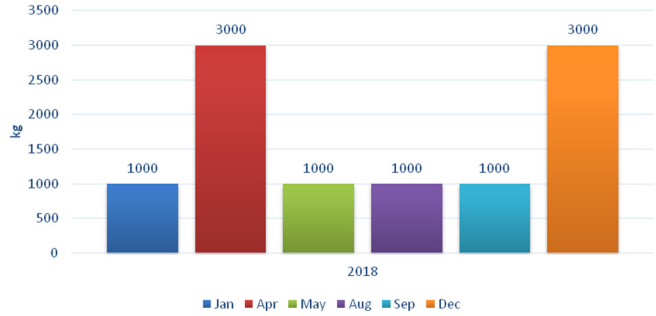

Figure 5. Garden and park biowaste (six-digit code for the waste: 20 02)

Also, larger amounts of bulky waste (Fig. 6) were recorded before the season because during the tourist season, when the number of guests in the hotel is stable, there are no activities that would result in the generation of bulky waste.

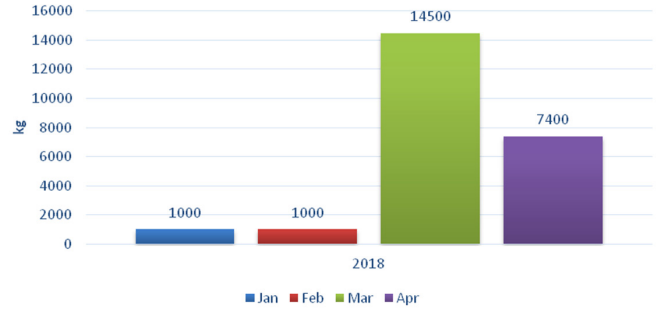

Figure 6. Bulky waste (six-digit code for the waste: 20 03 07)

In 2018, 23,900 kilograms of bulky waste came out from Ilirija (1,000 kg in January, 1,000 kg in February, 14,500 kg in March and 7,400 kg in April).

During 2018, 34,200 kilograms of soil and stone came out in total, 9,600 kg in March and 24,600 kg in June. This category of waste was handed over for disposal only twice in 2018 as shown in Fig 7.

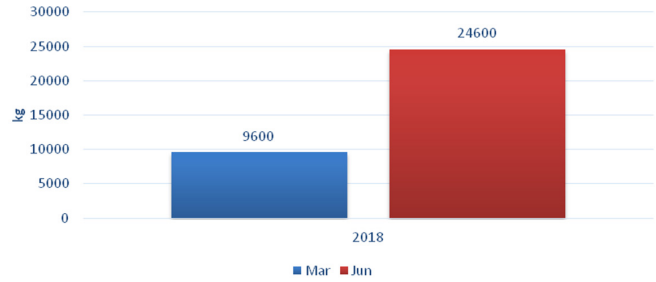

Figure 7. Soil and stones (six-digit code for the waste: 17 05 04)

Biodegradable waste was handed over to an authorized company after tourist season. 56,000 kg of this category of waste came out in October (Fig. 8).

Figure 8. Biodegradable waste (six-digit code for the waste: 20 02 01)

During 2018 2,035 kg of packaging containing residues of or contaminated by hazardous substances were created and taken out from the company (Fig. 9).

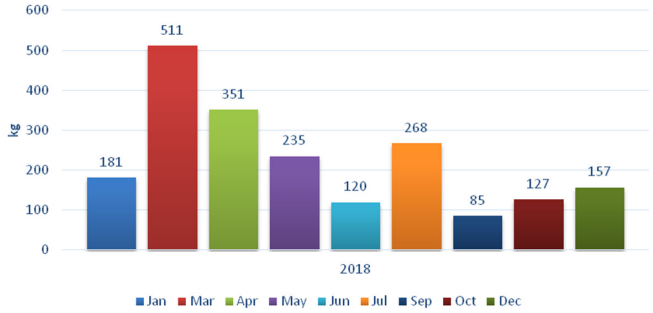

Figure 9. Packaging containing residues of or contaminated by hazardous substances (six-digit code for the waste: 15 01 10*)

The smallest quantities were generated during the tourist season and the largest quantities occurred just before and after the season.

Fig. 10 shows the quantities of produced hazardous printing toners.

