



Direct or indirect energy savings in food and beverage services? Visitors' preferences in hotel restaurants

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ABSTRACT

Food processing in hotels is one of most energy-intensive activities in the tourism industry. There is an urgent need to reduce energy consumption in hotels to limit their environmental impact. This research aims to assess tourists' preferences for the provision of food that require low energy preparation and to compare them with tourists' preferences for other indirect energy saving options. A quantitative survey with 944 tourists visiting six tourist sites across the Czech Republic was used for primary data collection. Data were analyzed using linear regression models. Our findings signal that direct energy savings tend to be perceived differentially and surprisingly as the least preferred option among tourists. Those who support direct energy savings in food processing are rather older respondents and also respondents who declare stronger pro-environmental everyday behaviour and subjective norms. We claim that as tourists show highly diverse preferences for various ways of energy savings, we need to ensure that multiple energy saving options are offered so that tourists contribute to reducing the ecological footprint of hotels. At the same time, it has to be highlighted that only few surveyed tourists voluntarily accepted reduction of comfort in the food and beverage provision. There is room for many technological and social innovations and raising environmental awareness among tourists to overcome this contradiction.

1. Introduction

Energy consumption in the tourism sector was found to be higher than in other sectors of the economy [1]. Across a wide range of tourism services, accommodation contributes significantly to the increased energy consumption and carbon dioxide emissions [2]. This is the reason why energy management and energy savings belong to highly important environmental topics that hotel managers urgently need to deal with [3]. However, the attention is especially focused on sustainability of general hotel operations [4,5], energy saving options through hotels' equipment and introduction of innovations to heating, air conditioning, lighting, etc. [3,6]. Many studies have also focused the visitors' (guests') preferences for sustainably behaving hotels [7–9] and also their willingness to contribute to the energy-saving and general environmental-friendliness of the hotel operations [10,11].

Potential of food and beverage (F&B) services are surprisingly omitted in the recent studies but F&B revenue makes an very important contribution to the hotels' total revenue [12].

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The importance of F&B services in the consumption of resources in the hotel industry is determined by energy consumption as it can be responsible for even more than 50% of a hotel's energy consumption [13]. High energy expenditures per visitor in F&B services [14] are caused by a high amount of food waste produced especially by heating of buffet breakfast that hotels offer by default [15]. Hotel guests require energy-intensive service on the one side and leave considerable food waste on the other [16]. But there are ways of reducing or modification of the consumption throughout breakfast and general changing behavioural options available can bring direct or indirect energy savings without tourist satisfaction being negatively affected [16–19].

Thus, the preferences of hotel guests for food that varies in energy requirements can substantially influence overall energy consumption of tourism sector. However, food preferences as well as for various types of food preparation are highly diverse among consumers [20,21]. It needs to be stated that the individual energy-related behaviour of tourists has been under-researched so far. Behavioural interventions should be given similar importance to technologies [22].

Although the researchers already focused on the tourists' preferences in energy-saving hotels (or more widely in green hotels) and the tourists' willingness to contribute to the energy-saving during their use of the accommodation services, less attention was paid to the question of F&B services. Previous studies show a gap in our knowledge regarding the importance of energy savings in F&B services for hotels when comparing different energy savings methods. This is why our main objective is to assess the tourists' preferences for providing foods with low energy consumption (raw food or food with only minimal processing standing as a direct way of energy saving in F&B services) including the comparison of such direct way energy saving with types of indirect energy savings in the F&B services. Our research question is what is the character of the tourists' (hotel guests') preferences and attitudes in case of the energy-savings in the F&B services in a hotel and how strongly are they ready to contribute to the energy-savings by accepting lower standard of F&B services. In the theoretical background, we identify various possible energy savings in F&B services and multiple factors of visitors' preferences and attitudes concerning the hotels' energy-saving efforts.

2. Conceptual background and hypotheses

2.1. Possibilities for energy savings in F&B services

The F&B department can surely identify many points where managers can decrease energy consumption by using energy-efficient equipment [23] or applying technological innovation. Hotel restaurants require energy for cooking, they use gas, electricity, or steam [24] and coal or oil less often [25]. Energy is necessary for heating (keeping food at a serving temperature, using chafing dishes, or infrared heaters), preparing meals (cutters, graters, kneading machines, etc.), food storage (refrigerators, freezers), and dishwashing and sanitation. They also need water heating for cleaning and personal hygiene, lighting, and air conditioning. They can decrease energy consumption through efficient warehouse management, for instance, long cooling or freezing as well as efficient reverse logistics [26]. Saving energy in all those cases are directly linked to managers' or owners' decision [27], employees' attitudes and behaviour [28] and can be considered as **direct energy savings**. All such measures are, at the same time, invisible to the consumers, i. e. the tourists, as they do not influence the quality and character of F&B service. The restaurants can take many steps to save energy and, which is primarily desirable for them, to reduce their costs. The following ways and the degree of their contribution and benefit were previously studied:

- Energy-efficient lighting - installing LED lights in the restaurant [29] and using motion sensors [30] or timers to control their usage or turning off lights when the restaurant is not in use.
- Energy-efficient kitchen equipment and utensils [31].
- Optimizing cooking processes from very simple measures up to highly sophisticated ones [32]. The most energy-intensive areas for food service systems are hot food preparation, refrigeration, and warming [33]. Limiting the high-processed meals can decrease energy consumption for cooking and warming. Reducing the volume of high energy-intensive leisure consumption is one of the suggested strategic steps or elements to decrease energy consumption in the sector of leisure activities [34].
- Employing skilled staff and train them – the more prepared food is served, the higher skill level is required to attain the capacity of using progressive cooking processes [35]; next to that, it is necessary to train the staff to do small things, like to turn off equipment when not in use, close refrigerator and freezer doors quickly, switch the lighting off, etc.
- Managing heating, ventilation and air conditioning (HVAC) systems [36,37]. Install programmable thermostats and make sure the restaurant is properly insulated to maintain the temperature. Set the temperature to save energy when the restaurant is not in use.
- Using SMART technologies and SMART devices [35]. Innovations in kitchens rapidly increased during the Internet of Things period [38].

The hotel restaurants can also contribute to the energy savings elsewhere outside of their inside operation:

- Preference to purchasing local, seasonal produce - source ingredients locally and seasonally to reduce transportation emissions and energy usage. Organic and local food is generally considered an element of sustainability. Improving energy efficiency is one of many principles and objectives of organic farming. Organic farmers achieve considerable energy savings in livestock products, which is directly linked with a less intensive way of breeding [39]. Organic food can at the same time originate from local farmers and producers.
- Consideration of the way of using processed products and dealing with packages - all processes involved in the conversion of raw materials to packages consume large amounts of energy [40]. Returnable packages encourage closed-loop logistics, and recycling

emphasizes the recovery of primary parts of packages [41]. Zero distance purchase is seen as the key for the F&B department, which means the hotel should purchase food locally produced to reduce transport costs. Some local products require almost no distance to pass on the way to a hotel – for example, bakery products. As for the farm products, significant energy savings could be realised as the amount of food being transported reaches levels where transport efficiencies begin to take effect [42]. As the local food systems do sell in-season food products, are grown in the open air and are produced locally, they have a considerable effect on the final energy bill of their products [43]. Next to the local food systems, hotels can represent a customer with significant delivery needs or they can consolidate the delivery with other hotels or restaurants [44]. According to Hu et al. [28], avoiding food ingredients with food miles enhances the overall F&B quality. There were identified also other ways to decrease energy consumption that can have an impact on the hotels' energy costs or can only decrease the energy costs more generally in the food production and delivery sectors. We have identified four main fields of **indirect energy-saving methods** in F&B services, that will be used in our analyses:

- Providing only a limited number of meals whose preparing and serving are technology-intensive or energy-intensive,
- providing a small or zero amount of food and beverages in one-way containers (e.g., bottled water, boxed food),
- using organic food in certified quality, and
- offering local food and using local sources.

