GREEN MANAGEMENT IMPLEMENTATION: A CASE OF THE BULGARIAN HOTEL MARKET

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Abstract: This research article focuses on the ecological operation of accommodation services in Bulgaria. The aim of this article is to evaluate the application of various green management elements and measures in selected hotels in Bulgaria, namely in the cities of Sofia and Varna. The research will pay attention to the implementation of individual green measures in hotel operations as well as a comparison between hotel categories and hotels in the two cities in terms of the application of green measures. Running an environmentally friendly hotel can have several positive effects. It significantly manifests itself in the area of marketing – it creates an image, has an effect on current and prospective guests, and defines the positioning of the hotel. It also impacts the economic and operational aspects, with ecological elements having the potential to reduce hotels' operating costs. The societal impact of running hotels in an environmentally friendly fashion lies in resource conservation and ensuring environmental sustainability. This research was carried out using mixed research methods, combining semi-structured interviews with hotel management staff in Varna (n = 90) and Sofia (n = 96). The total sample of participating hotels represented 81.6% of hotels in the two cities. The interviews were complemented with a questionnaire survey, which focused on the application of environmentally friendly solutions in hotel operations. In the data analysis stage, the methods of correspondence analysis, the ANOVA test and the Kruskal-Wallis test were used. The results suggest that the higher the hotel category, the stronger the trend to use environmentally friendly methods in running hotels. The research also found that there were differences between the level at which green measures were applied in hotel operations in the two cities. The research results are applicable in practice by national professional associations that support resource conservation and thus affect the entire hospitality industry.

Keywords: Hotel, green management, green elements and measures, environment, Bulgaria.

JEL Classification: L83, M14, Q56.

Introduction

Currently, at a time greatly impacted by the COVID-19 pandemic affecting not only tourism but also other areas of business, there is demand for modern and effective trends of increasing profitability and cost-effectiveness, especially considering the fact that revenues in tourism have dropped worldwide by 74%. There

is a noticeable pressure on cost reduction throughout society at this time. According to Sangeetha and Rebecca (2020), the green approach can, over the long term, reduce business operating costs while increasing the added value in society. Tourism represents 10% of global GDP and is also responsible for 5% of global CO_2 emissions, of which 1% is attributed to accommodation facilities. Accommodation facilities, particularly hotels, are the key element of tourism (Khatter et al., 2021). In this respect, sustainable hotel strategies are primarily intended for maintaining and improving the socio-economic and environmental balance of our planet (Migale et al., 2019). The Earth's energy resources are finite; therefore, resource conservation should become an important component of the green management of each accommodation facility (Tiwari et al., 2020). However, Sadom et al. (2021) point out that the problem of overconsumption in the hotel industry is caused mainly by the irresponsible consumer behavior of hotel guests.

The sustainability concept is known from the early '70s, particularly in connection with the cognizance that any uncontrolled growth, e.g., population, consumption, pollution, etc, is unsustainable in an environment of limited resources (Svidroňová, 2013; Marková et al., 2017). Sustainable development is a word that is being bandied more and more often in any industry. It is necessary to maintain a balance between fauna, flora, and population. This balance is threatened today by human activities and their impact on the environment: population growth, economic expansion, and consumer trends (Ben Rhouma, 2010). The latest trends in accommodation facilities in recent years have been the acceptance of sustainable development principles, environmental protection, and natural resource and energy conservation (Chen et al., 2018). These trends are seen mainly in large hotel chains, but small-capacity hotels and boarding houses are also trying to adopt the green way (Kim et al., 2016; Mbasera et al., 2016). The media often report on the green approach being in demand by organizations. Many hotel guests, particularly in Western Europe and the United States, are asking for products and services that do not pose a threat to the environment, or those that reduce their burden on the environment (Chen, 2015; Chung, 2016). In the Czech Republic, the voluntary integration of social

and environmental aspects into daily business operations and interactions with stakeholders is less used compared to Western Europe or the USA, but the situation is improving (Kraftová et al., 2011). Rodríguez et al. (2020) state that older hotel guests have a more pro-environmental behavior compared to younger guests. Environmentally friendly products and services have seen a great deal of success in response to the increased sensitivity of guests caused by concerns over the current state of the environment (Gupta et al., 2019). In their research, Moise et al. (2021) emphasize that it is important for hotels in developing countries to implement green measures in order to improve their image and increase the level of trust and satisfaction on the part of their guests, and also to maintain long-term relationships with their current and prospective guests. Gil-Soto et al. (2019) suggest that environmentally friendly advertising is currently widespread in the hotel industry and it is a known fact that it supports sustainable behavior and environmentally friendly consumption. The aim of this article is to evaluate the application of various green management elements and measures in selected hotels in Bulgaria, namely in the cities of Sofia and Varna. The research will pay attention to the implementation of individual green measures in hotel operations as well as a comparison between hotel categories and hotels in the two cities in terms of the application of green measures.

1. Theoretical Background

Environmental protection is currently a burning issue which draws a lot of attention and is discussed in all areas of life (Graci & Dodds, 2008; Petkova, 2017; Trejos, 2013). Dragomir (2013) states that environmental performance has always been the main point of research among all CSR dimensions. Understandably, because being green is in and partly because pollution levels and ratings (e.g., ROA, ROE) are more easily quantifiable and comparable than other social performance measures. The effort to minimize any negative effects on the environment is also manifested in the hotel industry, in the form of environmental management. The majority of accommodation facilities are beginning to be environmentally conscious and are aware that hotels and boarding houses should be more engaged in sustainable practices and thus contribute