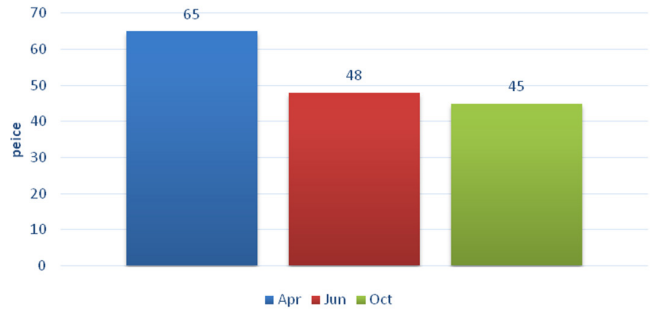

Figure 10. Waste printing toner containing hazardous substances (six-digit code for the waste: 08 03 17*)

During 2018 in Ilirija d.d. 158 pieces of printing toners were produced (65 pieces in April, 48 pieces in June and 45 pieces in October).

Fig. 11 shows the amount of used and discarded oiled wiping cloths in 2018.

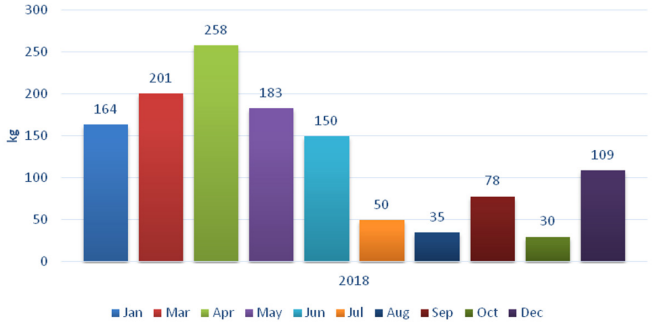

Figure 11. Oiled wiping cloths (six-digit code for the waste: 15 02 02*)

It can be concluded that a larger amount of this type of waste was generated before the tourist season, i.e. during the preparatory activities for the season. 1,855 kg of waste oil filters were recorded (Fig. 12).

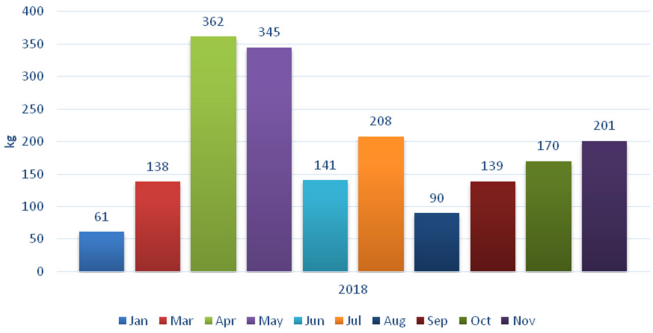

Figure 12. Oil filters (six-digit code for the waste: 16 01 07*)

The lowest amount (61 kilograms) was recorded in January. The largest amount was recorded in April (362 kilograms) and May (345 kilograms).

A fairly large amount of engine, gear and lubricating oils waste was generated (19,600 kg) during 2018 (Fig. 13).

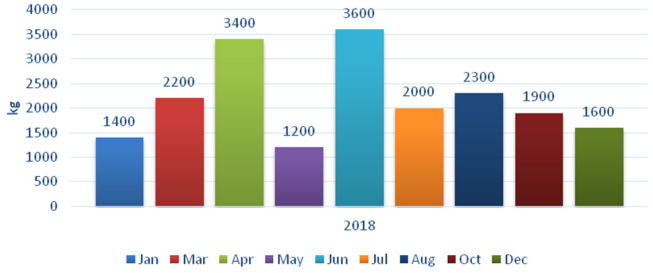

Figure 13. Engine, gear and lubricating oils (six-digit code for the waste: 13 02 08*)

This type of hazardous waste was handed over to an authorized collector during 9 months in 2018, as follows: 1,400 kg in January, 2,200 kg in March, 3,400 kg in April, 1,200 kg in May, 3,600 kg in June, 2,000 kg in July, 2,300 kg in August, 1,900 kg in October and 1,600 kg in December. Also, 490 kilograms of edible oil and fat waste were generated (Fig. 14).