Such energy-saving methods can only be adopted in a narrow link with the guests' preferences and the acceptability of the such energy-saving measures buy the guests.

2.2. Tourists' food preferences

Eating is an integral part of traveling and tourists' holidays [45]. Food is clearly situated among one of the top three tourist expenditures, along with accommodation and souvenirs, and shopping [46]. There are estimations that food accounts for approximately one-third of tourist expenditure [47]. Tourists simply must eat when they travel away from home unless they bring home food to the destination [48]. Food is also central to the tourist experience [49].

Tourists' food choices and preferences are recognised as important forces driving food demand in tourism [50]. Telfer and Wall [46] linked tourist eating behaviour with Cohen's typology of tourists. They concluded the first type of tourist (the adventurous one) may have a light breakfast, spend the day out sightseeing, and may return for a light supper in the evening. The second type of tourist sleeps late, eats breakfast late, and may have a late dinner at the hotel or a nearby restaurant. The third type of tourist gets up early, has three meals a day at the hotel, and spends most of the time within the hotel grounds. We also have to keep in mind that the food choice motives and behaviours during travel are inconsistent with consumers' food regimens followed at home [51].

Studies on all five identified energy-saving methods have already been carried out. For example, consumers usually consider low-processed food [52] or raw food [53] rather in relation to their health or as a lifestyle element. Researchers have also widely studied consumer behaviour in the case of organic food [54–57]. Consumer preference for local product and their behaviour is another important subject of investigation [58,59]. Separately conducted preferences-oriented studies showed that all the types of energy-saving measures are positively perceived. But their relative level of preferences is unknown, yet important as they can save important amount of energy. Based on the literature review presented above we can state our first hypothesis.

Hypothesis H1. All five main ways of direct and indirect energy savings in the F&B are of interest to tourists, and all are preferred.

2.3. Factors of preferences for energy savings in the F&B services

Preferences for ways to achieve energy savings in the hospitality sector were found to be influenced by many factors [60]. The socio-demographic status of the respondents, including gender, age, respondent's origin, and economic status of respondent belong among the most important [61]. Women typically exhibit stronger environmentally friendly behaviours, attitudes, perceptions, or intentions in tourism than men [62,63], as well as a greater sense of responsibility and care for the environment during their travels [64,65]. The origin of visitors usually significantly affects their behaviour [66–68], which is also true for waste production behaviour during travel [15]. Scholars also associate green behaviour to higher costs and tourists' willingness to spend more on environmentally friendly products and services [69,70].

Pro-environmental behaviour in tourism activities includes attitudes, subjective/personal norms, behavioural control. Ajzen [71] concluded the latter three factors to be the three main elements influencing tourists' behaviour that are commonly used for analysis in leisure studies [72]. Another important factor is the environmental awareness of the tourists [73]. Tourists also frequently declare the importance of the fact their visits did not damage the destination's environment [74].

Pro-environmental behaviour in everyday life, including LOHAS factors, was also found to have an important influence on travel behaviour [75]. Several studies on water savings and towel reuse have confirmed the relationship between pro-environmental behaviour in everyday life and tourists' travel behaviour [76,77]. LOHAS was found to be an important lifestyle in consumer markets with a strong emphasis on environmental awareness [78].

Based on the information stated above, we can assume that preferences for direct and indirect energy-saving options in F&B services are not homogenous among hotel guests. We need to identify groups of hotel guests with different preferences and behaviour when consuming F&B services to enable decision-makers to consider the application of particular energy-saving measures. So, the second and third hypotheses can be stated as follows.

Hypothesis H2. The level of preference for direct energy savings in F&B services is influenced by the nature of the respondent, including socio-demographic characteristics, attitudes, subjective norms, behavioural control, and behaviour.

Hypothesis H3. Differences between preferences for direct and preferences for all other indirect methods of energy savings in F&B service are influenced by the respondent's character, including socio-demographic characteristics, attitudes, subjective norms, behavioural control, and behaviour.

3. Materials and methods

The data was gathered utilising a questionnaire survey as the main research method. We focused on in-depth understanding of the opinions of visitors to tourist places so that the overall aim of our research could be achieved.

3.1. Study area and selection of respondents

Tourists visiting six diverse attractive sites were asked to participate in research that is included in a larger study about the way how tourists perceive the greening of the tourism industry. Our endeavour was to get as much unbiased answers as possible [7,79]. Three of these six attractions are cultural heritage sites, and three are natural heritage sites, both of which are found in the southern part of the Czech Republic:

- Český Krumlov UNESCO Cultural Heritage Site – chateaux visitors,
- Kratochvíle Chateaux, the National cultural monument – chateaux visitors,
- City of České Budějovice – city visitors,
- Šumava Mts. UNESCO Biosphere reserve – visitors at the Jezerní slať vantage point,
- Pálava UNESCO Biosphere reserve – visitors at the Děvín vantage point,
- Žďárské vrchy Protected landscape area – visitors at the Devět skal vantage point.

The peak tourist season (June–October 2015) was selected for the study to be conducted. Several rules were strictly used in order to choose responders as randomly as feasible. In other words, one in ten visitors [80] interviewed, and if a group of visitors received was approached, only one person was chosen to talk to. Both weekdays and weekends were used to collect data [81]. From each site the responses from 200 respondents were gathered. Out of the total of 1200 approached respondents 944 completed interviews were conducted, yielding a rejection rate of 21.3%. Only overnight visitors and visitors older than 18 years old were of interest to us in this survey. The gathered sample is described in detail in Table 1.

3.2. Questionnaire

Solely previously evaluated constructs were used in the survey, ensuring the research instrument's content validity. Each construct's reliability using Cronbach's alpha can be found in Section 3.3, "Data Preparation and Analyses." Prior to being used in the survey, the questionnaire underwent testing in May 2015 to detect and avoid any possible ambiguities, particularly with regard to the translations. The survey can be accessed in Appendix 1.

Answers to the question "Are you willing to visit a hotel restaurant when the price is the same as for a standard service if they have/don't have ... ?" were used to gauge perceptions of direct and indirect energy-saving strategies for food and beverage preparation. The items based on literature review connected to the subject of our research followed then (please check Section 2.1 for identification of individual items):

Table 1
Structure of the surveyed sample.