to improving the environment at both the local and national level (Tran, 2009). The construction of new accommodation facilities results in the reduction of living space for local fauna and flora; therefore, it is important to take the environmental approach to mitigate the negative impacts on the environment (Kalábová & Abrhám, 2016). The future of the hospitality industry is built upon green and socially responsible principles (Tran, 2009). A well-preserved environment seems to be the best option to ensure a good feeling for any stakeholder, particularly holidaymakers. That is why it is important to make sure that running a business involves environmentally friendly processes and thus contributes to a better result for this entire branch of the economy without posing a threat to profitability and financial reliability (Dani et al., 2021). Environmental management (aka green management) refers to a philosophy, technology and methodology of organization management aimed at optimizing the effect of its operation on the environment. Its principal goals are economical use of materials, energy and other resources, economical processes and the reduction of factors posing a burden for the environment. Last but not least, one of the advantages is competitive differentiation. To run an environmentally friendly hotel does not require the relevant certification and a large initial investment. The problem arises when defining the terms green management and green hotel. Many small and medium-sized accommodation facilities have no idea what the term green management means, as they often apply elements of it and are not aware of it. A guest can choose between two types of accommodation facilities that focus on applying green management steps. The first type is accommodation facilities that have met the demanding criteria for environmental certification with their operation and subsequently obtained it. The second group of accommodation facilities consists of environmentally active and environmentally friendly buildings which apply countless elements of green management but do not have an environmental certificate due to financial indisposition (Belešová, 2014). It means that a hotel does not necessarily have to be certified to be environmentally active and help improve the quality of the environment in its surroundings. These activities can increase guests' awareness of green management

and thus generally increase the demand for environmental elements in accommodation facilities. On the other hand, the laws or regulations of most countries do not have a legal or a universally accepted definition of what is a 'green hotel or eco-friendly hotel'. It means that the practice of using 'green or eco-friendly' as a marketing ploy is still widespread in many cities and towns around the world. Many hotel managers claim that they are 'green or environmentally friendly' by simply hanging a sign and declaring themselves to be green (Pizam, 2009). In their study, Sangeetha and Rebecca (2020) verified that over the long-term hotels applying environmentally sustainable principles reduce costs and improve the rate of return on their investments. Omune et al. (2021) note that the government should provide financial support for hotels in implementing costly environmental measures.

A number of environmental measures are aimed at reducing the consumption of energy (Ali et al., 2008; Chan & Lam, 2003; Khemiri & Hassairi, 2005; Wan et al., 2017), water (Deng & Burnett, 2002; Gössling et al., 2015; Reddy & Wilkes, 2015), chemicals, office supplies, reducing waste production, increasing the share of natural materials, environmental aesthetics, reducing noise and other emissions, etc (Bohdanowicz, 2005; Chan & Lam, 2001; Chen & Hsieh, 2011; Hillary, 2004; Mensah, 2006; Patúš & Gúčik, 2005; Wie & Shanklin, 2001). Accommodation facilities proceed differently in choosing cost-saving measures. Some make their decision based on what is currently most urgent, others choose measures that deliver the largest savings at the lowest costs (Tab. 1).

Environmental responsibility takes on many different forms, including energy management or recycling procedures, switching off lights, monitoring the use of air-conditioning units, and waste recycling (Bansal & Roth, 2000). In the procurement of raw materials and products, accommodation facilities should prefer regional products and specialties, try to support the local infrastructure, ensure continual training of their staff regarding the use of new technologies, and keep to the principles of environmental management. In a friendly fashion, they should also raise their guests' environmental awareness. Also necessary are sorting waste and reusing recycled materials. Hotel waste management can help reduce the volume of municipal waste generated by the hotel,

Tab. 1:	Examples of environmental management elements
Economic and social activities	- purchasing commodities and products within the region; - supporting local infrastructure; - utilizing public transport and bikes; - employing local residents, etc.
Communication and raising employees' and guests' awareness	- a steady plan for staff training in working with new technologies; - setting work procedures and checking their implementation; - promoting a public environmental program; - gently promoting the observance of green principles even by guests, etc.
Management	- implementing EMAS, EN ISO 14 001 standards; - purchasing in bulk; - giving priority to 'eco-friendly' products; - purchasing quality and truly needed products; - purchasing products from regional suppliers; - measuring customer satisfaction, etc.
Waste management	- sorting waste at the accommodation facility; - recycling bins for plastic, paper, etc, in hotel rooms; - multiple reuse of recyclable materials, - composting organic waste, etc.
Energy conservation	- geothermal energy and waste heat utilization, - heating and air-conditioning control; - compact fluorescent lamps and LED light bulbs; - at a minimum Class A energy-efficient appliances (A+, A++, A+++); - energy-saving technologies; - thermal insulation of buildings, etc.
Water conservation	- installing single lever taps and faucet aerators; - installing water-saving shower heads; - dual-flush toilets; - utilizing gray water; - rain water catchment, etc.

Source: own

conserve raw materials and natural resources, energy and financial means. The basic prerequisite for waste reduction and its efficient use is sorting. Waste is sorted based on the type of material into metal, paper, glass, plastic, bio-waste and used oil (Patúš & Gúčik, 2005). Despite numerous environmental practices, for example, in housekeeping, some measures do not necessarily make as big a difference as expected, but certain practices may present an excessive burden on housekeeping staff (Choy et al., 2021). As the prevention or reduction of food waste is one of the priorities in the process of waste reduction, specific recommendations should be made in the hotel and hospitality industries. According to the European Commission, some 88 million tons of food worth EUR 143 billion is estimated to be thrown away annually. Restaurants in Europe generate approximately 12% of the total amount of food wasted, producing over 10 million tons of food waste annually. This is more than EUR 17 billion worth of food per year (Ratinger et al., 2020). Food supply management should meet suitable food storage conditions and the food consumption dynamic should be monitored. Facilities should also keep records of the volume and types of food waste generated (Priefer et al., 2016). Meal portions should also be held in check. Catering facilities should process foodstuffs based on food standards, efficiently and without waste. Portion sizes need to be reduced, especially for those types of food that make up the largest part of food waste. This fact was confirmed, for example, in a study focused on food waste in buffet-type catering. The study proved that more food was wasted at dinner buffets than at breakfast buffets, with

more food left uneaten on customers' plates at dinnertime (Juvan et al., 2021). Last but not least, establishments should also raise their guests' awareness of the negative effects of wasting food (Betz et al., 2015; Engström & Carlsson-Kanyama, 2004; Pirani & Arafat, 2016). Some hotels and restaurants encourage guests to take their uneaten food home with them to be consumed at a later time (Zuraikat et al., 2018). There should also be processes put in place to ensure the rational use of leftovers to minimize waste production, i.e., prepare and sort leftovers for hotel staff, donate soup and other types of food to institutions, etc (Awasthi et al., 2018).

