

The determinants of more responsible restaurant food choice in Poland

Abstract

In the context of emerging markets, restaurant food choice needs to be better architected in order to minimize the negative societal and environmental implications. For effective consumer choice architecture the determinants of restaurant food choice need to be first established. This study explores the determinants of restaurant food choice in Poland, a transitional economy in East-Central Europe with a rapidly growing pattern of out-of-home food consumption. It finds that the low level of public environmental awareness in Poland translates into low consumer recognition of the environmental implications of restaurant food choice. Although customer preference for locally-produced and organic food is recorded, this preference is not associated with public environmental awareness, but attributed to possible media effect. In contrast, the level of public awareness of the health repercussions of restaurant food choice is higher in Poland, especially among younger consumers, which is reflected in the desire to see the nutritional and calorific values of food to be displayed on restaurant menus. Implications for policy-making and hospitality management are discussed.

Keywords

Food service provision; consumer attitudes; environmental awareness; public health; food choice; menu design; Poland

Highlights

- Food nutrition, provenance and production method affect restaurant food choice in Poland
- Displaying these food attributes on a menu will appeal to Polish consumers, especially the younger market
- There is no major gender-evoked effect in restaurant food choice in Poland

1. Introduction

Food service provision (known as catering in some countries) is a rapidly developing sector of the global hospitality industry which plays a major role in many national economies and the modern society (Sloan *et al.* 2013). Food consumption out-of-home is no longer seen as a luxury, which is reflected in the rising frequency of eating out and the increasing number of business opportunities that catering provides (Intel 2016). Further development of the sector is predicted, especially in emerging and transitional economies where the levels of disposable income are growing which drives public demand for food, both when cooking at home and when dining out (Nielsen 2015).

While the socio-economic significance of food service provision rises, so do the negative repercussions of catering operations (Gössling *et al.* 2011). The sector contributes to a number of global societal (for example, public health, nutrition and subjective well-being) and environmental (for instance, climate change, resource efficiency and food security) challenges (Hall and Gössling 2013). Indeed, dining out may lead to obesity (Josiam and Foster 2009), consuming excessive amounts of energy with associated carbon footprint build-up (Hu *et al.* 2013) and the generation of food waste (Papargyropoulou *et al.* 2016), among other negative effects. This underlines the importance of minimising the detrimental societal and environmental implications of food service provision as a means of enhancing sustainability of the global hospitality industry (Jones *et al.* 2016).

Numerous factors contribute to the large, and yet growing, negative societal and environmental repercussions of catering. Operational inefficiencies can drive energy and food wastage in food service provision enterprises (Sanjeev 2007), while limited corporate resources (Chan 2011), insufficient managerial knowledge (Leoinidou *et al.* 2013) and indifferent staff attitudes (Muster 2010) can hamper the adoption of sustainability initiatives in catering ventures. Most importantly, irresponsible consumer choice can accelerate the

substantial negative impact of food service provision on public health and the environment (Aschemann-Witzel 2015; Juvan *et al.* 2018; Lusk and Ellison 2013).

To mitigate the detrimental implications of reckless consumer choice in catering, consumer choice can be ‘nudged’ to make it more society-beneficial and environment-benign (Filimonau *et al.* 2017; Johnson *et al.* 2012; Warren *et al.* 2017). Consumer choice architecture represents a promising managerial tool in food service provision as the sector holds significant potential for pro-societal and pro-environmental ‘nudging’ interventions (Mont *et al.* 2014). To prove the value of consumer choice architecture to the managers of catering enterprises, business shareholders and national policy-makers, more evidence on the effectiveness of its application in various socio-economic and political contexts is necessary (Lehner *et al.* 2016).

The research agenda on consumer choice architecture in food service provision is rapidly emerging, and yet it is limited geographically and restricted in analytical scope. Nudging interventions have been examined in developed, ‘western’ countries while, despite the on-going growth of national catering sectors in the emerging and transitional economies these have been excluded from analysis. Furthermore, the bulk of studies have focused on the health-related nudging interventions while the research agenda on architecting consumer choice to make it more environment-benign is significantly less established (see Skov *et al.* 2013 for a systematic review).

This study aims to explore how various, health- and environment-related, food attributes can affect restaurant food choice. It focuses on Poland, a transitional economy in East-Central Europe with a rapidly growing catering market. While the outcome of this study is therefore most representative of the Polish consumers, it can be generalised to better understand restaurant food choice within the broader region in question where the socio-

economic and political backgrounds are alike, i.e. Czech Republic, Slovak Republic and Hungary.

2. The catering sector in Poland

The hospitality industry in Poland is growing at an annual rate of circa 8%, thus outperforming the countries of Western Europe and many markets in East-Central Europe (Ernst & Young 2013). This rapid growth is facilitated by the gradual increase in the levels of disposable income among the local population alongside a steady rise in inbound and domestic tourism (United States Development Agency-USDA 2016). A substantial share of hospitality growth is attributed to the national food service provision sector which is set to enlarge in the future (Ernst & Young 2013). In 2014, there were about 66,000 catering enterprises in Poland that had cumulatively generated almost €3 billion in sales (USDA 2016). For comparison, this is equivalent to circa 7% of the total value of the UK hospitality industry which is one of the largest in Europe (British Hospitality Association 2015)

In terms of frequency of food consumption out-of-home, 23% of Polish consumers eat out on a regular basis (USDA 2016). In Western Europe regular diners account for circa 30% of population (Mintel 2016); however, given the rapid growth of the food service provision sector in Poland, this 'western' benchmark is likely to be reached soon. The major difference between Poland and West-European countries is in that the Polish consumers prefer eating out in smaller and cheaper catering outlets, such as snack bars, self-service cafes and fast-food restaurants, while casual dining prevails in the west (Mintel 2016; USDA 2016). Yet, according to Derek (2017), the on-going growth in the societal wealth and the recent lifestyle changes in Poland have increased the frequency of eating out in restaurants, especially in large Polish cities, such as Warsaw, Krakow and Poznan.

