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**ДОКЛАДЫ**

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## **WASTE MANAGEMENT IN THE TOURISM INDUSTRY: A SYSTEMATIC REVIEW**

**Abstract.** One of the important issue in the world is waste and recycling management. Considering the pollution, economic and social damages, the reduction of natural resources caused by the wastes, the effective management and recycling of the wastes have impact on the operational efficiencies and the effective management and recycling of waste are important in ensuring sustainable development and productivity for enterprises. The tourism industry can be seen as a natural laboratory for waste management and recycling within the scope of its products and services. Recent years, it has been observed that there has been an increasing study on waste management and recycling; however, there is a limited study on the tourism industry. Therefore, the main purpose of the study is to review the waste management studies in the tourism industry by systematic review technique. For this purpose, 15 articles published in the Web of Science (WOS) since 1975 have been examined. The results were evaluated and suggestions were given for future researches within the scope of the tourism industry.

**Key words:** Waste Management, Tourism, Systematic Review.

With the industrial revolution, mass production has started and the damage to nature has increased with produced more wastes. Until the 1950s, these wastes were ignored by the countries. However, after these years, countries became conscious about the waste and regulate various laws and regulations. Although the tourism sector in the past seems to have been less effective than the heavy industrial sectors in the field of waste extraction, the tourism sector has been more active in the 21st century, as a matter of fact, this has been realized that tourism industry have more wastes. In order to maintain the existence of the tourism industry, it is necessary to protect nature and to evaluate its waste. In this context, various applications have been started. Today's businesses are trying to reduce energy consumption, minimize waste, and be conservative through the use of 3Rs (Reduce, Reuse, and Recycle) applications (Kasavana, 2008: 140).

Hotel enterprises as a tourism industry's most important activity area, occupy a great place in terms of environmental and resources protection (Trung and Kumar, 2005: 111). In the 1990s, hotel management practices for reducing solid waste were negative. Because of labor costs and equipment costs, it is believed that additional costs will arise for the enterprise (Wilco et al., 2001: 372). In fact, in terms of hotel operations, solid waste management is beneficial both in terms of the hotel's monetary activities (minimization of solid wastes, recycling and recovery, etc.) as well as the sustainability of tourism with the reduction of environmental pollution and the health of the surrounding community (Shamshiry et al., 2011: 4).

Trung and Kumar (2005) in their research, they also looked at the waste categories of hotels according to the number of stars and the methods of disposal of these wastes. About 60% of the hotels stated that food waste (wet wastes) was sold to local collectors for animal feed purposes, about 10-30% of solid waste was classified and sold to local collectors for recycling purposes. Reusable dry waste, corresponding to 10-30% of total waste, is classified as plastic, paper, cardboard, tin cans, glass, metal. The remaining waste percentage was directly dumped to the garbage site where it was located (Trung and Kumar, 2005). Waste means a huge monetary loss. Because the purchase price of food discarded as waste, storage, preparation (cooking) cost is formed. Accommodation companies can reduce waste by using waste management applications of many materials, especially food and beverage, and can provide both economic benefit and environmental protection by providing reuse and recycling. In this context, the

purpose of the study was determined as a systematic review of waste management studies in tourism industry and to guide future researches in this issue.

According to Bontoux and Leone (1997) waste is the substance or objects that are disposed of in accordance with national law requirements. Waste management “is a process that starts with product and preparation process planning and continues with purchasing policy, inventory control and production planning combination and generally affects all operational phases” (Kirk, 1996: 102). A typical waste management system includes collection, transportation, pre-treatment, waste handling and final disposal of the remaining wastes. General classification of waste is quite difficult. Household wastes, industrial wastes, ashes, medical wastes, construction debris, solid wastes, biodegradable wastes, non-biodegradable wastes and hazardous wastes are the most common types of waste (Demirbaş, 2011). The classification of waste is important for the effective monitoring, development and implementation of waste management. In addition, classification of waste, coding of each type of waste, collection of waste according to classification, registration and reporting of such issues provide great convenience (Pocock et al., 2009: 1).

