

Do consumers intend to purchase the food with Geographical Indication?

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Abstract

This research aims to determine the effect of consumers' perceptions of GI on purchasing intention. Data were obtained from surveys conducted with 384 consumers in Turkey. Structural equation model (SEM) was used to analyze the data. According to the results, 62.5% of the consumers have information about foods with GI while 58.9% of the consumers consume foods with GI. The SEM results indicated that food with GI perception had a statistically significant and positive effect on the intention to purchase foods with GI. Consumers want to buy geographically marked foods as they are "healthier", "higher quality", and "more reliable". Consumers have positive opinions about foods with GI, and are willing to pay more for them. The fact consumer perceptions do not change is closely related to the performance of products with GI. Monitoring the production processes of GI foods that are more delicious, healthier, reliable, and ensuring the continuity in product quality will increase the demand of consumers for geographically marked foods.

Keywords: *Consumer behaviour, Food consumption, Geographical indication, Structural equation model.*

1. Introduction

The tricks in the food industry, health problems and especially the COVID-19 pandemic lead consumers to consume products that are healthier and more reliable (Cacic *et al.* 2011; Şahin and Meral, 2012; Dhamotharan *et al.* 2015; Kos Skubic *et al.*, 2018), well-known in origin, their composition, and the way they are produced and processed (Grunert *et al.*, 2000; Salaun and Flores, 2001; Guerrero *et al.*, 2010; Meral and Şahin, 2013; Doherty *et al.*, 2015) and environmentally friendly (Kumar *et al.*, 2017; Alamsyah *et al.*, 2020; Aytop *et al.*, 2021).

One approach of informing and developing consumer awareness of a product's sustainabil-

ity features is through product labeling (Erraach *et al.*, 2021). Geographical indication is one such labels. Geographical indications (GIs) are signs documenting the origin of the food, its characteristic features, and its connection to the area where it is produced. GI is "a sign indicating the food identified with the traditionally, area, region, or country in which it originates in terms of a distinct quality, reputation or other features." GI registration can be completed in two ways; protected designation of origin (PDO) and protected geographical indication (PGI). If the production, processing, and rest of operations of the product take place in the geographically indicated area, the PGI is registered. If at least one of the production, processing, or

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rest of operations takes place geographically (specified area, PDO is registered (EU, 2012). GIs have an important tool in developing countries (Bowen, 2010) where the economy is based on agricultural products and industrialization requires technological developments (Addor *et al.*, 2003). Geographical indication may ensure consumers of the excellent quality of food products, which is a possible major reason for providing geographical information with food. Several empirical studies have examined the impact of location information on consumer food decisions; however, most of these studies were undertaken in industrialized countries. However, little information is available on the importance of geographical information in food products (Lee *et al.*, 2020). Because it is a tool that can be used to identify the exceptional quality of agricultural products, maintain the sustainability of a defined indigenous production region, and support the development of rural communities, a geographical indication label could be adopted in developing countries to further improve the livelihood of farmers (Rangnekar, 2004; Kan and Gülçubuk, 2008; Jena and Grote, 2010; Kneafsey *et al.*, 2013; Cei *et al.* 2018; Lee *et al.*, 2020). Using geographical indications to protect commodities from unfair competition is critical (Dokuzlu *et al.*, 2020).

A rising part of the population is concerned about food safety and quality and considers provenance to be a helpful quality indicator (Teuber, 2011). Consumers believe that products with GI have superior quality and taste compared to other products (Van Ittersum *et al.*, 2000; Teuber, 2011; Vecchio and Annunziata, 2011; Verbeke *et al.*, 2012; Meral and Şahin, 2013; Likoudis *et al.*, 2016; Ahrendsen and Majewski, 2017; Kos Skubic *et al.*, 2018; Roselli *et al.*, 2018). The fact that products with GI inform consumers about the reliability, quality and origin of the product causes the consumers to increase the price they are willing to pay (Bramley *et al.*, 2009; Vecchio and Annunziata, 2011; Aprile *et al.* 2012; Deselnicu *et al.* 2013; Lefèvre, 2014; Bishop and Barber, 2015; Lu and Sajiki, 2021; Zhang *et al.* 2022).