To fulfil the rising demand for food and to address the emerging market trends, the nature of food service provision in Poland is changing. Healthy eating is gaining its appeal

(Rudawska 2001) with nearly two thirds of Polish consumers claiming to closely monitor the intake of key nutrients and calories in their diets (Mintel 2015). Organic food consumption is on the rise driven by the public perception of its healthiness and safety, but also by the environmental protection considerations (Zakowska-Biemans 2011). These consumption trends prompt Polish catering enterprises to innovate and apply frequent changes to their menus (USDA 2016). However, the role played by the food healthiness and its environmental qualities in restaurant food choice in Poland has never been investigated which justifies the need for this study.

2.1. Health and environmental considerations as the drivers of restaurant food choice

As a generic study object, food choice has long been conceptualised (Furst *et al.* 1996) and yet it remains insufficiently understood within certain consumption contexts, such as catering (Amiraian and Sobal 2009). Food choice decisions are complex and multifaceted (Sobal and Bisogni 2009); they are emotional, situational and dynamic (Sobal *et al.* 2014), externally- and internally-driven (Booth *et al.* 2001), and vary across cultures (Prescott *et al.* 2002). This hampers generalisability of restaurant food choice and calls for more research to identify patterns and establish trends in food consumption out-of-home (Grunert 2002). Better understanding of restaurant food choice in the different geographical markets by the different socio-demographic segments is crucial from a managerial viewpoint as it enables catering operators to design more relevant products, enhance consumer loyalty, distinguish themselves from competition and devise more effective marketing campaigns (Kozup *et al.* 2003).

Among the internal determinants of restaurant food choice, personal health considerations play an important role (Namkung and Jang 2007). This is reflected in the increased attention paid by consumers to the nutritional and calorific values of restaurant

food (Gallicano *et al.* 2012; Hoefkens *et al.* 2012; Hwang and Lorenzen 2008). The precise impact of personal health considerations on restaurant food choice has not however been established (Filimonau and Krivcova 2017). Systematic literature reviews (Kiszko *et al.* 2014; Long *et al.* 2015; Swartz *et al.* 2011) have provided contradictory evidence on the effect of the nutritional and calorific labels on restaurant food choice which calls for more research on this topic (Kim *et al.* 2013), especially outside North America where the bulk of research on this topic was conducted. Nutritional and calorific labelling of restaurant menus has become compulsory in some US jurisdictions and this has brought about studies on its effectiveness (Krieger *et al.* 2013). The role of personal health considerations in restaurant food choice among European consumers has been studied to a lesser extent (Grunert and Wills 2007). This is despite the evidence of the growing public awareness of the implications of food choice for personal health in this geographical market as a result of extensive policy interventions (Brambila-Macias *et al.* 2011; Capacci *et al.* 2012; Perez-Kueto *et al.* 2012). Due to its specific historical and political circumstances, the region of East-Central Europe has been excluded from analysis (Honkanen and Frewer 2009). To reduce the impact of food service provision on the national public health systems, thus enhancing the societal sustainability of the national catering sectors, it is paramount to reinforce personal health considerations as a determinant of restaurant food choice in this region.

In line with the growing public awareness of the repercussions of restaurant food choice for personal health, the modern consumer is getting increasingly environment-conscious which is often reflected in the 'greener' food choices when dining out (Schubert *et al.* 2010; Sirieix *et al.* 2017; Teng *et al.* 2014). In terms of research, the environmental considerations as a driver of restaurant food choice have been explored from the three main perspectives. First, the role of food production methods (i.e. 'organic' versus conventional) and animal welfare (i.e. 'free-range' versus confined livestock) in consumer choice when dining out has

been examined (Filimonau and Grant 2017; Hanks and Mattila 2016; Poulston and Yiu 2011). Although questions have been raised about the true environmental footprint of ‘organic’ produce (Cederberg and Mattsson 2000) and its exact health benefits (Smith-Spangler *et al.* 2012), the research has established that the ‘organic’ label retains its appeal to many diners who associate it with healthier and more environment-benign food choices (Petrescu *et al.* 2015). Same holds true for more responsible methods of animal husbandry (Harper and Makatouni 2002). Second, the impact of provenance on restaurant food choice has been investigated (Mak *et al.* 2012). ‘Local’ food has been found to hold a major appeal which is, however, largely attributed to the perceived consumer benefits it generates for the local economies and local communities, rather than the environment (Kim *et al.* 2009; Kivela and Crofts 2006; Telfer and Wall 2000). Due to shorter distances travelled, the studies has established that the consumer often perceives ‘local’ food as being more traditional (Bessiere 1998), authentic (Sims 2009), fresher and thus, ultimately, safer (Cohen and Avieli 2004) which is reflected in its preference when dining out. This consumer perception is closely linked to the issue of ‘food miles’ whose impact on restaurant food choice has also been recorded (Kemp *et al.* 2010; Sirieiz *et al.* 2008; Weber and Matthews 2008). Lastly, due to the significant carbon intensity of food service provision, an emerging research stream explores the climate repercussions of restaurant food choice (Caputo *et al.* 2017; Gössling 2010; Spaargaren *et al.* 2013). The studies have shown a potentially significant role of climate considerations when dining out, especially in western societies where the levels of public environmental awareness are fairly high (Pulkkinen *et al.* 2016).