Category	Share of respondents (n = 944)
Gender (share of females)	51.5%
18–25 years old	48.5%
26–35 years old	19.8%
36–45 years old	21.0%
46–55 years old	21.2%
56–65 years old	16.9%
66–75 years old	10.2%
75 and more years old	8.5%
Cost up to 40 Euro	2.4%
Cost 40–80 Euro	1.4%
Cost 80–400 Euro	10.5%
Cost 400–800 Euro	24.6%
Cost 800–1200 Euro	36.1%
Cost over 1200 Euro	21.6%
Foreigners	5.8%

- The offer is limited only to the not energy-intensive products (e.g. raw food).
- There is no offer of meals, the preparing and serving of which is technology-intensive.
- There is no offer of food and beverages in one-way containers (e.g. bottled water).
- There is only an offer of organic meals.
- There is only an offer of local food (= delivered by local farmers).

To make the results easy to compare, each response was scored on a 5-point scale (1 meaning definitely no, and 5 meaning definitely yes).

Attitudes of tourists towards responsible tourism activities were measured by the revised Personal Involvement Inventory Scale. This standardized scale was used as it is a one-dimensional scale and has a universal use [82] and was used in tourism studies before [83,84]. Respondents were asked to state their level of agreement on all ten semantic differential 7-point scales proposed by Zaichowsky [85] (important – unimportant, boring – interesting, relevant – irrelevant, exciting – unexciting, means nothing – means a lot to me, appealing – unappealing, fascinating – mundane, worthless – valuable, involving – uninvolved, not needed – needed) with the statement “I consider the public support to the environmental friendly tourism, be it financed by public sources or using, for instance, the money from charges for breaking the set environmental limits, to be...”.

As this scale was most frequently used in prior studies and is most relevant for our investigation, the highly valued scale suggested by Han et al. [86] was used as the measure of subjective standards. Visiting an environmentally friendly lodging establishment is included on this scale. In our study, the same three questions were posed: “Most of the people, who are important to me, think that I should choose environmental-friendly accommodation and boarding during my holiday”; “Most of the people, who are important to me, want me to choose environmental-friendly accommodation and boarding during my holiday”; “People, whose opinion I appreciate, would prefer environmental-friendly accommodation and boarding during their holiday”). Responses were scored using a Likert scale with 1 being strongly disagree and 5 being strongly agree.

Questions drawn from the LOHAS were used to gauge daily environmental friendliness [87]. Ten items were selected from a larger spectrum that was examined in earlier research [78]. We chose this metric because, although being viewed as one-dimensional, it encompasses all elements of routinely eco-friendly behaviour: “I prefer nature-based food or beverages without any artificial colouring and preservatives”; “I am willing to pay more for nature-based food or beverages, without any artificial colouring and preservatives.”; “I save water.”; “I save energy by switching the lights off.”; “I prefer clothes made of organic cotton.”; “I prefer nature-based cosmetic products.”; “Environmental protection is important to me when deciding to shop.”; “I am willing to pay more for environmental-friendly products.”; “I pay attention to the recyclability of packaging materials.”; “I am willing to pay more for a product with eco-friendly containers.”).

The respondent’s gender, age, cost per person and per night, and country of origin (foreign or domestic visitor) were the last pieces of personal data gathered.

The questionnaire was written in German, Czech, and English.

3.3. Data Preparation and Analyses

Preference data that were gathered using a 5-point scale were evaluated. The discrepancies between the direct and separately each indirect energy-saving strategy (for responses of each respondent) were only calculated for testing hypothesis 3. When evaluating processes under hypothesis 3, these variations were used as dependent variables.

There was no direct measurement of attitudes, subjective norms, behavioural control, or regular eco-friendly behaviours. Multi-item previous tests (please see Section 3.2) and standardised measuring methods were applied in each of the four situations. The acquired data were examined using Factor Analysis using the Principal Component approach, and Cronbach’s alpha was used to assess the internal consistency of each measuring tool.

A one-dimensional, 10-item standardised scale was used to assess attitudes [85]. The one factor with an eigenvalue greater than one was discovered by factor analysis of our ten variables (eigenvalue = 6.55, explained variance = 65.50%, all ten variables reached factor loadings greater than 0.7, which is significantly above the recommended value of 0.5), confirming the one-dimensionality of this measure. Our data’s Cronbach’s alpha for this measurement is 0.94, which indicates great internal consistency for this tool of measurement. In subsequent analyses, means obtained from all 10 semantic differential scales served as one attitude measure.

A one-dimensional standardised test with three items was used to assess subjective norms [86]. Our data provided evidence that this measure is one-dimensional because factor analysis of our three variables revealed one factor with an eigenvalue greater than 1 (eigenvalue = 7.72, explained variance = 77.20%, all three variables reached factor loadings above 0.8, well above the suggested value of 0.5). Given that this measure’s Cronbach’s alpha is 0.85, internal consistency is excellent. It was decided to utilise a one-dimensional subjective norm measure based on the mean value of the answers to those three questions.

A one-dimensional, three-item standardised measure of behaviour control was used to assess it [86]. The one factor with an eigenvalue greater than one that was discovered by factor analysis of our three variables (eigenvalue = 5.72, explained variance = 57.23%, all three variables reached factor loadings greater than 0.7, which is above the suggested value of 0.5) in our data supported the one-dimensional nature of this measure. Despite having a very low internal consistency (Cronbach’s alpha of only 0.59), this measure was still employed in additional analyses because it was near to the required value of 0.60. The one-dimensional behaviour control measure utilised was the mean value of responses to those three questions.

The newly developed ten items measure, which is based on LOHAS as examined by Picha and Navratil for buying behaviour [78], was used to assess daily environmental-friendly behaviours. The factor analysis of our 10 variables revealed one factor with an

eigenvalue greater than 1, with all 10 variables reaching factor loadings greater than 0.5 and very good internal consistency (Cronbach's alpha for this measure is 0.87). This measure can be thought of as being one-dimensional. One dimension of pro-environmental activity in daily life was measured using the mean value of responses to all items.

Attitudes, subjective norms, behavioural control, and every-day environmental-friendly behaviour with socio-demographic characteristics of respondents (gender, age, the cost per person per stay, and the origin) were used as independent variables in further analyses.

Our first hypothesis was tested by the means of repeated measures ANOVA with Tukey post-hoc test. Repeated measures ANOVA was used as answers were made by one respondent and there could be interdependence among responses on all five measured preferences for direct and indirect energy-saving ways in the F&B services, so the degrees of freedom must be reduced. The means with standard error of means were visualized in the results.

Series of OLS multiple linear regressions with a forward selection of independent variables were used for testing our hypotheses 2 and 3. The procedure of the forward selection of variables ensures, that only statistically important variables will enter the regression model. F to enter the model was set to 1 and the tolerance to 0.0001. Heteroskedasticity robust standard errors were not used. The results of regressions were summarized in tables presented in section 4.

All calculations were done using Tibco Statistica version 13.3 [88] and means and Standard Deviation of all variables measured and used further in analyses can be reached in [Appendix 2](#).