In general, solid waste sources in hotels; food and beverage preparation, guest rooms, offices, laundry and garden. Types of solid wastes include food waste, packaging waste (plastic, paper, cardboard, glass, etc.) and varies from garden wastes to chemical wastes (Trung and Kumar, 2005). Food waste in solid wastes has become an important global problem today. Many countries, institutions and non-governmental organizations are working on edible food waste. Waste disposal of edible food wastes brings environmental, economic and ethical problems (Marthinsen et al., 2012). Food waste is one of the most important issues that have been taken into consideration worldwide in recent times as it plays a direct threat to environmental, social and economic sustainability (Marra, 2013). Food waste can be classified as edible food waste and uneatable food waste. Edible food waste is also possible in food and beverage firms to separate the waste from the kitchen (in the preparation stage) and the waste from the customer (plate waste). Edible food waste is the expressions used for waste such as bone, egg shell, coffee grounds that are not possible to be consumed by humans (Owen vd, 2013). According to Schott and Andersson (2015: 220), it is possible to split food waste into mandatory food waste and preventable food waste. (Unavoidable) food waste is usually non-edible wastes, such as fruit-vegetable shells, bones, shells from sea products, which are formed during the preparation of the product. Preventable food wastes are actually edible foods, such as stale bread, baked pasta, some of which are prepared for human consumption but not consumed for any reason.

According to Kirk (1996) waste management in hotel enterprises is carried out for four main reasons. These reasons are; arising from legal regulations and regulations, increasing the number of customers with environmental protection awareness, development of eco-tourism and business advantages arising from savings. For these reasons, the hotel management should be more careful about waste management. Because if a hotel stores waste in its source at random and then delivers it to the municipality in this way, there is a criminal sanction. This raises the cost of the hotel operation. In order not to be exposed to this situation, if the hotel management allocates waste from its source and implements waste management, it will fulfill its legal obligations and get rid of the costs of the punishment (Ramachandra, 2006: 4).

Every customer in the hotel creates about 1 kg daily waste (Pirani and Arafat, 2014: 320). Waste volume in hotel enterprises varies according to hotel type, guest characteristics, guest and employee activities and occupancy rate (Pirani and Arafat, 2014: 322). However, 80% of the waste generated by the well-implemented recycling program is recyclable (Hotels and Resorts, 2008). Each hotel has a different concept of waste management. For example, some of them collect only the waste that occurs at one point without separation, while others do the separation at the source to collect the materials that are suitable for recycling. Regardless of the size and operating system of a hotel enterprise, it is necessary to establish a system that effectively manages its waste to minimize costs (Owen et al., 2013: 2).

Recycleable waste is another type of waste from hotel enterprises. The separation and classification of hotel facilities for recycling plastic, metal, glass, paper and food solid wastes is of great importance for the protection of the natural environment. In order to achieve efficiency in recycling, the program must be developed and the participation of staff and customers must be ensured (Enz and Siguav, 1999: 74). For example, glass bottles from hotels' bars, waste paper from reception or old sheets are recycleable waste. Reuse of paper products in the reception or hotel management units, shampoo and other personal cleaning products in the bathroom to be presented in refillable and reusable stationary containers, all food and

beverage service equipment should be selected from durable products and in some cases products should be recycled when disposable products should be used (Cooper ETD, 2008: 363).

Trung and Kumar (2005) conduct a research with sample of 50 hotels operating in Vietnam in terms of energy, water consumption and waste formation issues. As a result of the research, they calculated the use of resources and efficient management of hotel enterprises. It has been determined that waste water management is one of the most important problems for hotels, that the waste water management system in hotels cannot be applied due to the high investment cost, therefore it is necessary to develop low cost waste water treatment systems. In another study, environmental management practices among different hotel categories were investigated by Mensah (2006) in Ghana's major Accra Region. Only 17.3% of hotels recycle their waste, 8% produce compost from food waste and 7.7% prefer recycled paper products in hotel advertising and information posters.

Molina-Azorin et al. (2009) is examined the relationship between environmental practices in Spanish hotel enterprises and company performances by using cluster analysis and regression analysis. According to the study, if hotels improve their environmental responsibilities, they provide sustainability by protecting the natural structure and resources of the place and increase their income by reducing the cost of environmental management applied by the hotels and increasing their performance levels. Kallbekken and Saelen (2013) observed a change in the amount of food waste by the use of two simple non-disturbing methods in hotel restaurants. These two simple methods are to reduce the size of the plate and to use social markings. When these methods were used, it was observed that the amount of food waste in the hotel decreased by about 20%. Singh et al. (2014) investigated what can be done to increase the role of hotel businesses in terms of recycling. The result is that the wastes from the hotel are recyclable.