2.2. Health and environmental considerations as the drivers of restaurant food choice in Poland

The research on the role of health considerations in food choice of Polish residents is at its infancy. Although a number of studies have recently tested the level of public knowledge

about food nutrition and its impact on personal health, these have been conducted from a pure medical perspective and targeted the representatives of specific socio-demographic groups, such as the students and the elderly, and hospitality patients suffering from food-related diseases, such as obesity and food intolerances (Myszkowska-Ryciak *et al.* 2011; Szczepańska *et al.* 2013). The non-medical research on food choice in Poland has primarily been concerned with culinary interests of Polish domestic tourists (Gwiazdowska and Kowalczyk 2015). It has not however considered health and the environment as the determinants of travel with culinary tourism purposes. No research has attempted to examine the role of health- and environment-related considerations in restaurant food choice in Poland.

This lack of research can be partially attributed to the circumstances of historical development of Poland. In communist times, the catering sector was public, under-developed and expensive meaning that the Poles preferred eating at home (Derek 2017). This status quo has however changed after Poland gained independence in 1989. Since then the national catering sector has rapidly evolved and so have the consumption patterns of Polish residents. The steadily rising level of disposable income in Poland has dramatically increased the number and the frequency of dining out (Poland on the plate 2015) while health and environmental awareness of the public have also grown (CBOS 2014). As a result, although the cost factor retains its weight when purchasing food in Poland, Polish consumers have started paying increasingly more attention to such food attributes as its healthiness and food production method (Niewczas 2013). Despite the on-going changes in consumer behaviour, little research has however attempted to examine the level of public knowledge about food nutrition and the environmental impacts of food choice and how this knowledge shapes consumer food choice in Poland, both when cooking at home and dining out (Goryńska-Goldmann and Ratajczak, 2010). There is thus a need to revisit the research agenda on

restaurant food choice in Poland to better understand its determinants and make it more responsible from the societal and environmental perspectives.

2.3. *Consumer choice architecture and customer nudging in food service provision*

Given that personal health and environmental considerations can drive restaurant food choice, it is important to understand how these can be reinforced. The positive effect of growing public awareness of the repercussions held by food choice in the catering sector for personal health and the environment can be harnessed through the application of the tools of consumer choice architecture, such as customer nudging (Filimonau *et al.* 2017). Nudging is a product of the ‘neo-liberal’ economy which suggests that customers should be reminded about the implications of their purchasing decisions and ‘softly’ prompted towards the products that are more beneficial from the societal or environmental perspective, or both (Croson and Treich 2014; Hall 2013; Sunstein and Thaler 2009). This is in contrast to the use of traditional ‘hard’ policy-making and managerial tools designed to penalise the undesirable consumer action (for example, by banning unhealthy products and introducing a ‘fat’ or ‘sugar tax’) or prevent it from happening (for instance, via displaying only the ‘healthier’ items on a restaurant menu) (Duvaleix-Treguer *et al.* 2012; Nayga 2008). Penalties and restrictions are not seen favourably by consumers as they imply coercive choice (Lombardini and Lankoski 2013) which underlines the value of customer nudging.

The catering sector holds numerous opportunities for the design of nudging interventions. Food consumption is a habitualised social activity which offers little scope for voluntary changes (Mont *et al.* 2014). Concurrently, food service provision is highly competitive and vulnerable to external impacts (Tepeci 1999). This implies that any ‘hard’ interventions within the sector should be applied with caution to ensure they impose no detrimental effect on business success and its reputation. Consumer choice in restaurants can instead be architected to encourage consumption of more society-beneficial and environment-

benign food (Freedman and Brochado 2010; Ittersum and Wansink 2012; Kallbekken and Saelen 2013). This is best achieved via menu design (Filimonau and Krivcova 2017) as menu cards represent a key, and often the only, communication medium between food service providers and consumers (Bowen and Morris 1995), while effective communication is paramount to nudge voluntary changes to protect the environment (Olander and Thøgersen 2014). For example, it has been recognised that labeling restaurant menus with nutritional, calorific and environment-related information can be successfully adopted in the food service provision sector as a means of architecting consumer choice (Hwang and Lorenzen 2008).

Despite the potential the sector holds to facilitate more responsible restaurant food choice, research on nudging in catering is yet emerging. The bulk of studies conducted in this context to-date have dealt with architecting healthier consumer choice and shown the varying degrees of success (Filimonau *et al.* 2017). The research agenda on nudging pro-environmental consumer choice (or so-called ‘green nudging’) in the hospitality industry is significantly less established (Hall 2013). The outcome reported by a handful of existing studies is positive (Chang *et al.* 2016; Kallbekken and Saelen 2013; Whitehair *et al.* 2013) and yet more empirical evidence is necessary to demonstrate the value of nudging interventions to the industry representatives and policy-makers, delving into the different consumption markets (Lehner *et al.* 2016). The large, and rapidly growing, societal and environmental footprint of food service provision calls for the broader application of consumer choice architecture in this sector. Nudging consumer choice when dining out is particularly important in the context of emerging and transitional economies, such as those in East-Central Europe. Here, food demand is rising which implies that its negative societal and environmental repercussions should be mitigated to make the national catering sectors more sustainable.

2.4. *Knowledge gap and research aims*

This study aims to better understand the extent to which the key health- (i.e. nutrition and calories) and environment-related (i.e. provenance, production method and carbon footprint) attributes of food affect restaurant food choice in Poland. To this end, the study aims to explore (1) how public knowledge of and public attitudes to the health and environmental repercussions of restaurant food choice affect consumer purchasing decisions when dining out in Poland; and (2) the mediating role of key socio-demographic characteristics, most notably consumer gender and age. Knowing the determinants of food choice when dining out is critical for the design of nudging interventions in restaurants. These can be implemented in the form of menu (re)design when a menu card is devised to contain the key information blocks that are of relevance to restaurant food choice. For example, if restaurant food choice in Poland is driven by food nutrition, then nutritional content of food should be displayed on a menu to facilitate healthier, and thus more society-beneficial, consumer purchasing behaviour. Likewise, if food provenance proves to be of no interest to Polish diners, then its presentation on a menu is unnecessary.