4. Results

Preference for particular aspects of energy savings in F&B services (testing [hypothesis H1](#)) differs significantly (Repeated-measures ANOVA: $F(4, 3772) = 147.18, p < 0.001$). The tourists' preference for direct energy savings which means an enhanced offer of raw food and cold products is the lowest of all studied aspects and is below average. On the other hand, the preference for local food is the highest and highly above average ([Fig. 1](#)).

Preferences for the direct energy saving during the meal preparation (testing [hypothesis H2](#)) are influenced by characteristics of respondents ($F(3,940) = 50.76, p < 0.001$, Std. Error of estimate = 1.07, Adjusted $R^2 = 0.14$). Typical tourists that prefer direct energy-saving meal preparation are older tourists and tourists with higher subjective norms whose environmentally friendly behaviour in every-day-life is stronger ([Table 2](#)).

We have further paid our attention to the series of testing [hypothesis H3](#). First was the test of the influence of the independent variables concerning the difference between the preference for direct energy saving during meal preparation and the preference for the removal of the high technology-demanding meals from the menu. The differences do not represent a high percentage of the explained variation (Adjusted $R^2 = 0.02$). Despite this fact, the model and the parameters are significant and meaningful ($F(3,940) = 8.41, p < 0.001$, Standard Error of estimate = 1.06). We have revealed higher preferences for direct energy savings among elderly people and respondents with a higher subjective norm but a lower attitude ([Table 3](#)).

In the next step, we tested the influence of the independent variables on the difference between the preference for direct energy-saving during meal preparation and the preference for the removal of the food and beverages in the one-way containers from the menu. The results are quite similar to the result of the previous test. The proportion of the explained variation is slightly higher (Adjusted $R^2 = 0.07$). The model and the parameters are significant and meaningful ($F(3,939) = 17.32, p < 0.001$, Standard Error of estimate = 1.31). We have again revealed higher preferences for direct energy savings among elderly people and respondents with a higher subjective norm but a lower attitude and also with a lower behavioural control ([Table 4](#)).

The result of the regression of the third difference between the measured dependent variables, which is the difference between the preference for direct energy-saving during meal preparation and the preference for certified organic products is resembling the

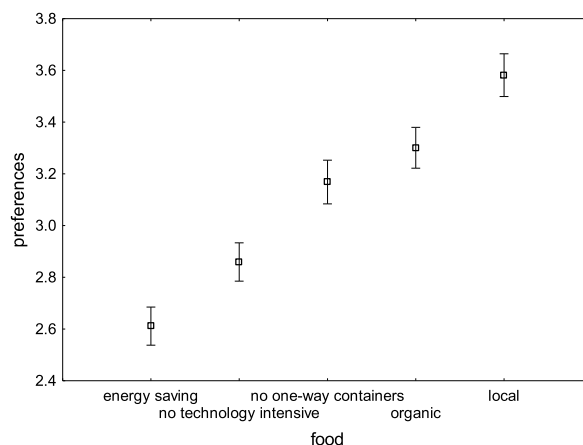


Fig. 1. Means and 95% confidence intervals for five direct and indirect energy saving procedures in the F&B tourism sector, all means are different one from the other (Tukey post hoc test at $p = 0.05$).

Table 2

Results of regression model – preference for direct energy saving during meal preparation.

	b	Std.Err.	t(940)	p-value
Intercept	0.722	0.164	4.394	0.000
Age	0.060	0.021	2.844	0.005
Subjective norm	0.102	0.039	2.636	0.009
Every-day living	0.456	0.046	9.872	0.000

Table 3

Results of regression model – difference between preference for direct energy saving during meal preparation and preference for the removal of food and beverages in one-way containers from the menu.

	b	Std.Err.	t(940)	p-value
Intercept	-0.236	0.148	-1.592	0.112
Age	0.054	0.021	2.547	0.011
Subjective norm	0.097	0.038	2.516	0.012
Attitude	-0.109	0.028	-3.905	0.000

previous two tests. The proportion of the explained variability is higher (Adjusted $R^2 = 0.08$) and the model and the parameters are significant and meaningful ($F(3,940) = 28.90$, $p < 0.001$, Standard Error of estimate = 1.41). Higher preferences for direct energy-saving are again in the case of elderly respondents and among respondents with lower attitudes and lower behavioural control (Table 5).

And finally, the result of the regression of the measured dependent variables. The difference between the preference for the direct energy-saving and the preference for local products is very similar to the results of the previous test, and it is the same as the result of the differences between the preference for the direct energy-saving and the preference for the removal of the food and beverages in the one-way-containers from the menu. The proportion of the explained variation is higher (Adjusted $R^2 = 0.09$) and the model and the parameters are significant and meaningful ($F(3,939) = 25.64$, $p < 0.001$, Standard Error of estimate = 1.50). Again, the test revealed a higher preference for direct energy-saving among the elderly respondents and the respondents with a higher subjective norm but a lower attitude and also with a lower behavioural control (Table 6).

5. Discussion

Meals and particularly breakfast are an indispensable part of hotel services. Many lodging operations offer a complimentary breakfast as a sales support tool. Breakfast has become a standard and expected perk at a hotel [89].

Guests have a particular interest in increasing environmental friendliness [90–92], thus reducing energy consumption. But at the same time, most of them are not willing to compromise on their comfort with hotel meals and even tend to be wasteful [16]. Our results found direct energy-saving by limiting meals requiring more energy-demanding preparation procedures or warming during the serving as not preferred. We had to reject our first hypothesis because not only direct energy-savings but also one of indirect saving procedures were not preferred by respondents of our survey (their responses were below-average).

Respondents perceive the role of organic food and local food as important. The use of these products can save transport costs and also longer-term storage costs as products from the local area can be delivered on daily-basis or at least very frequently. The role of organic food and local food in the hospitality services has been confirmed later than in the retail stores, but it has grown significantly in recent years [93]. Restaurant customers may see it as an opportunity to improve their health [94]. The visible shift of consumers from conventional products can result in a deflection from conventional agricultural practices [95,96], which are often logistics-intensive and fuel-intensive [97,98]. The production of organic food is increasingly associated with the direct consumption of products by a particular segment of tourists, like eco-tourists, agritourists, etc. [99,100].