The aim of the study is to make a systematic review of waste management studies in the tourism industry. In this context, the main question of the research is what is known about waste management in the tourism industry. Systematic review method was used in the research (Herdman, 2006). Systematic review can be defined as a method of gathering the information obtained when appropriate criteria are met on a given subject (Higgins & green, 2008). English articles published in Web of Science (sci-expanded, SSCI, a@HCI, CPCI-s, CPCI-SSH and ESCI) database were used in the research. It was determined that there was a total of 7611 articles related to the subject in the scanning with the keyword waste management. The path following the criteria for inclusion in the research is shown in Figure 1.

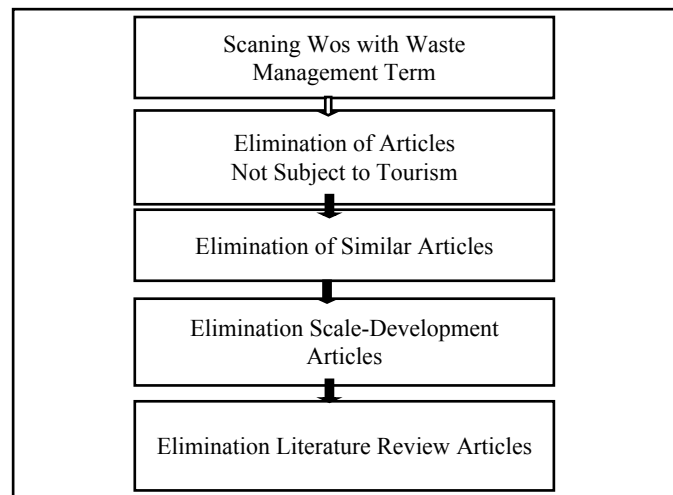


Figure 1 - Criteria For Inclusion In Research

Scale development studies and literature survey studies, which are not subject to the tourism industry, have been excluded. As a result, 15 studies were found and evaluated in accordance with the determined research criteria.

The studies included in the study were categorized according to the regions where the researches were conducted, sampling characteristics and methodology and other issues related with waste management in tourism industry.

When the research areas analyzed, it found that there are one study in Morocco, India, Mallorca, Cape Town, Hill Towns, Bahamas, Pennsylvania, Tanzania, Romania and Italy, Wales, Turkey, Welsh (Wales) and three studies in Vietnam region. As can be seen, the number of waste management researches in the tourism industry is very low.

The sample and method results about the researches are summarized in Table 1. Table 1 shows that the first study was conducted in 2003 and in recent years the studies on waste management in the tourism industry showed an upward trend. When the methods of the studies were examined, it was determined that 8 articles were used observation method, 6 articles were used questionnaires, 2 researches were used semi-structured interviews, 3 articles are case studies, 2 articles were used benchmark and 1 research was used application method. Therefore, it can be said that the studies on waste management in the tourism industry have examined the subject in several methods instead of using only one method.