3. Research design

The research instrument was administered face-to-face in popular public places within the three major cities in Poland (Warsaw, Krakow and Poznan) using the PAPI (PAper and Pencil Interviewing) technique. Warsaw, Krakow and Poznan were selected because these are the largest cities in Poland characterised by the rapidly developing sector of food service provision and the substantial magnitude of inbound and outbound tourism development. The research instrument took the form of a self-completed, but researcher-observed, survey which was conducted within the period of May-September 2016 using a non-probability sampling strategy on a 'next-to-pass' basis. The response rate varied from 40% to 60% across the demographical groups. This is largely because, similar to previous public opinion studies in Poland (Dickinson *et al.* 2013), the elderly residents were found to be the most difficult

category of participants to engage in a survey due to the generational prejudices assigned to the participation in market studies. Despite this challenge, the resultant sample profile achieved in the survey (n=681) was broadly representative of the Polish population (Table 1).

[Insert Table 1 here]

Given the exploratory nature of this project, the survey questionnaire was designed based on the outcomes of the literature review and a qualitative pilot study. The pilot study was conducted with 20 volunteers. These were randomly selected but it was ensured that the sample represented the range of socio-demographic profiles of Polish residents. The pilot study involved in-depth interviewing of the volunteers to test the themes derived from the literature review and identify any new, emerging themes related to the study's topic. The themes tested in the pilot study were as follows: the health-related attributes of restaurant food choice (namely, nutrition and calories) and the environment-related attributes of restaurant food choice (namely, food provenance, food production method and carbon footprint of food). These themes were subsequently utilised to develop the questionnaire statements. Pilot study interviews were semi-structured and lasted between 30 and 50 minutes. No incentives were offered.

The questionnaire statements were grouped into three main sections. Section 1 consisted of 17 statements and tested consumer knowledge of and attitudes to the health- and environment-related implications of restaurant food choice in Poland. Section 2 contained 27 statements and looked at the determinants of restaurant food choice in Poland. The attitudinal, 5-point Likert rating scale ranging from strongly agree (1) to strongly disagree (5) was utilised to capture the effect of the 44 statements in these two sections. Lastly, Section 3 (8 questions) collected the key socio-demographical information. There were three additional items to control for consumer preference for informative menus (PIM) and one additional item to measure the role of price in restaurant food choice as the literature pinpointed the

importance of these considerations in restaurant food choice research. The original questionnaire was developed in English and the back-translation technique with subsequent piloting on native speakers as suggested by Brislin (1970) was employed to ensure its fluency in Polish.

The survey data were processed and analysed using SPSS Statistics 23.0. To achieve the study's aims, Exploratory Factor Analysis (EFA) was first applied in order to establish the factor structure of the different survey items. The EFA outcome was employed to create the latent variables; these were included into a structural model estimated with Partial Least Squares (PLS) and facilitated by SmartPLS software. The resultant structural model enabled an in-depth analysis of the effect made by various health- and environment-related food attributes on restaurant food choice in Poland.

4. Data analysis

4.1. Exploratory Factor Analysis (EFA)

In order to identify the dimensions underlying the health- and environment-related food attributes and restaurant food choice among Polish consumers, a principal component analysis was carried out. Varimax rotation was conducted to delineate the patterns of patronage factors based on consumer awareness and preferences. The high values of the Kaiser-Meyer-Olkin (KMO) measures and the Bartlett's Test of sphericity supported the factorability of the correlation matrix (Table 2-3). The rotated solutions (Table 2-3) revealed the presence of four factors underlying the health- and environment-related food attributes and three factors for restaurant food choice among Polish consumers.

[Insert Table 2 here]

[Insert Table 3 here]

Focusing on health- and environment-related food attributes (HEFA), Table 2 shows the structure matrix of these constructs after carrying out a varimax orthogonal rotation. Items with low factorial loadings (<0.5) were removed from EFA and not displayed in the table. Analysis indicated the four major dimensions in Polish consumer attitudes towards HEFA. Specifically, Factor 1 indicated the general knowledge of Polish consumers about the interlinkages between food and the global environmental issues and demonstrated their familiarity with major environmental concepts, such as 'carbon footprint' and 'climate change'. This factor was therefore named Food General Environmental Awareness (FGEA). Factor 2 covered the items related to the familiarity of Polish consumers with, and their attitudes towards, specific environmental food attributes, such as the methods of organic production or animal welfare. This factor was named Organic Food Environmental Awareness (OFEA). Factor 3 included the three major items related to the personal health considerations in food consumption among Polish residents. Thus, this factor was labeled as Food Health Awareness (FHA). Lastly, Factor 4 clustered the two items on the awareness of Polish consumers of the environmental repercussions of their food choice when dining out. It was therefore named Food Choice Impact Awareness (FCIA).

Table 3 presents the outcome of EFA applied to Polish Consumer Food Choices (CFC) when dining out. Factor 1 covered the six items on the consumer interest in, and their decision-making process on, the environmental impact of food choice when eating out. Specifically, this factor captured consumer attitudes to such concepts as climate-benign food and the carbon implications of catering. This factor was therefore named Preference for Carbon Footprint Food (PCFF). Factor 2 involved the six items on customer preference for food provenance and production methods, such as local food and organic food. This factor was therefore labeled as Preference for Local and Sustainably Produced Food (PLSPF). Lastly, Factor 3 was named Preference for Calorific and Nutritional Information (PCNI) as it

clustered the major items referring to the public interest in displaying this type of information on restaurant menus.

4.2. *Partial Least Squares (PLS) analysis*

In order to analyse the influence of the HEFA dimensions on the CFC dimensions, PLS analysis was applied. PLS is a distribution-independent technique which is appropriate for structural equation modeling in the situations of high complexity and reduced theoretical support and development. This method is best suited to make predictions and develop theory, rather than to confirm theory (Reinartz *et al.* 2009). In other words, PLS is best used for exploratory purposes and at early stages of theoretical development, i.e. when an attempt is made to identify the new potential causal relationships and when the measurement instruments are not yet well formed (Roldan and Sánchez-Franco 2012). Thus, PLS represents an adequate research tool for this study given its exploratory nature.