Direct consumption often shortens the distribution chain at the point of production of these foods, limiting the need to use a greater number of preservatives and substances used in conventional agriculture. The current strong demand for local food in catering establishments will save the already mentioned logistics costs [101]. Thanks to the current high prices for transportation, restaurant operators are often “forced” to change their supplier relationships and can proceed to cooperation with local food producers or the

Table 4

Results of regression model – difference between preference for direct energy saving during meal preparation and preference for removal of food and beverages in one-way containers from the menu.

	b	Std.Err.	t(940)	p-value
Intercept	-0.047	0.228	-0.204	0.838
Age	0.117	0.026	4.456	0.000
Attitude	-0.148	0.036	-4.154	0.000
Subjective norm	0.137	0.048	2.854	0.004
Behavioural control	-0.182	0.053	-3.468	0.001

Table 5

Results of regression model – difference between preference for direct energy-saving during meal preparation and preference for certified organic products.

	b	Std.Err.	t(940)	p-value
Intercept	-0.199	0.238	-0.834	0.404
Age	0.186	0.028	6.620	0.000
Attitude	-0.116	0.036	-3.256	0.001
Behavioural control	-0.167	0.056	-2.978	0.003

Table 6

Results of regression model – difference between preferences for the direct energy-saving and preference for local products.

	b	Std.Err.	t(940)	p-value
Intercept	0.042	0.261	0.161	0.872
Age	0.117	0.030	3.919	0.000
Attitude	-0.244	0.041	-6.003	0.000
Subjective norm	0.207	0.055	3.781	0.000
Behavioural control	-0.268	0.060	-4.449	0.000

increasingly popular combination of own food production and sales in their own restaurants. In this way, local producers can increase their sales channels and diversify their activities, which can improve the economy of operation. But it can also avoid transporting their products to distant places, which is related to energy savings in transportation, storage, and production of preservatives.

Excluding food in single-portion packages, especially for breakfast, can be a significant energy saving. This trend is also mentioned among the investigated variables, the result of which was significant. The packaging of these products is demanding on storage space. Considering the nature of these packages and the frequency of their disposal, cooling storage areas are required. So here is the point of possible energy savings. Packaging ends up as mixed waste, although it is often plastic, but polluted. On the other hand, these are foods with the lowest risk to health (from the point of view of storage and hygiene during serving). The use of plastic packaging saves the amount of utensils that we use when dividing large packages - bowls, knives, cutting boards, and foil for wrapping partially cut pieces (like cheese, salami, etc.).

As for the second hypothesis, the most significant factor influencing the extent of preference for meals with low energy consumption (including raw food) is the age of the respondents. Pro-environmental behaviour in tourism activities and pro-environmental behaviour in everyday life were also significant. A limited or missing offer of high-energy demanding meals that need a considerable amount of energy for preparing and also for warming is rather acceptable for elderly respondents. Elderly people very often were not used to high standards in the past and are more likely to accept some limitations. They appreciate other factors, like friendly service or individualised attention [102]. At the same time, this age group is not much concerned with environmental protection. The younger generation is usually more inclined to sustainable behaviour [103] and the increased interest in sustainability is typical of Generation Z. Even in this segment, however, the impact of this behaviour is specific in the area of catering. Their focus on sustainable food consumption behaviour is limited to eating seasonal fruits and vegetables and purchasing regional food [104]. Another segment of consumers who accept this way of energy-savings in F&B services can be raw foodists [53].

Interestingly, older people not only prefer direct energy-saving options more than the younger population, but older respondents prefer this type over the others. Additionally, these preferences are not motivated by pro-environmental attitudes of respondents. Some authors propose that older people's preferences are economically motivated, for example, they are ready to support colder temperatures in rooms they live in Refs. [105,106]. People who prefer direct energy savings relatively more, generally have a worse attitude towards other environmental measures (to protect the environment). They are willing to compromise on requirements, but it is not motivated by environmental protection. This finding complements previous findings, for instance, that technical tools to save energy are more acceptable than behavioural change [107].

6. Conclusion

Summarizing the above-mentioned findings, we can conclude that F&B services have very limited potential to achieve energy savings by directly limiting energy-demanding meals on their menus. This is probably not acceptable to most tourists.

Given the similar results of the investigated variables, it can be said that increased awareness of the investigated factors increases the possibility of savings and greening of tourists' behaviour. It seems that tourists are not willing to accept energy-savings in the form of a reduction in their comfort and consumed services. Therefore, equipment operators are faced with the question of how to ensure a reduction in energy consumption, without changing the services provided. A clear possibility is to make the offer more attractive by expanding to raw products, which truly are and can be further communicated as new and progressive trends in nutrition.

In the field of F&B, hotels must focus on equipment innovation and use the most effective equipment and not rely on supplied services restrictions. Considering the hotel guests' behaviour, hotel managers, together with F&B managers are able to find indirect ways to decrease energy consumption. Some measures have clear potential to rather save energy consumption more generally in the food and beverage sector. These can bring more general benefit but, on the other hand, this is not directly linked to decrease hotels'

costs. Hotel managers can surely introduce particular saving measures when directly communicating with their customers. This strategy can be surprisingly effective and contribute to spreading the word about sustainability of individual hotels. When considering particular measures, hotel managers necessarily need to take into account increasing hygienic and food quality requirements. Further studies expanding our findings may be focused on several principal topics. One is to intensify effort to seek for innovative technological solutions for energy savings in F&B services, the second is to update organisational and logistics measures (analysis of transferrable best practice examples would be an enormous asset). The third topic covers innovative marketing communication leading to the improved sustainability and further explaining the benefits of so needed pro-environmental behavioural change.

Ethical statement

We have conducted the research presented in our article in accordance with the laws of the Czech Republic and the rules established for research at the respective universities. The participants confirmed the informed consent. The data were collected entirely anonymously and were processed as completely anonymous - the respondents were informed about this fact before the interview.

Author contribution statement

Roman Švec: Conceived and designed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Kamil Picha: Stanislav Martinát: Josef Navrátil: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Data availability statement

The authors are unable or have chosen not to specify which data has been used.

Additional information

Supplementary content related to this article has been published online at [URL].

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.heliyon.2023.e17519>.

References

- [1] J.C. Wang, K.T. Huang, Energy consumption characteristics of hotel's marketing preference for guests from regions perspective, *Energy* 52 (2013) 173–184.
- [2] A. Michopoulos, I. Ziogou, M. Kerimis, T. Zachariadis, A study on hot-water production of hotels in Cyprus: energy and environmental considerations, *Energy Build.* 150 (2017) 1–12.
- [3] Y.B. Li, T.Y. Wang, R.X. Lin, S.N. Yu, X. Liu, Q.C. Wang, et al., Behaviour-driven energy-saving in hotels: the roles of extraversion and past behaviours on guests' energy-conservation intention, *Buildings* 12 (7) (2022).
- [4] I. Trisic, S. Stetic, D. Privitera, M.D. Petrovic, M. Maksin, S. Vujovic, et al., Perspectives on sustainable tourism development in the hotel industry-A case study from southern Europe, *Sustainability* 13 (10) (2021).
- [5] D. Weaver, M.C.G. Davidson, L. Lawton, A. Patiar, S. Reid, N. Johnston, Awarding sustainable Asia-Pacific hotel practices: rewarding innovative practices or open rhetoric? *Tour. Recreat. Res.* 38 (1) (2013) 15–28.
- [6] F. Nocera, S. Giuffrida, M.R. Trovato, A. Gagliano, Energy and new economic approach for nearly zero energy hotels, *Entropy* 21 (7) (2019).
- [7] R. Švec, S. Martinat, K. Picha, P. Klusacek, J. Knotek, J.C. Schaefer, et al., What drives visitors to tourist sites to choose "green" accommodation facilities? *Environ. Dev. Sustain.* 23 (10) (2021) 15074–15099.
- [8] M.S. Balaji, Y.Y. Jiang, S. Jha, Green hotel adoption: a personal choice or social pressure? *Int. J. Contemp. Hospit. Manag.* 31 (8) (2019) 3287–3305.
- [9] E. Buunk, E. van der Werf, Adopters versus non-adopters of the green key ecolabel in the Dutch accommodation sector, *Sustainability* 11 (13) (2019).
- [10] H. Han, S.S. Hyun, College youth travelers' eco-purchase behavior and recycling activity while traveling: an examination of gender difference, *J. Trav. Tourism Market.* 35 (6) (2018) 740–754.
- [11] H. Han, S.S. Hyun, Eliciting customer green decisions related to water saving at hotels: impact of customer characteristics, *J. Sustain. Tourism* 26 (8) (2018) 1437–1452.
- [12] J.C. Wang, A study on the energy performance of hotel buildings in Taiwan, *Energy Build.* 49 (2012) 268–275.
- [13] D.E. Santiago, Energy use in hotels: a case study in Gran Canaria, *Int. J. Low Carbon Technol.* 16 (4) (2021) 1264–1276.
- [14] S. Kasavan, R. Siron, S. Yusoff, M.F.R. Fakri, Drivers of food waste generation and best practice towards sustainable food waste management in the hotel sector: a systematic review, *Environ. Sci. Pollut. Control Ser.* 29 (32) (2022) 48152–48167.
- [15] L.K. Cvelbar, B. Grun, S. Dolnicar, To Clean or Not to Clean? Reducing Daily Routine Hotel Room Cleaning by Letting Tourists Answer This Question for Themselves. *Journal of Travel Research* 60 (1) (2021) 220–229.