Table 1 - Method and Sample Analysis of the Researches

Authors (s)	Method	Sampling
Kuniyal, J.C., Jain, A.P., Shannigrahi, A.S., 2003	Obsevation	For two years (a total of 113 days) observation was carried out in trekking stands.
Trung, D.M., Kumar, S., 2005	Questionnaire, Benchmark	Data has been collected from 50 hotels. Also compare hotels in Europe and Asia with Vietnam.
Radwan, H., Jones, E., Minoli, D., 2008	Semi-structured interview	Data were collected from 4 local managers and 3 private waste companies.
Kaseva, M.E., Moirana, J.L., 2009	Observation and Questionnaire	Data on the determination of waste loads and waste extraction procedures were collected on tourist routes.
Radwan, H.R.I., Jones, E., Minoli, D., 2012	Semi-structured interview	Data collected from the 18 hotel manager.
Alonso-Almeida, M.M., 2012	Interview	First of all, interviews were made with ten hotel managers, but in the study, interviews were made with three hotels administered by women.
Wyngaard, A.T., Lange, R., 2013	Case Study	A total of 50 surveys were distributed to 25 hotels. 25 questionnaires are given to food and beverage departments, 25 questionnaires are given to room division. Interviews were conducted with human resources department.
Singh, N., Cranage, D., Lee, S., 2014	Waste Management Application	Research used total of 5 hotels for waste management application.
Sealey, K.S., Smith, J., 2014	Benchmark	Waste and recycling were monitored for 10 months. Benchmarks were made between 7 kitchen departments.
Arbulu, I., Lozano, J., Rey-Maqueira, J., 2016	Case Study	Mallorca region has been researched.
Bashir, S., Subhrangsu, G., 2016	Interview	Data were collected from 60 households and hotels. Then the meeting was held with the tourists.
Bekiroğlu, S., Elmas, G.M., Yagshiyev, Y., 2017	Questionnaire	Data has been collected from 100 hotels in Istanbul.
Phu, S.T.P., Hoang, M.G., Fujiwara, T., 2018a	Interview	A total of 120 hotels were interviewed and data were collected.
Phu, S.T.P., Fujiwara, T., Dinh, P.V., Hoa, K.T., 2018b	Interview	300 households, 120 hotel managers, 50 restaurant managers and 17 recycling business owners were surveyed and face-to-face interviews were conducted.
Giurea, R., Precazzini, I.D.I., Ragazzi, M. et al., 2018	Case Study	Municipal waste management related to Romania and Italy tourism has been examined.

Compiled by the author.

Table 1 shows the following important issues related to the samples of the researches;

- 10 researches has obtained data from hotel enterprises,
- Studies that collect data from hotel enterprises have collected data through questionnaires, interviews and semi-structured interviews.,
- A study has been carried out by the on-site application method in the hotel business,
- A study was carried out with benchmark in 7 kitchen departments,
- A study compared Vietnam and Asian and European hotels in line with the results of the questionnaire,
- Case study method has examined the Mallorca, Romania and Italy destinations.



As shown in Table 1, researches examining waste management in the tourism industry are usually focused on hotel enterprises. Beside the hotel, there are limited work that collects data from local administrators and tourists. In recent years, it has been determined that there is a tendency to questionnaire and interview methods in the researches related to waste management.

Kunial et al (2003) stated that pollution in the region is increasing rapidly due to the lack of awareness among visitors and the lack of concrete government policies to manage waste in the trekking area with the increasing number of visitors in and around Sahib Valley. During their observation on trekking route, they observed that soft drinks bottles and disposable mineral water bottles were easily visible on the roads along the route. They stated that the trekking point looks like an ugly slum area. Because of the visitors, they expressed that in the evenings there were stacks of food waste in and around Lake Hempund, which ultimately could lead to risks for local communities, future visitors and natural environmental components.

Radwan et al (2008) in their study showed that the local government provides a recycling system with three different themes, offering cardboard, glass and mixed recycling bags for commercial enterprises. In addition, local government has prepared brochures to inform businesses about the importance of recycling and how to do it. As a result of semi-structured interviews with the public and private sectors, they found that the most important obstacle to recycling commercial wastes was cost. The private sector has stated that the most effective tools of directing the waste management sector towards sustainability are storage tax and legislation.

Kaseva and Moirana (2009) estimated that the total amount of waste produced in the study was between 87 tonnes in 2003 and 125 tonnes in 2006. They determined that the waste collection rate, which was 64% in 2003, increased to 94% in 2006. They suggested that this recovery was caught because of the waste collection system implemented in Kilimanjaro National Park Management. The study also found that the recyclable materials in total waste were about 34%.

Arbulu et al (2016) conducted case studie to determine the problems experienced in public-private partnerships in recycling systems in mature tourist destinations (Mallorca). In mass tourist destinations located in small geographic areas such as islands, land prices tend to be more expensive. Therefore, waste and recycling plant construction is biased in such destinations. In relation to recycling and energy recovery facilities, one drawback of the recycling facility system in Mallorca is that tourism is dependent on seasonality. Public-private partnerships are not considered in recycling systems as the facility will have an empty capacity in some seasons.

Giurea et al (2018) stated that the agro-tourism sector in Trentino, Italy has to comply with a regulation that states that the minimum percentage of products offered should be produced by the farm itself. The authors see this application as a way to reduce packaging waste in the region. The Italian and Romanian tourism regulations have also determined that waste can positively affect environmental protection through proper management of water and energy resources.