The first step of PLS involves the estimation of the measurement model. To this end, the latent variables were built using the items and factors obtained in EFA. This enabled estimation of the influence made by the HEFA dimensions on the different CFC dimensions. The validation of the measurement model requires the verification that the items and constructs are reliable and valid. Table 4 presents the outcome of the estimation of the structural model. As regards to the items' individual reliability, most of the items' outer loadings on their respective latent variables were above the critical threshold of 0.7 (Carmines and Zeller 1979). Although some items were found below 0.7, these were retained to enable their contribution to content validity (Hair *et al.* 2011) and because composite reliability shown good values. As for the latent variables, they all indicated adequate composite reliability values above the critical threshold of 0.7. Furthermore, the latent variables met the convergent validity criteria since the Average Variance Extracted (AVE) values were above, or close to, 0.5. Finally, discriminant validity was verified using the

recent Heterotrait-Monotrait (HTMT) approach suggested by Henseler *et al.* (2015). This technique analysed the HTMT ratios between every pair of variables to certify that, effectively, all latent variables were sufficiently different from the rest of variables included in the model. All HTMT ratios were below the critical threshold of 0.850.

[Insert Table 4 here]

The second step of PLS involves the estimation of the significance of the path coefficients. To this end, a bootstrapping procedure, which is a nonparametric technique of resampling commonly used in PLS (Hair *et al.* 2011), with 6.000 subsamples was applied. The results of the structural estimation revealed that the model explained 33.3% of PCFF, 40.6% of PLSPF and 18.8% of PCNI variance. The predictive relevance of the model was further confirmed through the Stone-Geisser test (Table 5). Table 6 presents the outcome of the resultant structural model.

[Insert Table 5 here]

[Insert Table 6 here]

4.3. *Interpretation of results*

The analysis demonstrated the fairly low levels of public environmental awareness alongside awareness of the environmental repercussions of food choice among Polish consumers. Furthermore, for those consumer groups with high levels of (general and food-related) environmental awareness, the only positive and significant correlation was recorded between public awareness and consumer preference for eating local and sustainably produced food in restaurants ($\beta=0.214$; $t=6.746$). Contrary to the initial expectations, for these consumer groups, the high level of public awareness of the environmental implications of food choice did not translate into high consumer preference for climate-friendly food ($\beta=0.017$; $t=0.490$). Likewise, no correlation was established between high environmental

awareness and consumer preference for the display of nutritional and calorific information on restaurant menus ($\beta=0.033$; $t=0.868$).

The outcome of modelling revealed that the generally high level of public awareness of organic methods of food production in Poland had a positive and significant influence on consumer preference for climate-benign food ($\beta=0.148$; $t=4.114$) and for local and sustainably produced food when dining out ($\beta=0.109$; $t=3.230$). This variable did not however exert a significant influence on consumer preference for more informative menus ($\beta=-0.015$; $t=0.400$). Notably, the generally high level of personal health awareness attached to food choices among Polish consumers had a positive and significant influence on all dimensions of their food preference, thus suggesting that environmentally-friendly food was seen as 'healthy' food. These paths were significant for consumer preference for the display of the carbon footprint of food ($\beta=0.220$; $t=6.099$), its provenance, calorific ($\beta=0.255$; $t=6.330$) and nutritional attributes on restaurants menus ($\beta=0.325$; $t=10.591$). Lastly, the level of public awareness of the environmental implications of food choice and catering practices in Poland was found to be positively and significantly explaining consumer preference for more climate-benign food ($\beta=0.296$; $t=8.376$) and for caloric and nutritional information ($\beta=0.152$; $t=3.788$) when dining out. In contrast, this variable did not exert a significant influence on consumer preference for local food ($\beta=0.037$; $t=1.091$).

Regarding the role of the control variable 'price', the analysis indicated that when price was considered a key determinant of restaurant food choice, Polish consumers would be less inclined to favour local and sustainably produced food ($\beta=-0.059$; $t=1.777$). Price constraints were not significantly correlated with consumer preference for climate-benign food ($\beta=0.029$; $t=0.834$) and nutritional information ($\beta=-0.016$; $t=0.441$). Finally, the control variable measuring the level of interest among Polish consumers in more informative restaurant menus significantly explained consumer preference for the display of carbon footprint values

($\beta=0.158$; $t=4.362$) as well as information on local and sustainably produced food ($\beta=0.210$; $t=5.586$) and nutrition ($\beta=0.182$; $t=4.660$).

In terms of the role of age, the analysis revealed that this variable was negatively and significantly associated with consumer preference for climate-benign ($\beta=-0.094$; $t=2.777$), local and sustainably produced food ($\beta=-0.131$; $t=4.245$), but not for calorific and nutritional information ($\beta=0.013$; $t=0.387$). This suggests that the younger Polish consumers have more marked preference for environmentally-friendly food and for the restaurants that serve such food compared to the older Polish consumers.