- [16] E. Juvan, B. Grun, S. Dolnicar, Biting off more than they can chew: food waste at hotel breakfast buffets, *J. Trav. Res.* 57 (2) (2018) 232–242.
- [17] S. Dolnicar, L.K. Cvelbar, B. Grun, Changing service settings for the environment How to reduce negative environmental impacts without sacrificing tourist satisfaction, *Ann. Tourism Res.* 76 (2019) 301–304.
- [18] C. Cozzio, O. Tokarchuk, O. Maurer, Minimising plate waste at hotel breakfast buffets: an experimental approach through persuasive messages, *Br. Food J.* 123 (9) (2021) 3208–3227.
- [19] L. Silva, Adoption of renewable energy innovations in the Portuguese rural tourist accommodation sector, *Morav. Geogr. Rep.* 30 (1) (2022) 22–33.
- [20] A. Cavaliere, E.C. Ricci, A. Banterle, Nutrition and health claims: who is interested? An empirical analysis of consumer preferences in Italy, *Food Qual. Prefer.* 41 (2015) 44–51.
- [21] E.M. Ineson, R.H. Smith, A.T. Barsby, Food and beer matching to promote destinations: a central and eastern european perspective, *Deturope-the Central European Journal of Regional Development and Tourism* 14 (2) (2022) 23–44.
- [22] L. Zhang, J. Zhang, Chapter 13 - A Systematic Review on Tourism Energy Consumption, Sustainable Tourism, and Destination Development: a Behavioral Perspective. *Transport and Energy Research*, Elsevier, 2020, pp. 295–313.
- [23] E. Jeong, S. Jang, Effects of Restaurant Green Practices: Which Practices Are Important and Effective?, 2010 [Available from: <http://digitalscholarship.unlv.edu/hhrc/2010/june2010/13>].
- [24] D. Shiming, J. Burnett, Energy use and management in hotels in Hong Kong, *Int. J. Hospit. Manag.* 21 (4) (2002) 371–380.
- [25] G. Xydis, C. Koroneos, A. Polyzakis, Energy and exergy analysis of the Greek hotel sector: an application, *Energy Build.* 41 (4) (2009) 402–406.
- [26] R. Skapa, Reverse logistics as sustainable tool in tourism industry: scope and motivation, *Eur. J. Tour. Hosp. Recreat.* 5 (1) (2014) 139–158.
- [27] Y. Namkung, S. Jang, Effects of restaurant green practices on brand equity formation: do green practices really matter? *Int. J. Hospit. Manag.* 33 (2013) 85–95.
- [28] M.L. Hu, J.S. Hornig, C.C. Teng, S.F. Chou, Exploring the energy-saving and CarbonReduction literacy of restaurant employees, in: M. Kasimoglu (Ed.), *Strategies for Tourism Industry-Micro and Macro Perspectives*, InTech, 2012, pp. 313–326.
- [29] R. Labayrade, P. Avouac, Cie, Visual Quality Assessment of Led Spots in Comparison to Low-Volt Age Halogen Spots. *Proceedings of the Cie Centenary Conference towards a New Century of Light*, 2013, pp. 348–355.
- [30] R. Dani, K. Tiwari, P. Negi, Ecological approach towards sustainability in hotel industry, *Mater. Today Proc.* 46 (2021).
- [31] S.P. Joshi, D.R. Waghole, Experimental investigation on energy efficient design for household cooking utensils, *Mater. Today Proc.* 63 (2022) 197–201.
- [32] R.K. Ramasamy, S.C. Haw, F.F. Chua, Casual dining restaurant queue management system to optimize decision making in table seating arrangement, *Proceedings of Knowledge Management International Conference (Kmicc) 2018* (2018) 18–22.
- [33] Dwyer SJ, Unklesbay K, Unklesbay N, Dunlap C. Identification of Major Areas of Energy Utilization in the Food Processing/foodservice Industry: University of Missouri, Columbia (USA); 1977.
- [34] C. Aall, Energy use and leisure consumption in Norway: an analysis and reduction strategy, *J. Sustain. Tourism* 19 (6) (2011) 729–745.
- [35] D. Foskett, P. Paskins, A. Pennington, N. Rippington, *The Theory of Hospitality and Catering*, fourteenth ed., Hachette: Hodder Education, 2021.
- [36] D.H. Bennett, W. Fisk, M.G. Apte, X. Wu, A. Trout, D. Faulkner, et al., Ventilation, temperature, and HVAC characteristics in small and medium commercial buildings in California, *Indoor Air* 22 (4) (2012) 309–320.
- [37] Y.J. Zhao, P.F. Tao, B. Zhang, C. Huan, Contribution of Chinese hot pot and barbecue restaurants on indoor environmental parameters, *Aerosol Air Qual. Res.* 20 (12) (2020) 2925–2940.
- [38] Internet of things and artificial intelligence in the hotel industry: which opportunities and threats for sensory marketing? in: J.E. Pelet, E. Lick, B. Taieb (Eds.), *6th International Conference on Research on National Brand and Private Label Marketing (NB and PL) Barcelona*, 2019 Jun 12–14, p. SPAIN2019.
- [39] Halberg NH, J. E., Kristensen IS, Eriksen J, Tvedegaard N. Comparative environmental assessment of three systems for organic pig production in Denmark. In: Köpke U, Sohn SM, editors. *ISOFAR Conference Series2008*. p. 249–261.