Based on the literature in this research, it is assumed that geographical indication contributes

to the producer and the regional economy, more delicious, better quality, healthier, more reliable, more troublesome, and accepted by consumers. It is assumed that consumers who intend to purchase food with GI pay more for geographically marked foods, consume them in the future, and increase their consumption in the future.

The aims of this study are to determine consumers' perception of foods with GI, the status of consumption of foods with GI and the factors that influence consumers' purchase intent of foods with GI in Turkey. In this respect, the results of this study are expected to contribute significantly to decision-makers working in the field of GI.

In the light of this information, the effect of geographical indication perception on consumers' intention to purchase products with geographical indications was analyzed using the structural equation model. The research questions were as follows. Do the observed variables (contributing to the producer and the regional economy, more delicious, better quality, healthier, more reliable, more troublesome) affect the intention to purchase geographically indicated foods? (1) What is the degree of influence of this factor? (2) Which factors are more effective? (3) The hypothesis of the research is that geographical indication perception directly affects the intention to purchase products with geographical indications.

2. Material and method

The main material of this study is data obtained from online surveys conducted with 384 consumers online in November and December 2020. The sample is representative of the population in rural and urban areas of Turkey. Before the data collection process started, pilot interviews were conducted with 30 people and errors in the questionnaire form were corrected. A simple random sampling method was used to determine sample size. The following formula has been used because the number of universe units is over 10000 (Özdamar, 2003):

$$n = \frac{p \cdot q \cdot z^2}{d^2}$$

where p is the probability of consumers in the universe consuming foods with GI (0.2), q is

the probability of consumers in the universe not consuming foods with GI (0.8), α is 0.05, z is 1.96, and d is the sampling error (0.04). According to this formula, the sample volume was determined to be 384.

Structural equation model (confirmatory factor analysis and path analysis) is used in the analysis of the data. Statistical analysis was performed using the AMOS software.

2.1. Structural Equation Model

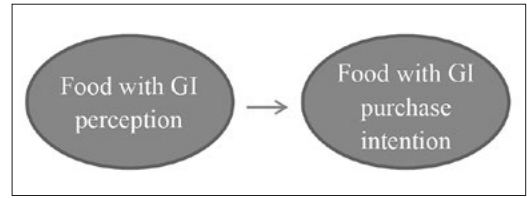
Structural equation model (SEM) is the ability to test direct and indirect relationships between observable and unobservable variables in a single model (Ullman and Bentler, 2003; Mueller and Hancock, 2018; Dash and Paul, 2021). In a single study, researchers can ask more complicated research questions and test multivariate models using SEM (Weston and Gore, 2006).

SEM can simultaneously multiple regression analyse at the same time. Some authors refer to SEM as causal modelling, causal analysis, simultaneous structural modeling, covariance structure analysis, path analysis, and confirmatory factor analysis (Tabachnick and Fidell, 2001). Model creation, parameter identification and estimate, data-model fit evaluation, and prospective model re-specification are all part of the SEM process. This method assesses the fit between correlational data from experimental or non-experimental research and one or more competing causal theories that have been created a priori; most SEM applications are not built for exploratory purposes (Mueller and Hancock, 2018).

The data acquired to validate the sophisticated theoretical model generated using this method are usually linked. The model-data fit is the term for this connection. With available empirical data, any theoretical model can be examined for this type of fitness. SEM is a large sample approach that typically requires a sample size of 200 (Weston and Gore, 2006). The sample size is often determined by three factors: the type of distribution (observed variables), model complexity, and the estimation method utilised (Hayes *et al.* 2017).

The basic hypothesis of this study relies on the assumption that foods with GI perception

Figure 1 - Model design.



affect the intention to purchase foods with GI. The structural equation model (SEM) was used to test this hypothesis. The data used in the structural equation model were expressed on a 5-point Likert scale (1: strongly disagree, 5: strongly agree).

SEM design is given in Figure 1. In the model, the effect of foods with GI perception on the intention to purchase foods with GI was analyzed. In addition, foods with GI perception latent variable are represented by six observed variables (coded variables; c1, c2, c3, c4, c5, c6), and foods with GI purchase intention are represented by three observed variables (coded variables; c7, c8, c9) in the model. SEM was used to determine the effect of food with GI perception on GI food purchase intention.