The role of gender was further explored through a multisample analysis facilitated by SmartPLS (Sarstedt *et al.* 2011). The 6.000 subsample bootstrapping technique was employed to identify the differences in the structural parameters between male and female Polish customers. The outcome of this multigroup analysis indicated no major gender-evoked differences and, yet, some specific HEFA dimensions had a significantly higher weight on preference of male consumers. This held true for Food Choice Impact Awareness (FCIA) and its correlation with consumer preference for climate-benign food (PCFF) ($\beta_{men}=0.349$; $\beta_{women}=0.233$; $p\text{-value (men-women)}=0.049$) and for the food health considerations (FHA) and its correlation with consumer preference for the display of calorific and nutritional information on restaurant menus (PCNI) ($\beta_{men}=0.355$; $\beta_{women}=0.172$; $p\text{-value (men-women)}=0.012$). Further gender-related differences were recorded for the influence of price on consumer preference for climate-benign food ($\beta_{men}=0.127$; $\beta_{women}=-0.052$; $p\text{-value (men-women)}=0.005$) and on consumer preference for local and sustainably produced food ($\beta_{men}=-0.007$; $\beta_{women}=-0.098$; $p\text{-value (men-women)}=0.096$). This pinpointed that Polish male consumers were generally less concerned about price when purchasing more sustainable food which may therefore suggest their higher willingness to pay for food with better environmental credentials when eating out. In contrast, Polish female consumers were more

price-conscious and tended to prioritize the cost of dining out over the sustainability considerations.

5. Discussion

Data analysis provided a number of interesting research insights. First, it shed light on the level of public environmental awareness in Poland which was found to be fairly low. This held true not only for the general level of public environmental awareness, but also for public awareness of the environmental repercussions of restaurant food choice. Insufficient public understanding of the inter-linkages between tourism and its specific sub-sectors, such as hospitality, and particular environmental impacts, such as climate change, among Polish residents has been acknowledged previously (Bohdanowicz 2006; Dickinson *et al.* 2013; Filimonau *et al.* 2018; Niewczas 2013; Nowaczek and Fennell 2002) with further evidence provided in this study. This underlines an important area for policy-making intervention. This intervention should aim at enhancing public understanding of the relationship between consumer choice and the environmental impacts in Poland to facilitate more responsible consumption patterns and, ultimately, enable the nation's progress towards sustainability goals. The lack of public environmental awareness with subsequent negative implications for tourism and hospitality management represents a major challenge not only for developing and transitional economies (Kim *et al.* 2006), but also for developed countries (Miller and Rathouse 2010). Yet, it is of particular relevance to the transitional markets, such as Poland, given the rapid growth in consumption of many items, including food.

Second, despite the low level of public environmental awareness in Poland, the survey recorded consumer preference for local and sustainably-produced (which embeds methods of organic production and ethical animal husbandry) food when dining out with a subsequent desire to see these attributes displayed on a menu. This is in line with previous studies conducted on this topic in the western context (Edwards-Jones 2010; Filimonau and Krivcova

2017; Sims 2009). The key difference is however in that the Polish consumers have limited knowledge of how food provenance and the methods of food production are connected with the overall sustainability of restaurant food choice (Niewczas 2013). Consumer preference for local and sustainably-produced food is therefore more likely to be attributed to the media influence (including the user generated media, i.e. food-related online social networks and culinary blogs) which may have created a positive 'halo' effect around the notion of 'Polish'/'regional' and 'organic' produce (Durydiwka 2013). This outlines scope for policy-making intervention designed to reinforce public understanding of the discourse on the environmental repercussions of restaurant food choice in Poland. This finding also suggests that Polish restaurateurs should consider providing information on where the food comes from and how it has been produced to consumers, especially to those of younger age. The younger Polish diners have better environmental awareness of and higher interest in learning more about the various attributes of the food they consume. Curiosity and openness to the new consumption patterns is a typical feature of the millennial consumer market (Gurau 2012) and the Polish catering sector should comprehend and respond to this demand accordingly. Furthermore, although the idea of carbon labelling of restaurant menus has been trialled in western economies (Filimonau *et al.* 2017; Pulkkinen *et al.* 2016; Spaargaren *et al.* 2013), the climate significance of foodstuffs does not yet represent a determinant of restaurant food choice in Poland. This suggests that this information should only be displayed on a menu by those Polish restaurateurs who cater for highly educated and environment-conscious consumers and/or by those who want to achieve a 'novelty' effect which can appeal to the Millennials.

Third, in contrast to the low level of public environmental awareness, the level of public understanding of the implications of restaurant food choice for personal health was found significant in Poland which confirms the recent study by CBOS (2014). This trend

should be capitalised upon and further reinforced by Polish restaurateurs by displaying information about the health-related food attributes (for example, nutritional values and calories) on a menu. This has potential to nudge restaurant food choice in Poland, to make it more responsible as healthy eating can reduce the growing pressure on the national system of public health. This finding is in line with the outcome of studies conducted in the western contexts (Filimonau *et al.* 2017; Kozup *et al.* 2003; Swartz *et al.* 2011) where consumer demand for displaying health-related information on restaurant menus exists, thus representing a good nudging opportunity.

Fourth, similar to the western consumers, Polish diners tend to associate organic food with healthy food which is not necessarily the case (Schuldt and Schwarz 2010). This provides a rationale for the design of policy interventions aiming to raise consumer awareness of the true benefits of organic food. The major difference between this study and the studies conducted in the western context is in that the desire to see the health-related information displayed on restaurant menus is of more relevance to the younger consumer category in Poland. This can in part be attributed to the 'Millennial' effect, as discussed above. Another major difference in restaurant food choice between Western Europe/North America and Poland is in that gender does not play a significant role in consumer preference for healthy restaurant food choice. This contradicts the outcome of previous research in the West which pinpoints that females are more interested in knowing about the repercussions of restaurant food choice for personal health compared to males (Driskell *et al.* 2006).