- [40] A. Calabrese, R. Costa, N.L. Ghironi, T. Menichini, V. Miscoli, L. Tiburzi, Operating modes and cost burdens for the European deposit-refund systems: a systematic approach for their analysis and design, *J. Clean. Prod.* (2021) 288.
- [41] S. Radhakrishnan, Environmental Implications of Reuse and Recycling of Packaging. *Environmental Footprints of Packaging*, Springer Singapore, Singapore, 2016, pp. 165–192.
- [42] T. Gajic, M.D. Petrovic, M. Radovanovic, J.A. Syromiatnikova, D.D. Bajrami, Determining the profile of tourists as users of rural tourism product- focus on a developing area (vojvodina province), *Deturope-the Central European Journal of Regional Development and Tourism* 13 (1) (2021) 39–57.
- [43] A. Van Hauwermeiren, H. Coene, G. Engelen, E. Mathijs, Energy lifecycle inputs in food systems: a comparison of local versus mainstream cases, *J. Environ. Pol. Plann.* 9 (1) (2007) 31–51.
- [44] L. Newman, C. Ling, K. Peters, Between field and table: environmental implications of local food distribution, *Int. J. Sustain. Soc.* 5 (1) (2012) 11–23.
- [45] J. Bessiere, Local development and heritage: traditional food and cuisine as tourist attractions in rural areas, *Sociol. Rural.* 38 (1) (1998) 21–+.
- [46] D.J. Telfer, G. Wall, Linkages between tourism and food production, *Ann. Tourism Res.* 23 (3) (1996) 635–653.
- [47] F.J. Belisle, Tourism and food-production in the caribbean, *Ann. Tourism Res.* 10 (4) (1983) 497–513.
- [48] R.C.Y. Chang, The influence of attitudes towards healthy eating on food consumption when travelling, *Curr. Issues Tourism* 20 (4) (2017) 369–390.
- [49] G. Richards, Gastronomy: an essential ingredient in tourism production and consumption? in: A.-M. Hjalager, G. Richards (Eds.), *Tourism and Gastronomy* Routledge, 2002, pp. 17–34.
- [50] A.H.N. Mak, M. Lumbers, A. Eves, Globalisation and food consumption in tourism, *Ann. Tourism Res.* 39 (1) (2012) 171–196.
- [51] S. Wang, X. Lehto, L.P. Cai, Creature of habit or embracer of change? Contrasting consumer daily food behavior with the tourism scenario, *J. Hospit. Tourism Res.* 43 (4) (2019) 595–616.
- [52] C.M. Sauer, T. Reardon, D. Tschirley, S. Liverpool-Tasie, T. Awokuse, R. Alphonse, et al., Consumption of processed food & food away from home in big cities, small towns, and rural areas of Tanzania, *Agric. Econ.* 52 (5) (2021) 749–770.
- [53] S. Thirucir, I eat therefore I believe: the raw food diet, a believing solution for healing, *The International Journal of Religion and Spirituality in Society* 9 (1) (2019) 41–55.
- [54] U. Hjelmar, Consumers' purchase of organic food products. A matter of convenience and reflexive practices, *Appetite* 56 (2) (2011) 336–344.
- [55] P. Bryla, Organic food consumption in Poland: motives and barriers, *Appetite* 105 (2016) 737–746.
- [56] A. Davies, A.J. Titterton, C. Cochrane, Who buys organic food? *Br. Food J.* 97 (10) (1995) 17–23.
- [57] H. Dolezalová, K. Pícha, D. Hanzalová, The marginal possibilities of realizing organic production for school establishments, *J. Cent. Eur. Agric.* 17 (1) (2016) 86–106.
- [58] I.M. Bakos, Local food systems supported by communities nationally and internationally, *Deturope-the Central European Journal of Regional Development and Tourism* 9 (1) (2017) 59–79.
- [59] J.A.C. Santos, M.C. Santos, L.N. Pereira, G. Richards, L. Caiado, Local food and changes in tourist eating habits in a sun-and-sea destination: a segmentation approach, *Int. J. Contemp. Hospit. Manag.* 32 (11) (2020) 3501–3521.
- [60] L. Novacka, K. Pícha, J. Navrátil, C. Topaloglu, R. Švec, Adopting environmentally friendly mechanisms in the hotel industry A perspective of hotel managers in Central and Eastern European countries, *Int. J. Contemp. Hospit. Manag.* 31 (6) (2019) 2488–2508.
- [61] J. Patel, A. Modi, J. Paul, Pro-environmental behavior and socio-demographic factors in an emerging market, *Asian Journal of Business Ethics* 6 (2) (2017) 189–214.
- [62] H. Han, L.T. Hsu, J.S. Lee, Empirical investigation of the roles of attitudes toward green behaviors, overall image, gender, and age in hotel customers' eco-friendly decision-making process, *Int. J. Hospit. Manag.* 28 (4) (2009) 519–528.
- [63] H. Han, J. Yu, W. Kim, Investigating airline customers' decision-making process for emerging environmentally-responsible electric airplanes: influence of gender and age, *Tourism Manag. Perspect.* 31 (2019) 85–94.
- [64] S. Dolnicar, Nature-conserving tourists: the need for a broader perspective, *Anatolia: An International Journal of Tourism and Hospitality Research* 17 (2) (2006) 235–255.