Trung and Kumar (2005) collected data to investigate resource utilization and management in Vietnam hotels in terms of energy, water and waste. Authors proposed that hotels can use green labeling and pilot projects to traine personnel and visitors for efficient resource use. As a result, the authors found that water consumption in Vietnam hotels was higher than in European hotels. Alonso-Almeida (2012) has shown that women managers are aware of water management as a result of their interviews in hotels.

Radwan et al (2012) found that the Welsh council government is largely dependent on storage to dispose of solid waste from small hotels that do not meet the Green Dragon Environmental standard. In contrast, small hotels that match the Green Dragon Environmental Standard have used waste as a last solution.

Wyngaard and Lange (2013) have determined that worm farms can reduce the amount of food waste in landfills as a result of their survey and interviews with hotels. This can be achieved by converting organic food waste into usable compost. The authors have shown that there is a relationship between the

application of eco initiatives to recycle water and food waste and the reduction of the amount of waste produced by a hotel.

Singha et al (2014) determined that 87%, 89% and 84% of the total waste disposed of by data collected from three hotels were recyclable, respectively. After three years of research, 212.16, 204.78 and 241.92 tons of waste are produced. However, because the real garbage is only 13%, 11% and 16%, these three hotels could save USD 12.920, USD 12.758 and USD 14.225, respectively. The remaining waste can be recycled and sold. The authors' analysis showed that a hotel could generate approximately USD 21,372 profit over a period of five years, after USD 43,200 of labor cost and USD 30,000 of extra spending.

Sealey and Smith (2014) identified some of the challenges and obstacles to solid waste reduction in the Bahamas through a year-long pilot project. These challenges are logistics and labor, economies of scale for island recycling, and finally training requirements. Successful solid waste management requires basic components of regulation, manufacturer accountability and consumer awareness.

Bashir and Subhrangsu (2016) showed that tourism industry is the main source of solid wastes in the Dehangam, especially in periods of religious tourism activities in the peak season. The authors found that local institutions had problems such as lack of capacity, lack of flat land in the region, unsuitable locations of land-related waste collection infrastructure. One of the important findings of the study is that there is a strong relationship between the non-scientific disposal of waste management and the degradation of the quality of surface waters and the emergence of water-borne diseases during the tourism season.

Bekiroğlu et al (2017) found that 70% of Istanbul hotel managers and employees were sensitive to waste paper recycling, but they were not aware of the benefits of waste paper recycling. In addition, because of waste paper recycling, 18 thousand trees, 3 thousand tons of water and 1.3 thousand tons of fuel were saved and 27 thousand tons of CO<sub>2</sub> production per year were prevented. In the last five years, hotels in Istanbul have an annual average of 752 tons of paper waste, which corresponds to 78% of the foreign trade deficit of Turkey's paper sector.

Phu vd (2018a) conducted a study to examine the recycling system in Hoi An. According to the results, Hoi An has a high potential to improve recycling. However, it has been determined that recyclable waste constitutes three-quarters of total waste and that the amount of waste is high. In addition, the rate of recycling was 62% for residential residents, 39% for hotel sectors and 56% for restaurants. Recycling mostly covers papers, plastics and metals and the recycling rate is 24%.

Phu et al (2018b) revealed that the waste production rate of hotels is 2.28 kg/guest per day and the hotel's capacity may vary depending on the price of the room and the restaurant level. Differences in waste production rates of hotels were statistically significant. The waste composition of hotels was 58.5% for biodegradable waste, 25.8% for recyclable products and 15.7% for others. As the capacity of hotels and the number of rooms increases, the recyclable waste rate decreases.

This systematic review is one of the first studies to combine waste management in the tourism industry with the data from the Web of Science database, identify waste management and recycling levels associated with hotels, and the benefits of waste management practices.

Although there are many studies on waste management in the Web of Science database (7611 papers), studies on waste management in the tourism industry (15 papers) are limited. Many of the studies conducted in the hotel were used questionnaire, interview and semi-structured interview technique to collect data (Trung and Kumar, 2005; Radwan et al, 2012; Wyngaard and Lange, 2013; Singha et al, 2014; Seeley and Smith, 2014; Bashir and Subhrangsu, 2016; Bekiroglu et al, 2017; Phu et al, 2018a; Phu et al, 2018b). Some studies have been carried out with the aim of cross-country benchmark (Giurea vd, 2018) in relation to tourism, some studies have been carried out with the aim of examining the applications of local governments in tourism regions (Radwan et al, 2008; Arbulu et al, 2016), some studies have been carried out with the aim of examining tourist routes (Kunial et al, 2003; Kaseva and Moirana, 2009).