In terms of policy-making and managerial implications, analysis of consumer age as a control variable in this study suggested that public understanding of the inter-linkages between personal health and restaurant food choice should be strengthened among the older Polish consumers. The ageing population imposes the largest pressure on the public health system and there is an urgent need to reduce this pressure by educating the elderly consumers

about the role of healthy eating, both when cooking at home and dining out. From the managerial viewpoint, this finding also implies that Polish restaurants catering for the younger consumer market should strive to make information about the nutritional and calorific values of food an integral element of their menus. This is to capture growing consumer demand for this information and make positive differentiation from the competition. Lastly, the study fits the scope of the integrated quality management (ITQ) concept proposed by UNWTO for application in catering businesses, both in developed and developing economies (UNWTO 2017). ITQ aims to protect public health, conserve the natural environment and contribute to the well-being of local community/economy through the adoption of corporate standards of a sustainable, socially responsible business. By understanding the role of health and the environment in restaurant food choice in Poland and by adjusting their business models accordingly, industry professionals can enable progress of national food service provision towards the goal of sustainability.

6. Conclusions

Due to its significant environmental and societal implications, restaurant food choice represents an important research object. Better understanding of the determinants of restaurant food choice enables managers of catering enterprises to develop more appealing product offers. This further provides managers with an opportunity to nudge or architect restaurant food choice so that it becomes more societally-benign and environmentally-responsible. For example, restaurant food choice can be nudged by displaying information about the health- and environment-related food attributes on a menu. Despite the policy-making and managerial importance, restaurant food choice has not yet been holistically scrutinised. This represents a vital knowledge gap, especially in the context of developing and transitional economies where food consumption is growing. This study contributed to knowledge by exploring the role of health- and environment-related considerations in

restaurant food choice in a transitional, rapidly developing economy in East-Central Europe, Poland. The areas for policy-making intervention were outlined to enhance consumer awareness of the implications of restaurant food choice in Poland for public health and environmental conservation while the managerial recommendations were put forward on how to utilise menu design to nudge more responsible restaurant food choice.

The study revealed a number of promising avenues for future research. First, it demonstrated some substantial similarities and differences in restaurant food choice within the consumption markets in Western Europe and Poland. This signifies further investigation of this important research topic in various political, socio-economic and cultural contexts to enable the development of targeted policy-making and managerial interventions to architect more responsible restaurant food choice. Second, the study indicated that the elderly consumers in Poland did not prioritise the health- and/or environment-related considerations in their restaurant food choice. Future research should therefore look into how the health- and environment-related food attributes should be presented to this consumption market to enhance their appeal, thus evolving into an important driver of restaurant food choice. Next, the 'millennial' effect was identified which was reflected in the desire of younger Polish consumers to know more about the health- and environment-related repercussions of their restaurant food choice with subsequent presentation of this information on a menu. Future research should delve into the determinants of restaurant food choice among the millennial consumers, paying particular attention to the role of the personal health and environmental considerations in it. The size of the millennial market is substantial while, concurrently, its loyalty varies, which signifies the importance of such future investigation. Lastly, a potential limitation of this study but, concurrently, a promising research avenue is in that it focussed on restaurant food choice in large Polish cities. In the future, the study should be extended to cover small-to-medium and even rural settlements in Poland where the socio-demographic

profile of the residents and the character of food service provision is different. This would enable a truly comprehensive analysis of the determinants of more responsible restaurant food choice in Poland.

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Table 1. Sample characteristics (n=681)

Gender		Frequency of dining out	
Male	44.8%	Often	28.2%
Female	55.2%	Quite often	31.5%
		Occasionally	40.3%
Level of education		Personal Salary	
Secondary School	38.7%	Lower than the average of the country	43%
Vocational School	13.4%	Higher than the average of the country	23.8%
High School	45.3%	Prefer not to say	33.2%
Other	2.6%		
Age		Occupation	
16-24	26.3%	Retired	7.6%
25-34	17.8%	Student	26.9%
34-44	20.1%	Unemployed	4.9%
45-54	19.5%	Full-Time employed	53.1%
55-64	9.3%	Part-Time employed	7.5%
More than 65	7.1%		

Table 2. EFA for health and environment-related food attributes (HEFA).

Items	Items factorial loadings				Arithmetic mean	Standard Deviation
	Factor 1	Factor 2	Factor 3	Factor 4		
Factor 1. General Food Environmental Awareness (FGEA)					3.266	1.150
I understand the meaning of carbon footprint and how it relates to the problem of climate change	.624				3.310	1.264
Generally, I understand how the carbon footprint of food can be calculated	.783				3.435	1.111
I am familiar with the concept of 'food miles'	.632				3.700	1.061
I am familiar with the concept of 'carbon labeling'	.866				2.414	0.907
I have heard about carbon labeling of foodstuffs	.843				3.470	1.165
Factor 2. Organic Food Environmental Awareness (OFEA)					2.358	1.054
I am familiar with the concept of 'organic produce'		.777			3.345	1.080
Organic produce is better for the environment		.781			1.773	0.883
Organic produce is better for my personal health		.779			2.068	0.794
I am familiar with the concept of 'free range food'		.591			2.244	1.027
Factor 3. Food Health Awareness (FHA)					2.375	1.042

You are what you eat			.648		2.144	1.004
I prefer eating to live. not living to eat			.698		2.100	1.028
Health considerations are paramount in my food decision-making when dining out			.712		2.881	1.094
Factor 4. Food Choice Impact Awareness (FCIA)					2.965	1.015
Restaurants and other catering establishments contribute significantly to the problem of climate change				.860	3.071	1.015
I am aware that my food choice when dining out makes a contribution to the problem of climate change				.790	2.859	1.261
KMO = 0.779; Bartlett sphericity test = 2460.18 (Sig. <0.000); Total Explained Variance = 59.8%						

Table 3. EFA for consumer food choice when dining out in Poland (CFC).