2. Research Methodology

The aim of this article is to evaluate the application of green management elements and measures in selected hotels in Bulgaria and to compare hotel categories and the cities of Sofia and Varna. In connection with the research goal, the following research questions were posed: *What kinds of green management measures are most frequently applied in the surveyed hotels in Bulgaria? Are there any connections between a hotel's category and the application of environmental measures? Are there any differences between the level of usage of environmental measures between the cities of Sofia and Varna?*

Based on literature research, we formulated two hypotheses as well as alternative hypotheses for which we supposed that the individual measures are essentially the same in terms of their importance for ecology.

$H1_0$: *Environmental measures are used the same way in all hotel categories.*

$H1_A$: *Non $H1_0$.*

$H2_0$: *The usage of environmental measures is identical in Varna and Sofia.*

$H2_A$: *Non $H2_0$.*

We focused on accommodation facilities, specifically on hotels in major cities, i.e., Sofia and Varna. The total number of hotels in Sofia was 108 and 89% of the hotels participated in the survey. In Varna, the total number of hotels was 120 and we successfully communicated with 80% of them.

The data were collected using mixed research, especially qualitative semi-structured interviews with members of top management and a questionnaire survey. The interviews were conducted between May and June 2018. Additional information was acquired by way of a questionnaire survey by email or telephone. The questionnaire consisted of twelve questions. The first five questions were of a general nature and served the purpose of identifying the respondent, i.e., the accommodation facility – division of hotels into appropriate categories, etc (Tiwari et al., 2020; Yoon et al., 2021). Other questions were focused on the usage of green management. An important question was whether the particular hotel had a green management concept in place at all (Rawashdeh & Al-Ababneh, 2021; Tourkolias et al., 2020). Another section of the questionnaire dealt with individual green management measures and elements (Moise et al., 2021; Sangeetha & Rebecca, 2020; Švec et al., 2021). The questions were formulated in such a way so that respondents could choose from several options. The questionnaire also inquired whether hotels found the implementation of green management an advantage and whether they will strive to gain a green management certificate. Finally, the questionnaire posed questions about the different ways in which guests are informed about the hotel's green activities. All the participants remained informed concerning the research and privacy of the questionnaire. The participants were willing to participate in the research and had the chance to contact the questioner via the email address stated on the survey list and inquire about the research results.

In this research, we used mathematical and statistical methods, Analysis of variance (ANOVA) and the Kruskal-Wallis test, Correspondence Analysis (CA) and the method of generalization. For evaluating the results, the Statistica 13 EN Program and R software were used. Using this CA, it is feasible to describe a relationship of nominal or ordinal variables and to obtain a graphic description of a relationship in multidimensional space – for the readers, it is easier to understand. The analysis gives further indication that correlations exist among variables.

Correspondence analysis is a multivariate statistical technique. It is conceptually like principal component evaluation but applies to categorical rather than continuous data. In a similar approach to principal component evaluation, it provides a means of displaying or reviewing a set of data in a two-dimensional graphical form (Zámková & Prokop, 2014).

All data must be non-negative and on the same scale for CA to be relevant, and the method treats rows and columns equivalently. It is usually applied to contingency tables. CA decomposes the chi-squared d statistic related with this table into orthogonal factors. The distance between single points is defined as a chi-squared d distance. The distance between the i-th and i'-th row is given by the formula:

$$D(i, i') = \sqrt{\sum_{j=1}^{c} \frac{(r_{ij} - r_{i'j})^2}{c_j}} \quad (1)$$

where r_{ij} represent components in the matrix R and loads c_j represent loading vector cT, that is equal to the centroid (mean column profile) in multidimensional space. The similarity between columns j and j' corresponds to the components of the vector r and the sum considering all rows. We perceive a relation between two categorical variables. With the introduction of axes of the reduced coordinates system, both variables of single categories are displayed in graphic form. The goal of this analysis is to diminish the multidimensional space of column and row profiles and save original data information as far as possible. Each correspondence of row and column in the table can be shown in r-dimensional (c-dimensional) space with values of profiles equal to the coordinates. Each axis and the column and row coordinates are scaled to present the principal inertia along that axis: these are the main column and row coordinates (Hebák et al., 2007).

For the correspondence analysis model, the dispersion of points is defined as total inertia. This comes from mechanics, as the term defined the sum of the product mass and square distances from the centroid, considering all the object's particles. Inertia communicates the level of dispersion of points in a multidimensional space, and in geometric terms it seems like statistical modeling. The total inertia (I) corresponds to the weighted average (weights p_{i+}) chi-squared d of the row profiles distance from their mean/average (vector c) (Beh & Lombardo, 2014; Greenacre, 2007; Hebák et al., 2007):

$$I = \sum_{i=1}^{r} p_{i+}(r_i - c)^T D_c^{-1}(r_i - c) \quad (2)$$

Something similar occurs as the weighted average (weights p_{+j}) chi-squared of the distance of the column describes from their average (vector r):