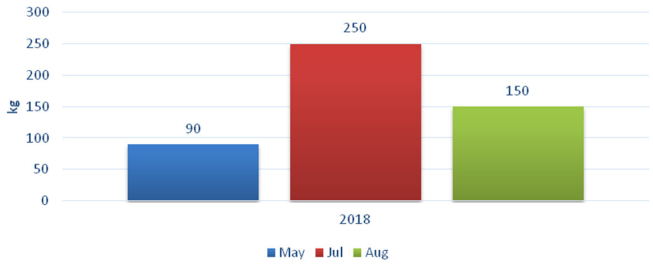

Figure 14. Edible oil and fat (six-digit code for the waste: 16 01 07*)

This category of waste is temporarily stored in a tank and handed over to the collector when required.

Through 2018, 208,276 tons of non-hazardous waste and 33,551 tons of hazardous waste were generated from the company.

An analysis of the amount of waste generated throughout the year compared to the number of overnight stays is shown on Fig. 15.

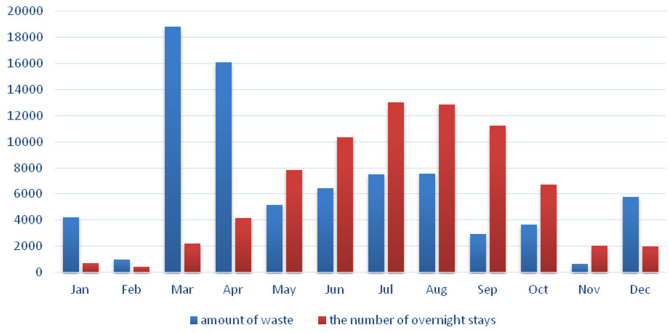

Figure 15. The amount of waste compared to the number of overnight stays

It is evident that the increase in the number of tourists increases the amount of waste during the tourist season, as well as preparations for the new season in March and April increase the amount of bulky and soil / stone waste.

Discussion

Tourism is one of the business sectors that is accounted for the largest amount of waste generated all over the world. From an operational point of view, it isn't surprising since guests tend to spend resources at a high rate, while hotels need to keep their rooms and other spaces clean 24 hours 7 days a week. The increase in the number of tourists directly increases the amount of waste during the tourist season. It is necessary to ensure sufficient quantity of different waste sorting containers and lower price for tourist companies by municipal services which recycle this waste. The reason for poor waste management sometimes is not just insufficient quantity of containers or unappropriate infrastructure but poor work organization caused by low environmental awareness of managers, employers and employees (Radwan et al, 2010). It is very important to motivate employees to make the system functional.

To make system completely functional, environmental protection must include the following (Manomaivibool, 2015; Olsen et al, 2000):

- Taking care of reducing tourism impact on climate changes
- Enforcing the energy efficiency measures in construction
- Establishing the complete waste management system
- Introducing the practice of separating waste collection and reusing used inventory
- Continuous educating of employees, their families, children and youth in the community about the need and ways to protect environment
- Implementing locally produced groceries from organic producers and fair trade products
- Excluding PET bottles by using tap water which is free for guests
- Encouraging usage of public transportation, ensuring transportation for guests from the bus/train station or airport to hotel and back in order to reduce GHG emissions.

One of the ways to reduce waste amount is a ″3R″concept, consisting of three main categories (Re-use, Recycle and Reduce). Packaging used daily in hotel can be easily reused. It is also quite easy to organize separate collecting of bottles and cups that can be recycled, using recycle containers, reusing different products, meal planning, donating food which is no longer usable in hotels or restaurants to charity or animal farms (Papargyropoulou et al, 2019). Donating unnecessary goods to charity instead of throwing them away is a good way of sorting out the problem. Employees and guests should be encouraged to manage waste and educated to improve environmental awareness (Petrić and Pranjić, 2010). The most important step in encouraging of recycling process is placing different waste containers. One of the possibilities, also, is using environment friendly materials and substitute natural resources with reusable ones (Stuchlíková and Botlíková, 2020). That includes usage of rechargeable batteries, textile instead of paper when possible, textile bags instead of plastic ones, limit packages that are not reusable and reducing usage of products that are not recyclable, as well as wholesale purchase in order to reduce amount of different packaging (Bohdanowicz et al., 2020).

The case study specifically shows the importance of efficient waste management due to the environmental protection and society in which we live, but also all the positive effects that are thus obtained (reduction of procurement costs, better image of the company…) but also those effects that do not directly affect the company. Waste and its recycling save a lot of resources. The results also pointed out some shortcomings and made suggestions on how to further improve the waste management policy in a particular company. That can also serve as a template for all other companies willing to take responsibility for the environment.