Radwan et al (2008) revealed that the most important obstacle to recycling waste was the cost. In Kaseva and Moirana (2009) study, they determined that the total recyclable materials were approximately

34%; that the total waste volume revealed from Singha et al (2014) study was 87%, 89% and 84%, respectively from three hotels; and that the Phu et al (2018a) was 25.8% for recyclable products. According to Bekiroğlu et al (2017) hotels in Istanbul have an annual average of 752 tons of paper waste, corresponding to 78% of the foreign trade deficit of Turkey's paper sector in the last five years, and Singha et al (2014) has determined that only 13%, 11% and 16% of garbage is the real garbage, respectively in three hotels.

As a result of the research within the scope of systematic review, a large proportion of the waste of hotels was determined to be suitable for recycling. Therefore, it can be said that a large part of the wastes can be reuse if the sustainable and effective recycling policy to be applied in the hotel enterprises. Furthermore, it can be said that with the waste management policy, both savings and productivity will be increase in hotel enterprises.

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### **ТУРИЗМ ИНДУСТРИЯСЫНДАҒЫ ҚАЛДЫҚТАРДЫ БАСҚАРУ: ЖҮЙЕЛІ ШОЛУ**

**Аннотация:** Әлемдегі маңызды мәселелердің бірі қалдықтарды басқару және қайта өңдеу болып табылады. Қалдықтардан туындайтын қоршаған орта табиғи ресурстарының сарқылуын, экономикалық және әлеуметтік зиянын және ластануын ескерсек, қалдықтарды тиімді басқару және қайта өңдеу операциялық тиімділікке әсер етеді және кәсіпорынның тұрақты дамуы мен өнімділігінің артуын қамтамасыз ету үшін маңызды болып табылады.

Туризм индустриясын өз өнімдері мен қызметтері шеңберінде қалдықтарды басқару және қайта өңдеу бойынша табиғи зертхана ретінде қарастыруға болады. Соңғы жылдары қалдықтармен жұмыс істеу және қайта өңдеу бойынша зерттеулердің артуы байқалады, дегенмен де туризм индустриясын зерттеуде баяусыздық байқалады. Сондықтан зерттеудің негізгі мақсаты жүйелі шолу әдісін қолдана отырып, туризм индустриясындағы қалдықтарды басқару бойынша зерттеулерді қарау болып табылады. Осы мақсатта 1975 жылдан бастап Web of Science (WOS) базасында жарияланған 15 мақала қарастырылып сарапталды. Нәтижелер бағаланып, туризм саласын зерттеуге қатысты ұсыныстар берілді.

**Түйін сөздер:** қалдықтарды басқару, туризм, жүйелі шолу.

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### **УПРАВЛЕНИЕ ОТХОДАМИ В ИНДУСТРИИ ТУРИЗМА: СИСТЕМАТИЧЕСКИЙ ОБЗОР**

**Аннотация.** Одним из важных вопросов в мире является управление отходами и переработкой.

Принимая во внимание загрязнение, экономический и социальный ущерб, сокращение природных ресурсов, вызываемое отходами, эффективное управление и рециркуляция отходов оказывают влияние на операционную эффективность, а эффективное управление и рециркуляция отходов имеют важное значение для обеспечения устойчивого развития и производительности для предприятия.

Индустрия туризма может рассматриваться как естественная лаборатория для обращения с отходами и их переработки в рамках своих продуктов и услуг. В последние годы было отмечено, что замечается все больше исследований по управлению отходами и утилизации, тем не менее, существует ограниченное исследование индустрии туризма. Поэтому основной целью исследования является обзор исследований по управлению отходами в индустрии туризма с помощью метода систематического обзора. Для этой цели было исследовано 15 статей, опубликованных в Web of Science (WOS) с 1975 года. Результаты были оценены, и были даны предложения для будущих исследований в сфере туризма.

**Ключевые слова:** управление отходами, туризм, систематический обзор.

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