$$I = \sum_{j=1}^{c} p_{+j}(c_j - r)^T D_r^{-1}(c_j - c) \quad (3)$$

The total inertia represents a significant part of the original table, typically described by the first several axes. This way is usually enough for the result of the correspondence analysis represented in the first two or three ordinal axes' space. Total inertia equates the sum of the eigenvalues of the matrix. Thus, it is feasible to specify how many ordinal axes it is acceptable to explain. So the option can be adopted in two ways. 1) We explain the ordinal axes whose eigenvalue is above-average. 2) We put a maximum value (e.g. 80%) and decide how several axes have a cumulative inertia higher than the set limit value. The impacts of the row points to the inertia in the corresponding dimension are defined by the quotient:

$$\frac{r_i f^2_{ik}}{\lambda_{(k)}} \quad (4)$$

where f_{ik} communicates the elements of the matrix F, r_i elements of the row loadings vector and $\lambda_{(k)}$ is inertia articulated by the k-th dimension. An impact of the row points to inertia expresses the comparative degree of the effect of the given category on the final orientation of the main axes. In a comparable point of view, the impacts of column point to inertia are exposed in the corresponding dimension:

$$\frac{c_j g^2_{jk}}{\lambda_{(k)}} \quad (5)$$

We may determine the total row inertia, for each row type, defined as:

$$\sum_{n=1} r_j f^2_{jk} \quad (6)$$

For column categories, the total column inertia is similarly characterized as:

$$\sum_{k} c_j g^2_{jk} \quad (7)$$

The inertia's values for single columns and rows give us a perception of the diverse categories on the resulting ordination (Beh & Lombardo, 2014; Greenacre, 2007; Hebák et

al., 2007). The values of inertia for individual columns and rows give us an indication of the significance of the various categories on the resulting ordination (Beh & Lombardo, 2014; Greenacre, 2007; Hebák et al., 2007).

3. Research Results

With an area of 492 square kilometers, Sofia is the largest city as well as the capital city of Bulgaria. Its population of 1.33 million makes up almost one-fifth (18.6%) of the Bulgarian population. Sofia is also the most visited tourist destination in Bulgaria, apart from the seaside and mountain resorts. Sofia offers a total of 485 accommodation facilities, of which 108 are hotels. Varna, with a population of approx. 369 thousand, is the third largest city in Bulgaria. With an area of 205 square kilometers, the city is situated on the shores of the Black Sea and is the largest port in Bulgaria. Varna offers a total of 1,073

Tab. 2: Selection and basic sample

Sofia	Selection sample (n = 96)	Basic sample (n = 108)	Willingness to respond (%)
Tourist	2	3	66.67
Economy	7	9	77.78
Standard	40	43	93.02
First Class	39	42	92.86
Luxury	8	11	72.73
Varna	**Selection sample (n = 90)**	**Basic sample (n = 120)**	**Willingness to respond (%)**
Tourist	9	12	75.00
Economy	26	44	59.10
Standard	39	47	82.98
First Class	13	14	92.86
Luxury	3	3	100.00

Source: own

Fig. 1: Surveyed hotels and the most frequent number of rooms in each class
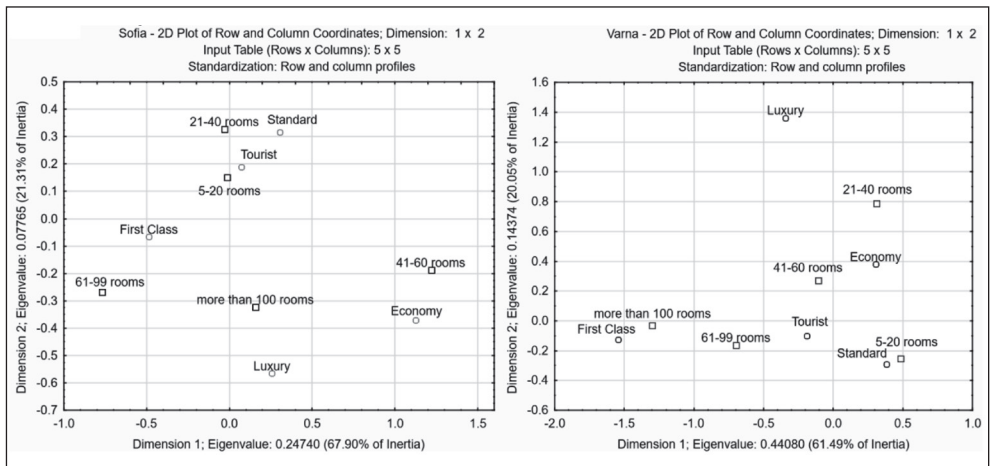
Source: own

accommodation facilities, of which 120 are hotels. The sample of hotels addressed as part of the survey is shown in Tab. 2.

The research focused solely on hotels. In Sofia, the surveyed hotels in the Tourist category most often had a capacity of 5–20 hotel rooms. In the Economy category, it was 41–60 hotel rooms, Standard category hotels offered 21–40 rooms, First Class hotels offered 61–99 rooms and Luxury category hotels usually offered over 100 rooms. The situation in Varna differed. There were most commonly 61–99 rooms in Tourist category hotels, 41–60 rooms in Economy hotels, 5–20 rooms in Standard category hotels, over 100 rooms in First Class hotels, and 21–40 rooms in Luxury category hotels (Fig. 1).

In terms of an overall assessment of the two cities, the surveyed hotels in Sofia most frequently applied green elements aimed at energy conservation (85.42%), sorting waste (57.29%), and water conservation (50%). Close to half of the hotels (47.92%) reduced their consumption of chemicals and more than a third of the hotels (35.42%) focused on communication and raising awareness among their hotel staff and guests regarding green management. Only 2.08% of the hotels in Sofia did not apply any of the aforementioned green elements.