Conclusion

Economy and consumer growth leads to increasing of waste. By developing of the tourist sector and increasing number of sleepovers in the most attractive counties of Croatia, there is also a noticeable increase in waste quantity. The whole hotel business is responsible for creating waste, starting from building objects to everyday usage. Waste is consequence of different activities and hotel business creates various waste categories such as: construction

waste, kitchen leftovers, glass, metal, plastic, cardboard and paper and also unidentified waste and toxic materials.

The problem of waste and environment pollution is not to be resolved 'overnight', not even by strict discipline and only with legislative, therefore we need to find the way to motivate and educate population. To do this, the community should implement in its business strategy sustainable development goals with the option of constant adapting.

References

Bohdanowicz P. (2005). European Hoteliers' Environmental Attitudes: Greening the Business. Cornell Hotel and Restaurant Administration Quarterly 46 (2): 188-204.

Bohdanowicz P., Simanic B., Martinac I. (2020). Sustainable hotels -environmental reporting according to Green Globe 21, Green Globes Canada / GEM UK, IHEI Benchmarkhotel and Hilton environmental reporting, The 2005 World Sustainable Building Conference, pp. 1642 - 1649

Chan, W. W., Lam J. (2001). Environmental Accounting of Municipal Solid Waste Originating from Rooms and Restaurants in the Hong Kong Hotel Industry. J Hosp Tour Res 25 (4): 371–385

Damjanić Z. (2016). Praksa i ponašanje gospodarskih subjekata u razdvajanju otpada na otoku krku. Media, culture and public relations 7 (2): 150-160

Kučar Dragičević S., Butuči J., Kufrin J. (2006): Zbrinjavanje otpada u Republici Hrvatskoj - postojeće stanje. Arh Hig Rada Toksikol 57 (3):263-266

Manomaivibool P. (2015). Wasteful Tourism in Developing Economy? A Present Situation and Sustainable Scenarios. Resour Conserv Recycl 103: 69-76

Okumus B. (2020) How Do Hotels Manage Food Waste? Evidence from Hotels in Orlando, Florida, Journal of Hospitality Marketing & Management, 29:3: 291-309

Olsen M. D., Zhao J., Sharma A., Choi, J. G. (2000). Leading Hospitality into the Age of Excellence: Expansion, Competition and Vision in the Multinational Hotel Industry 1995-2005. An IH&RA White Paper on the Global Hospitality Industry. International Hotel and Restaurant Association, Paris, France.

Papargyropoulou E., Steinberger J. K., Wright N., Lozano R., Padfield R., Ujang Z. (2019). Patterns and Causes of Food Waste in the Hospitality and Food Service Sector: Food Waste Prevention Insights from Malaysia. Sustainability 11: 6016. doi: 10.3390/su11216016

Petrić L., Pranić Lj. (2010): Ekološka svijest u hrvatskoj smještajnoj industriji. Acta turistica nova 4 (1): 5-21

Puntarić D.; Miškulin M.; Bošnir J. et. al.. (2012). „Otpad i zdravlje ljudi". In: Zdravstvena ekologija. Zagreb, Medicinska naklada, pp. 336-337.

Radwan H., Jones E., Minoli D. (2010) Managing Solid Waste in Small Hotels, J Sustain Tour 18(2): 175-190. doi: 10.1080/09669580903373946

Stuchlíková J., Botlíková M. (2020). Selected Aspects of Sustainable Tourism and Their Application in the Operation of Accommodation and Catering Facilities in the Moravian-Silesian Region. The 19th International Scientific Conference Globalization and its Socio-Economic Consequences 2019 – Sustainability in the Global-Knowledge Economy, SHS Web of Conferences 74, 05023. doi: 10.1051/shsconf/20207405023

Tilley F. (1999). The Gap between the Environmental Attitudes and the Environmental Behavior of Small Firms. Bus Strategy Environ 8: 238-248. doi: 10.1002/(SICI)1099-0836(199907/08)8:4<238::AID-BSE197>3.0.CO;2-M

Trung D. N., Kumar S. (2005). Resource Use and Waste Management in Vietnam Hotel Industry. J Clean Prod 13 (2): 109–116. doi: 10.1016/j.jclepro.2003.12.014

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