- [65] A.K. Kim, Determinants of tourist behaviour in coastal environmental protection, *Tourism Geogr.* 14 (1) (2012) 26–49.
- [66] J.G. Brida, M. Disegna, T. Vachkova, Visitor satisfaction at the museum: Italian versus foreign visitors, *Tourism* 61 (2) (2013) 167–186.
- [67] M. Caber, T. Albayrak, Does the importance of hotel attributes differ for senior tourists? A comparison of three markets, *Int. J. Contemp. Hospit. Manag.* 26 (4) (2014) 610–628.
- [68] D.Q. Liu, R.S. Upchurch, C. Curtis, C. Lusby, Chinese domestic tourist perceptions of wind farms experiences, *J. Sustain. Tourism* 24 (11) (2016) 1569–1583.
- [69] M. Millar, S. Baloglu, Hotel guests' preferences for green guest room attributes, *Cornell Hospitality Quarterly* 52 (3) (2011) 302–311.
- [70] K.H. Kang, L. Stein, C.Y. Heo, S. Lee, Consumers' willingness to pay for green initiatives of the hotel industry, *Int. J. Hospit. Manag.* 31 (2) (2012) 564–572.
- [71] I. Ajzen, The theory of planned behavior, *Organ. Behav. Hum. Decis. Process.* 50 (2) (1991) 179–211.
- [72] I. Ajzen, B.L. Driver, Application of the theory of planned behavior to leisure choice, *J. Leisure Res.* 24 (3) (1992) 207–224.
- [73] W.H. Lee, G. Moscardo, Understanding the impact of ecotourism resort experiences on tourists' environmental attitudes and behavioural intentions, *J. Sustain. Tourism* 13 (6) (2005) 546–565.
- [74] S. Dolnicar, G.I. Crouch, P. Long, Environment-friendly tourists: what do we really know about them? *J. Sustain. Tourism* 16 (2) (2008) 197–210.
- [75] F. Weber, Demand for Sustainable Tourism. Corporate Sustainability and Responsibility in Tourism: A Transformative Concept, Springer International Publishing, Cham, 2019, pp. 265–281.
- [76] E. Dimara, E. Manganari, D. Skuras, Don't change my towels please: factors influencing participation in towel reuse programs, *Tourism Manag.* 59 (2017) 425–437.
- [77] E.N. Untaru, A. Ispas, A.N. Candrea, M. Luca, G. Epuran, Predictors of individuals' intention to conserve water in a lodging context: the application of an extended Theory of Reasoned Action, *Int. J. Hospit. Manag.* 59 (2016) 50–59.
- [78] K. Picha, J. Navratil, The factors of Lifestyle of Health and Sustainability influencing pro-environmental buying behaviour, *J. Clean. Prod.* 234 (2019) 233–241.
- [79] J. Navratil, K. Picha, M. Buchecker, S. Martinat, R. Svec, M. Brezinova, et al., Visitors' preferences of renewable energy options in "green" hotels, *Renew. Energy* 138 (2019) 1065–1077.
- [80] E.M.P. Madin, D.M. Fenton, Environmental interpretation in the great barrier reef marine park: an assessment of programme effectiveness, *J. Sustain. Tourism* 12 (2) (2004) 121–137.
- [81] J.F. Petrick, D.D. Morais, W.C. Norman, An examination of the determinants of entertainment vacationers' intentions to revisit, *J. Trav. Res.* 40 (1) (2001) 41–48.
- [82] J. Coppes, V. Braunisch, Managing visitors in nature areas: where do they leave the trails? A spatial model, *Wildl. Biol.* 19 (1) (2013) 1–11.
- [83] A. Beerli, G.D. Meneses, S.M. Gil, Self-congruity and destination choice, *Ann. Tourism Res.* 34 (3) (2007) 571–587.
- [84] A. Yoon, D. Jeong, J. Chon, J.H. Yoon, A study of consumers' intentions to participate in responsible tourism using message framing and appeals, *Sustainability* 11 (3) (2019) 14.
- [85] J.L. Zaichkowsky, The personal involvement inventory - reduction, revision, and application to advertising, *J. Advert.* 23 (4) (1994) 59–70.
- [86] H. Han, L.T. Hsu, C. Sheu, Application of the Theory of Planned Behavior to green hotel choice: testing the effect of environmental friendly activities, *Tourism Manag.* 31 (3) (2010) 325–334.
- [87] M.J. Kim, C.K. Lee, W.G. Kim, J.M. Kim, Relationships between lifestyle of health and sustainability and healthy food choices for seniors, *Int. J. Contemp. Hospit. Manag.* 25 (4) (2013) 558–576.
- [88] TIBCO., TIBCO Statistica™ Quick Reference 2017 [Available from: https://docs.tibco.com/pub/stat/13.3.0/doc/pdf/TIB_stat_13.3_quick_ref.pdf].
- [89] S.H. Lee, J. Lee, S.M.F. Neilson, Exploring guest preferences of breakfast menu: conjoint analysis, *J. Culin. Sci. Technol.* 16 (2) (2018) 149–164.
- [90] M.A. Baker, E.A. Davis, P.A. Weaver, Eco-friendly attitudes, barriers to participation, and differences in behavior at green hotels, *Cornell Hospitality Quarterly* 55 (1) (2014) 89–99.
- [91] H. Han, H.J. Yoon, Hotel customers' environmentally responsible behavioral intention: impact of key constructs on decision in green consumerism, *Int. J. Hospit. Manag.* 45 (2015) 22–33.
- [92] Y.X. Gao, A.S. Mattila, S. Lee, A meta-analysis of behavioral intentions for environment-friendly initiatives in hospitality research, *Int. J. Hospit. Manag.* 54 (2016) 107–115.
- [93] Y.F. Wang, S.P. Chen, Y.C. Lee, C.T. Tsai, Developing green management standards for restaurants: an application of green supply chain management, *Int. J. Hospit. Manag.* 34 (2013) 263–273.
- [94] Y.H. Shin, J. Im, S.E. Jung, K. Severt, Motivations behind consumers' organic menu choices: the role of environmental concern, social value, and health consciousness, *J. Qual. Assur. Hospit. Tourism* 20 (1) (2019) 107–122.
- [95] R. Sapbamrer, A. Thammachai, A systematic review of factors influencing farmers' adoption of organic farming, *Sustainability* 13 (7) (2021).
- [96] K. Lyons, S. Lockie, G. Lawrence, Consuming 'Green': the symbolic construction of organic foods, *Rural Soc.* 11 (3) (2001) 197–210.
- [97] B. Tundys, A. Rzeczycki, Construction of green supply chain for organic products, *Operations and Supply Chain Management-an International Journal* 8 (1) (2015) 37–47.
- [98] S. Pedersen, J. Aschemann-Witzel, J. Thøgersen, Consumers' evaluation of imported organic food products: the role of geographical distance, *Appetite* 130 (2018) 134–145.
- [99] V. Agapieva-Aliosman, V. Dirimanova, The role of organic farming for the development of agricultural sector in Bulgaria, *Scientific Papers-Series Management Economic Engineering in Agriculture and Rural Development* 21 (2) (2021) 13–18.
- [100] M. Sauer, J. Vystoupil, M. Novotna, K. Widawski, Central European tourist flows: intraregional patterns and their implications, *Morav. Geogr. Rep.* 29 (4) (2021) 278–291.
- [101] T.M. Gao, V. Erokhin, A. Arskiy, Dynamic optimization of fuel and logistics costs as a tool in pursuing economic sustainability of a farm, *Sustainability* 11 (9) (2019).
- [102] R.J. Callan, L. Bowman, Selecting a hotel and determining salient quality attributes: a preliminary study of mature british travellers, *Int. J. Tourism Res.* 2 (2) (2000) 97–118.
- [103] R.D. Straughan, J.A. Roberts, Environmental segmentation alternatives: a look at green consumer behavior in the new millennium, *J. Consum. Market.* 16 (6) (1999) 558–575.
- [104] I.C. Kamenidou, S.A. Mamalis, S. Pavlidis, E.Z.G. Bara, Segmenting the generation Z cohort university students based on sustainable food consumption behavior: a preliminary study, *Sustainability* 11 (3) (2019).
- [105] J. van Hoof, L. Schellen, V. Soebarto, J.K.W. Wong, J.K. Kazak, Ten questions concerning thermal comfort and ageing, *Build. Environ.* 120 (2017) 123–133.
- [106] N. Willand, C. Maller, I. Ridley, 2017, It's not too bad" - The Lived Experience of Energy Saving Practices of Low-Income Older and Frail People. Improving Residential Energy Efficiency International Conference, *Iree* 121 (2017) 166–173.
- [107] Z. Simanaviciene, A. Volochovic, R. Vilke, O. Palekiene, A. Simanavicius, Research review of energy savings changing people's behavior: a case of foreign country, *Proceedings of 6th World Conference on Educational Sciences* 191 (2015) 1996–2001.