Accommodation facilities are a major source of environmental pollution. 90.63% of the hotels agreed with the statement that accommodation facilities can contribute to improving the quality of the environment in the region. Just over a seventh of the surveyed hotels (14.58%) had a green management concept in place, although most hotels realized that the application of green management can bring benefits to the accommodation facility itself. Such benefits most importantly included reducing costs (68.75%) and advertising and promotion (57.29%). More than one-third of the hotels (38.54%) saw an advantage in the preference of guests who search for accommodation facilities that are environmentally friendly. More than one-fifth of the hotels (21.86%) stated that applying green management principles can bring a competitive advantage over other accommodation facilities, and the same percentage value (21.86%) applies to the advantage in the form of an increase in revenue. More than one-tenth of the hotels (11.46%) did not see any advantages in implementing green management.

More than one-fourth of the hotels (28.13%) sought to get an environmental certificate. More than two-thirds of the hotels (68.89%) stated they did not know of any environmental certificates in the service area. The rest of the surveyed hotels (31.11%) recognized the national environmental certificate 'environmentally-friendly product' and the European Union's ecolabel – Flower (44.44%). Almost one-fifth of the hotels (18.52%) recognized the LEED ecolabel (Leadership in Energy and Environmental Design), and the BREEM (British Research Establishment's Environmental Assessment) and Green Key ecolabels were both marked as familiar by 14.81% of the hotels.

Most of the Tourist category hotels in Sofia did not apply any elements of green management. The most frequently used green management element in Economy category hotels was energy conservation, which also applied to hotels in the First Class category. The highest number of hotels in the Standard category reduced their water consumption and in terms of waste sorting the hotels achieved satisfactory results. The Luxury category hotels excelled in elements regarding reducing the use of chemicals and also in the communication with and training of hotel staff and guests.

Hotels in Varna most frequently sorted their waste (84.44%), tried to reduce water consumption (67.78%) and energy consumption (60.00%). Just under one-fifth of the hotels in Varna (18.89%) trained and communicated with hotel staff and guests to raise awareness of green management. In terms of reducing the consumption of chemicals, this element was applied by only 8.89% of the hotels. An interesting discovery was the fact that 5.56% of the hotels did not apply any of the elements mentioned above.

More than three-quarters of the hotels (86.67%) were convinced that accommodation facilities can make a difference in environmental protection in the region while only 5.56% of the hotels had a green management concept in place. Despite this fact, the majority of the hotels saw several advantages in applying green management. More than half of the hotels (58.89%) marked cost reduction, which was followed by increased revenue (22.22%) and advertising and promotion (16.67%). Gaining a competitive advantage over other hotels was marked by 13.33% of the hotels

and only 4.44% of the hotels believed that hotel guests prefer accommodation facilities which actively apply green management. More than one-tenth of the hotels (12.22%), the same as in Sofia, did not see any advantage in applying green management.

Unlike in Sofia, none of the surveyed hotels in Varna strived to get an environmental certificate. Almost two-thirds of the hotels (63.33%) did not know of any environmental certificates. The hotels that did recognize environmental certificates marked the Bulgarian ecolabel (66.67%) and the EU's ecolabel (63.64%). Their knowledge of the ecolabels LEED (9.09%) and Green Key (6.06%) was only marginal. However, according to the ec.europa.eu website, there are no accommodation facilities in Bulgaria that could boast the European Union's ecolabel (The Flower). In the structured interviews, researchers discovered that environmental certification is financially demanding for hotels and guests do not sufficiently appreciate staying at a hotel awarded with an environmental certificate. On the other hand, most hotels in Varna had applied, are now applying and in the future intend to apply some elements of green management even without the possession of an environmental certificate.

The surveyed hotels in Varna achieved similar results in the area of green management to those in Sofia; however, there were some differences. Only a very small number of hotels in the Tourist category applied some elements of green management. The largest number of hotels in the Economy category applied waste sorting. The element concerning water conservation was most frequently used by hotels in the Standard category and the element of energy conservation was most often seen in First Class hotels. Hotels in the Luxury category mainly engaged in the conservation of chemicals and also in communication with and training of hotel staff and guests (Fig. 2).

As for the individual measures in both surveyed cities, it can be said that Varna achieved better results in terms of the application of green measures than Sofia (Tab. 3, 4). The surveyed Tourist category hotels in Sofia only applied two measures; 66.67% of them used recycling containers and dual-flush 33.33% dual-flush toilets. The Economy category fared noticeably better compared to the previous category. The largest number of hotels promoted the use of compact fluorescent lamps and LED light bulbs (71.42%), while energy-saving appliances were used by 57.14%. What is interesting, though, is the fact that hotels in the Economy category achieved worse results in terms of sorting waste (42.86%) and the use of dual-flush toilets (28.57%). Surprising was the discovery that 14.28% of hotels inform their guests about their

Fig. 2:	Surveyed hotels and the most frequent number of green elements in each class
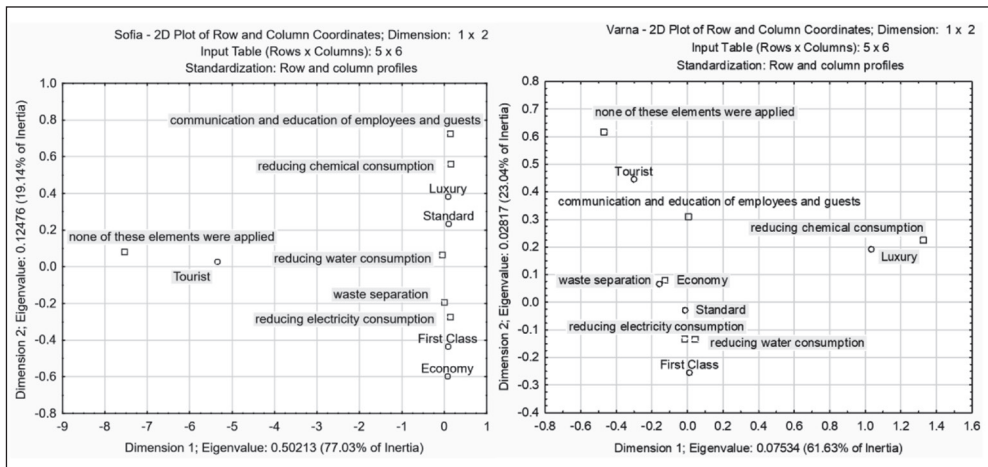
Source: own