	Items factorial loadings			Arithmetic mean	Standard Deviation
	Factor 1	Factor 2	Factor 3		
Factor 1. Preference for Carbon Footprint Food (PCFF)				2.985	1.050
Restaurants should take the lead in educating customers on the carbon implications of the food they order	.737			3.261	1.088
I would like to know more about the climate significance of my food choices when dining out	.771			2.618	1.064
When dining out, I would be willing to pay a premium for food which is climate-friendly	.697			2.854	1.042
In principle, I might change my restaurant order if I knew my food was large in carbon	.772			3.108	1.007
It would be good to see carbon labels on restaurant menus to ensure people understand the climate significance of their food choices	.785			2.984	0.940
I would like to see on my menu how much carbon footprint the food I am about to order contains	.661			3.087	0.898
Factor 2. Preference for Local and Sustainably Produced Food (PLSPF)				2.529	1.064
When dining out, I prefer ordering food which is 'free range'		.580		1.770	0.812
If presented on the menu, provenance of the ingredients would have an impact on my food choice		.730		2.790	1.021

When dining out, I would like to know where my food comes from (I would like to know my food provenance)		.712		2.574	0.934
When dining out, I would be willing to pay a premium for local food		.700		2.762	1.082
In principle, when dining out, I would be willing to pay a premium for organic food		.653		2.806	1.088
I would prefer my restaurant food to be organic		.584		2.471	0.887
Factor 3. Preference for Calorific and Nutritional Information (PCNI)				2.839	1.211
If presented on the menu, calorific information of food (i.e. the amount of calories it contains) would have an impact on my food choice			.865	2.912	1.246
If presented on the menu, nutritional information about my food (i.e. the amount of fats, sugar and salt it contains) would have an impact on my food choice			.834	2.766	1.175
KMO = 0.878; Bartlett sphericity test = 4332.73 (Sig. <0.000); Total Explained Variance = 62.3%					

Table 4. Results of the final measurement model.

Construct	Indicator	Standardized Loading	Composite Reliability Index (CRI)	Average Variance Extracted (AVE)
FGEA Food General Environmental Awareness	<i>FGEA1</i>	0.752*	0.835	0.561
	<i>FGEA2</i>	0.801*		
	<i>FGEA3</i>	0.796*		
	<i>FGEA4</i>	0.635*		
OFEA Organic Food Environmental Awareness	<i>OFEA1</i>	0.869*	0.873	0.583
	<i>OFEA2</i>	0.833*		
	<i>OFEA3</i>	0.617*		
	<i>OFEA4</i>	0.778*		
	<i>OFEA5</i>	0.692*		
FHA Food Health Awareness	<i>FHA1</i>	0.699*	0.744	0.492
	<i>FHA2</i>	0.705*		
	<i>FHA3</i>	0.700*		
FCIA Food Choice Impact Awareness	<i>FCIA1</i>	0.871*	0.864	0.760
	<i>FCIA2</i>	0.873*		
PCFF Preference for Carbon Footprint Food	<i>PCFF1</i>	0.770*	0.906	0.618
	<i>PCFF2</i>	0.831*		
	<i>PCFF3</i>	0.834*		
	<i>PCFF4</i>	0.784*		
	<i>PCFF5</i>	0.755*		
	<i>PCFF6</i>	0.737*		
	<i>PCFF7</i>	0.737*		
PLSPF Preference for Local and Sustainably Produced Food	<i>PLSPF1</i>	0.708*	0.864	0.559
	<i>PLSPF2</i>	0.742*		
	<i>PLSPF3</i>	0.714*		
	<i>PLSPF4</i>	0.760*		
	<i>PLSPF5</i>	0.811*		

PCNI <i>Preference for Calorific and Nutritional Info</i>	<i>PCNI1</i>	0.906*	0.924	0.858
	<i>PCNI2</i>	0.946*		
Control Variables				
PIM <i>Preference for Informative Menus</i>	<i>PIM1</i>	0.733*	0.799	0.571
	<i>PIM2</i>	0.810*		
	<i>PIM3</i>	0.721*		
Age	<i>Age</i>	1.00	n/a	n/a
Price	<i>Price</i>	1.00	n/a	n/a

Note: * = p<0.01; n.a. = Not Applicable.

Table 5. Discriminant validity of the final measurement model.

Construct	1	2	3	4	5	6	7	8
1. FGEA								
2. OFEA	0.217							
3. FHA	0.391	0.233						
4. FCIA	0.353	0.430	0.442					
5. PCFF	0.270	0.368	0.602	0.566				
6. PLSPF	0.488	0.319	0.789	0.338	0.692			
7. PCNI	0.223	0.136	0.554	0.328	0.504	0.485		
8. PIM	0.396	0.262	0.607	0.252	0.417	0.588	0.403	

Note 1: Values indicate the HTMT ratios.

Note 2: See Table 1.

Table 6. Results of the structural model

Relationships	β	t-value
FGEA → PCFF	0.017	0.490
FGEA → PLSPF	0.214	6.746*
FGEA → PCNI	0.033	0.868
OFEA → PCFF	0.148	4.114*
OFEA → PLSPF	0.109	3.230*
OFEA → PCNI	-0.015	0.400
FHA → PCFF	0.220	6.099*
FHA → PLSPF	0.255	6.330*
FHA → PCNI	0.325	10.591*
FCIA → PCFF	0.296	8.376*
FCIA → PLSPF	0.037	1.091
FCIA → PCNI	0.152	3.788*
Age → PCFF	-0.094	2.777*
Age → PLSPF	-0.131	4.245*
Age → PCNI	0.013	0.387
Control Relationships		
Price → PCFF	0.029	0.834
Price → PLSPF	-0.059	1.777***
Price → PCNI	-0.016	0.441
PIM → PCFF	0.158	4.362*
PIM → PLSPF	0.210	5.586*
PIM → PCNI	0.182	4.660*
R^2 (PCFF) = 33.3%; R^2 (PLSPF) = 40.6% ; R^2 (PCNI) = 18.8% Q^2 (PCFF) = 0.191; Q^2 (PLSPF) = 0.210; Q^2 (PCNI) = 0.145		

Note 1: See Table 1.

Note 2: * = $p < 0.01$; ** = $p < 0.05$; *** = $p < 0.10$.