environmental endeavors, but none of them train their staff in this philosophy or use recycled paper. The surveyed hotels in the Standard category achieved very good results in the use of compact fluorescent lamps and LED light bulbs (92.5%), replacing bed linen and towels on request (65%), central light switches in hotel rooms (62.5%), and minimizing the use of single-serve disposable packaging for products such as butter, jam, shampoo, shower gels, etc. (62.5%). The latter measure enjoyed the best result in the Standard category, as hotels in the Tourist and Economy categories did not apply this measure at all and the results in First Class and Luxury hotels did not even come close (38.46% and 25% respectively). On the other hand, hotels in the Standard category achieved worse results in comparison with the Tourist category in terms of sorting waste (55% vs. 66.67%) and the use of dual-flush toilets (27.5% vs. 33.33%). All of the surveyed hotels in the First Class category used compact fluorescent lamps and LED light bulbs and all of them

informed their guests about their environmental efforts, used energy-saving appliances (79.49%), thermally insulated windows (74.36%), central light switches in hotel rooms (71.79%), etc. None of the hotels separated bio-waste, which also applied to the Tourist and Economy categories. Almost all hotels in the Luxury category achieved better results (apart from energy-saving efficient appliances and minimizing single-serve disposable packaging). All the hotels used compact fluorescent lamps and LED light bulbs, central light switches in hotel rooms and recycled paper, and informed their guests about their environmental efforts. Very good results were achieved in terms of the thermal insulation of windows (87.5%), separate heating control for each room (75%) and the use of environmentally friendly cleaning products and laundry detergents (75%). High scores were achieved in measures concerning sorting waste (87.5%) and replacing bed linen and towels on request (87.5%). However, we believe that these measures should be

Tab. 3: **The application of green elements in Sofia (%)**

Environmental measures in Sofia	Tourist	Economy	Standard	First Class	Luxury
Sorting containers	66.67	42.86	55.00	56.41	87.50
Sorting bio-waste	0.00	0.00	7.50	0.00	37.50
Windows thermal insulation	0.00	0.00	57.50	74.36	87.50
Heating control in each room individually	0.00	14.28	55.00	53.85	75.00
Energy-saving appliances	0.00	57.14	35.00	79.49	62.50
Compact fluorescent lamps and LED lamps	0.00	71.42	92.50	100.00	100.00
Central lighting switches in rooms	0.00	28.57	62.50	71.79	100.00
Using recycled paper	0.00	0.00	30.00	56.41	100.00
Reducing the water flow of faucet aerators or shower heads	0.00	0.00	7.50	28.21	62.50
Dual-flush toilets	33.33	28.57	27.50	56.41	62.50
Changing linen and towels on request	0.00	14.28	65.00	62.23	87.50
Cleaning products and laundry detergents friendly to the environment	0.00	14.28	15.00	53.85	75.00
Minimizing the use of disposable products	0.00	0.00	62.50	38.46	25.00
Giving priority to products with the 'eco' label	0.00	0.00	10.00	17.95	37.50
Educating employees in green management	0.00	0.00	2.50	53.85	62.50
Informing guests about environmental efforts	0.00	14.28	2.50	100.00	100.00

Source: own

automatically used at each accommodation facility and should achieve much better results (Tab. 3).

The surveyed hotels in the Tourist category in Varna achieved satisfactory results in sorting waste (77.78%), while the results pertaining to other measures were below-average. Worth mentioning is the use of compact fluorescent lamps and LED light bulbs and dual-flush toilets. It is worth noting that compared to the same category hotels in Sofia, the results achieved by the Varna hotels in this category were much stronger. Hotels in the Economy category applied measures regarding waste sorting the most (80.77%), which was followed by replacing bed linen and towels on request (57.69%), the use of dual-flush toilets (57.69%) and recycled paper. However, almost half of the surveyed measures (43.75%) delivered insufficient values compared to the Tourist category. These measures included thermal insulation of windows, separate heating control for each room, reducing the water flow rate by using faucet aerators or low-flow showerheads, training staff in environmental management, informing guests about the facility's environmental efforts, the use of compact fluorescent lamps and LED light bulbs, and also the use of central light switches in hotel rooms. Hotels in the Standard category achieved better results with respect to all measures compared to the Economy category. Again, hotels focused the most on sorting waste (84.62%), which was followed by the replacement of bed linen and towels on request (79.49%), the use of dual-flush toilets (66.67%) and compact fluorescent lamps and LED light bulbs (58.97%). A major increase (compared to the Economy category) was seen in measures regarding water conservation through the use of faucet aerators and low-flow showerheads (56.41% vs. 7.69%) and the use of energy-saving appliances (51.28% vs. 11.54%). In terms of the use of faucet aerators and low-flow showerheads, the achieved results were not significantly great in either the First Class category (46.15%) or the Luxury category (66.67%). This measure was adopted on a smaller scale in hotels in Sofia, with Tourist and Economy hotels not having adopted it at all. This fact was somewhat of a surprise in the research findings, as the researchers had expected better results. The flow rate of a faucet aerator is reduced to 6 liters per minute, while a regular faucet without the low-flow attachment is set to between 12–15 liters per minute. Moreover, efficient aerators can in various ways reduce the flow rate to as low as 1 liter of water per minute, while not compromising on the strength of the stream. The investment in an efficient aerator and low-flow showerhead is approx. EUR 20 and if a double room is used at least 180 days of the year, the water savings can amount to approx. 5,000 liters of water, which translates into a minimum of EUR 25. The results of the structured interviews suggest that several hotel managers had removed faucet aerators or low-flow showerheads for reasons pertaining to their guests' comfort and based on their demand for a strong water flow from both the bathroom sink faucet and the showerhead. First Class hotels achieved the best results in waste sorting and the use of dual-flush toilets (both 92.31%), the use of compact fluorescent lamps and LED light bulbs and recycled paper (61.54%). All the surveyed hotels in the Luxury category applied measures of sorting waste and bio-waste, separate heating control for each room, energy-saving appliances, compact fluorescent lamps and LED light bulbs, the use of recycled paper, dual-flush toilets and the replacement of bed linen and towels on request. However, it needs to be noted that there are only three hotels in this category in Varna and it cannot be ruled out that with a higher number of hotels in this category the results might have been different. A major increase (compared to the Economy and Standard category hotels) was seen in the use of environmentally friendly cleaning products and laundry detergents (both 7.69% vs. both 66.67%). More detailed information is shown in Tab. 4.

Hotels in Sofia and Varna achieved adequate results with respect to the individual measures. For statistical verification purposes, we considered all the green measures to be of identical overall significance, i.e., the more green measures a hotel used, the more environmentally friendly it is. We focused on the various categories in Sofia and Varna and subsequently carried out an overall assessment separately for each city (Fig. 3, Tab. 5). For verification, we used ANOVA tests and the Kruskal-Wallis test (to verify median agreement). As the results were virtually identical, we present only the results of the ANOVA test in this research paper. The established p-value (p = 3.2682e-16) is

Tab. 4: The application of green elements in Varna (%)

| Environmental measures in Varna	Tourist	Economy	Standard	First Class	Luxury
Sorting containers	77.78	80.77	84.62	92.31	100.00
Sorting bio-waste	11.11	0.00	17.95	23.08	100.00
Windows thermal insulation	11.11	7.69	15.38	38.46	33.33
Heating control in each room individually	22.22	3.85	23.08	53.85	100.00
Energy-saving appliances	11.11	11.54	51.28	53.85	100.00
Compact fluorescent lamps and LED lamps	33.33	23.08	58.97	76.92	100.00
Central lighting switches in rooms	22.22	3.85	17.95	30.77	33.33
Using recycled paper	0.00	46.15	51.28	61.54	100.00
Reducing the water flow of faucet aerators or shower heads	11.11	7.69	56.41	46.15	66.67
Dual-flush toilets	33.33	57.69	66.67	92.31	100.00
Changing linen and towels on request	11.11	57.69	79.49	38.46	100.00
Cleaning products and laundry detergents friendly to the environment	0.00	0.00	7.69	7.69	66.67
Minimizing the use of disposable products	0.00	0.00	7.69	7.69	66.67
Giving priority to products with the 'eco' label	0.00	0.00	5.13	0.00	33.33
Educating employees in green management	11.11	3.85	15.38	15.38	33.33
Informing guests about environmental efforts	11.11	3.85	17.95	23.08	33.33

Source: own

lower than the selected value, therefore, at the significance level of 5% we reject *H0*. The overlapping means (Fig. 3) indicate identical results, i.e., */** hotels in Sofia applied the same environmental measures as they did in Varna, and similar measures to those adopted by Standard category hotels (***) in Sofia and Varna. This implies that there are differences between the application of environmental measures depending on the particular hotel category. Higher standard hotels are more likely to adopt environmental measures. Using the ANOVA test, we also tested the alternative hypothesis that the number of individual measures applied by the surveyed hotels in Sofia and Varna was the same. The established p-value (p = 3.4099e-05) is lower than the selected value, therefore, at the significance level of 5% we reject this hypothesis and it can be stated that there is a variance between the application of environmental measures between the two cities. This difference can be caused by the fact that in Sofia there are more higher-class hotels that apply more environmental measures.

4. Discussion

As indicated by the research results, the worst values in both cities were achieved by Tourist and Economy class hotels, which in terms of most of the surveyed measures saw significantly unsatisfactory results. On the other hand, it needs to be noted that in line with global trends in tourism, both Sofia and Varna are investing in their accommodation facilities with respect to the sustainable development of hotels. In general, we recommend that more resources be invested in faucet aerators and low-flow showerheads and recycling bins. When it comes to the procurement of raw materials and products, hotels should prefer regional products and specialties, try to support the local infrastructure, enable continual training of staff in working with new

Fig. 3: Comparison of means in Sofia and Varna individually and generally
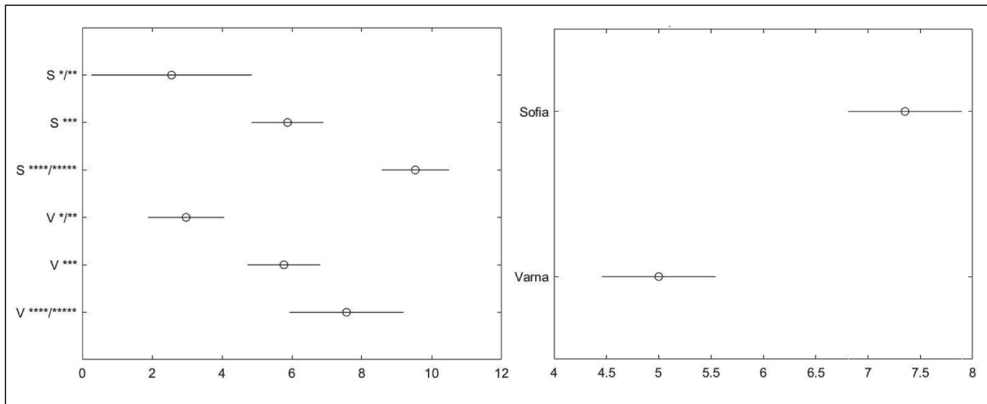
Source: own

Tab. 5: Comparison of means in Sofia and Varna

Var. source	The sum of sq. due to each source	Degrees of freedom associated with each source	The mean sq. for each source, which is the ratio SS/df	Chi-squared statistic	P-value
Hotel classification class					
Var. between groups	1,047.2665	5	209.4533	20.5556	3.2682e-16
Var. within groups	1,834.1310	180	10.1896		
Total variability	2,881.3978	185			

Number of observations in each group: [9; 40; 47; 35; 39; 16]
Est. values of the means: [2.5556; 5.8750; 9.5319; 2.9714; 5.7692; 7.5625]
Error (within-groups) degrees of freedom: 180
Square root of the mean squared error: 3.1921

Var. source	The sum of sq. due to each source	Degrees of freedom associated with each source	The mean sq. for each source, which is the ratio SS/df	Chi-squared statistic	P-value
Varna vs. Sofia					
Var. between groups	257.4395	1	257.4395	18.0524	3.4099e-05
Var. within groups	2,623.9583	184	14.2606		
Total variability	2,881.3978	185			

Number of observations in each group: [96; 90]
Est. values of the means: [7.3542; 5.0000]
Error (within-groups) degrees of freedom: 184
Square root of the mean squared error: 3.7763

Source: own

technologies, and follow green management measures. In a friendly fashion, they should also try to raise their guests' environmental awareness. These recommendations mostly apply to hotels in lower categories; however, there is always room for improvement. However, Gil-Soto et al. (2019) claim that communicating environmentally friendly procedures on social media does not improve their perception in hotel guests. Also necessary is waste sorting

and reusing recycled materials. It also needs to be noted that some managers stated during the structured interviews that they were not interested in sorting waste and bio-waste. These were mainly from independent hotels rather than hotel chains (Marriott, Hilton, etc). Pham Phu et al. (2018) claim in their research that 72% of hotel managers in the tourist city of Hoi An in Central Vietnam disliked storing waste, and 58% of hotels felt they lacked information and skills in the area of recycling. Some hotel managers explained that recycling requires more time and work (42% and 22%) and is unsanitary (18%). This is a surprising discovery, as each state has a law in place regarding waste sorting, yet many hotels do not engage in waste sorting or recycling at all. We agree that the aforementioned accommodation facilities should definitely invest in environmental initiatives (Chan & Lam, 2003; Bohdanowicz, 2005; Ready & Wilkes, 2015). The research suggests that there is still insufficient motivation to fully implement sustainability procedures. This may be caused by the insufficient education of managers in the industry, insufficient awareness on the part of clients, and insufficient investments in green management implementation in accommodation facilities (Sangeetha, 2020).

The structured interviews also revealed that hotel guests are willing to pay more for accommodation or services offered by a hotel that is environmentally friendly. Nelson et al. (2021) conducted research in which more than 50% of respondents stated that they were willing to pay a premium of USD 0.75–7.50 for sustainable hotel services at various price levels. The respondents set the lower limit for the surcharge which they would be willing to pay for staying at an eco-friendly hotel at USD 1.55. Rahman and Reynolds (2016) also discovered in their research willingness on the part of hotel guests to pay a higher rate, though they note to what extent this willingness translates into actual payment behavior. Rawashdeh and Al-Ababneh (2021) found in their research a slightly positive correlation between tourists' perception of environmental practices and their stay at eco-hotels. On the other hand, some research studies conducted in the hospitality industry show that consumers' positions on environmental practices and procedures in most cases do not correspond to the behavior in hotel chains and independent hotels (Kim

et al., 2017; Susskind, 2014). However, purchasing environmentally friendly products or services can increase one's social status and allow the consumer to be perceived as prosocial and a protector of the environment (Braun Kohlová & Urban, 2018). As noted by Rahman et al. (2020), some people view green products and services as products and services of a lower quality compared to conventional products and services. Green or eco-friendly hotels are no exception. Environmentally conscious guests are aware of the cost savings for sellers and operators implementing environmental practices and expect some of these savings to lead to lower rates, for example, for accommodation services. However, in practice operators profit from the cost reduction and higher rates which they charge hotel guests. Regular cost savings resulting from the application of these green practices are more than enough to pay back the initial extra cost associated with their procurement and installation. Hotel owners and managers should try to lower their prices for services for their hotel guests considering the cost savings in their green or eco-friendly hotels. Hotel owners and managers can be helped by the proposed model (Lorenzo-Romelo et al., 2020), which helps understand guests' eco-friendly behavior. They can better analyze and improve their green marketing strategies focusing on guests.

The limitations of the research lie in the lack of awareness of green management in the hotels, except hotel chains. As part of further research, it would be interesting to follow the impact of green technologies on the management of hotels of different classes. It would also be essential to find out to what extent it influences the hotel's green intentions, consumer behavior, and purchasing decisions.

Conclusions

The aim of this research article was to evaluate the application of various elements and measures of green management in selected hotels in Bulgaria. Specifically, we focused on two major cities – Sofia and Varna. In connection with the research objective, the following research question was posed: What kinds of green management elements and measures are most applied in the surveyed hotels in Bulgaria?

Generally speaking, the surveyed hotels in Sofia most frequently used compact fluorescent lamps and LED lights, dual-flush toilets, and

replaced bed linen and towels on request. Hotels in the Tourist category only had two environmental measures in place (recycling containers and dual-flush toilets). On the other hand, the hotels achieved better results in terms of recycling containers (66%) than any other hotel category (except for the Luxury category). Very low values were achieved in terms of separating bio-waste and the use of low-flow faucet aerators and showerheads.

The surveyed hotels in Varna also most frequently applied measures regarding waste sorting (the results corresponded to the individual hotel categories), dual-flush toilets, replacing bed linen and towels on request, and using recycled paper. All hotel categories used thermally insulated windows; however, they achieved significantly worse results compared to hotels in Sofia, where hotels in the Tourist and Economy categories had not adopted this measure. These results were also verified using statistical analyses, which proved that the higher the hotel category, the more green measures are applied. There were differences discovered in terms of the application of green measures between the two cities, which were probably caused by the different distribution of hotels in the particular hotel categories.

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