Confirmatory factor analysis and path analysis are techniques offered by SEM. Confirmatory factor analysis was applied to the data to collect the observed variables under a broad and comprehensive upper variable. In this study, the variables c1, c2, c3, c4, c5, and c6 were collected under the perception of foods with GI whereas the variables c7, c8, and c9 were collected under the intention of purchasing foods with GI. Because the model had sufficient fit values, it was decided to use all the variables in the model. After the confirmatory factor analysis, the hypotheses were tested by applying the path analysis method with latent variables.

2.1.1. Comparative Fit Indices

Normed Fit Index (NFI)

NFI value obtained by dividing the chi-square value of the tested model by the chi-square value of the independent model was between 0-1 (Bentler and Bonett, 1990). If the NFI value is above 0.90, it is acceptable; if it is above 0.95, it indicates perfect fit (Ullman, 2001).

Incremental Fit Index (IFI)

The difference in this index (Bollen, 1989), which is used to solve problems caused by large variability, is that the degree of freedom is not considered. An IFI value above 0.90 indicates a good fit, and above 0.95 indicates a perfect fit (Meydan and Şeşen, 2011).

Comparative Fit Index (CFI)

These index benches are also known as Comparative Fit Index. CFI compares the fit of the model with the fit of the null hypothesis. Although it is similar to NFI, its distinguishing feature is that it is affected by the sample size. A value above 0.90 for CFI indicates that the model is in harmony, and a value close to 1 indicates that the model is in stronger fit (Bentler, 1990).

Root Mean Square Error of Approximation (RMSEA)

RMSEA value was between 0-1, but a value between 0-0.05 indicates perfect fit (Steiger and Lind, 1980), and a value between 0.5-0.08 indicates acceptable fit. If the value is greater than 0.10, it indicates a weak fit. In models with small samples, the RMSEA value may be misleading. In such cases, it is recommended not to consider this result (Hu and Bentler, 1999; Ulmann, 2011).

Standardized Root Mean Square Residuals (SRMR)

The SRMR index was calculated using covariance residuals, with lower values indicating better fit. The SRMR summarises the differences between the observed data and the model. The SRMR is the absolute mean of all differences between observed and implied correlations in the model. A mean of zero indicates that there is no difference between the observed data and implied correlations of the model; thus, an SRMR of 0.00 indicates perfect fit (Bentler, 1990; Weston and Gore, 2006).

3. Results and discussion

3.1. Socio-demographic characteristics of consumers

The socio-demographic characteristics of the consumers surveyed are presented in Table 1. More than half of the consumers surveyed were women (59.1%), married (59.4%), and had at least an associate degree (50.3%). In terms of age groups, the respondents aged 29 and younger comprise 37.2% of the total, those 30 to 45 years 40.1% and those 46 and older comprised 22.7%. In addition, 50.3% of consumers have at least associate degree. The proportion of those

Table 1 - Socio-demographic characteristics of consumers.

<i>Demographic Features</i>	<i>Frequency</i>	<i>%</i>	<i>Demographic Features</i>	<i>Frequency</i>	<i>%</i>
<i>Gender</i>			<i>Marital Status</i>		
Female	227	59.1	Married	228	59.4
Male	157	40.9	Single	156	40.6
<i>Education</i>			<i>Age</i>		
≤ High school graduate	191	49.7	≤ 29	143	37.2
≥ Associate degree or higher	193	50.3	30-45	154	40.1
<i>Household size</i>			≥ 46	87	22.7
≤ 4	289	75.3	<i>Job</i>		
≥ 5	95	24.7	Housewife	52	13.5
<i>Household income (TL*/month)</i>			Employee in Private sector	90	23.4
≤ 5000	186	48.4	Employee in Public sector	109	28.4
≥ 5001	198	51.6	Self-employment / tradesman	17	4.4
<i>Number of employees</i>			Retired	32	8.3
≤ 1	186	48.4	Student	58	15.1
≥ 2	198	51.6	Unemployed	26	6.8
Total	384	100.0	Total	384	100.0

* TL: Turkish Liras.

with four or fewer people living in the household was 75.3%, and the proportion of those with two or more income earners in the family was 51.6%. Almost half of those surveyed reported earning an income of 5001 TL or more. Almost one-third of the participants (28.4%) worked in the public sector and 23.4% were employed in the private sector.

3.2. Consumption of foods with GIs

Surveyed consumers were asked what the geographically marked product meant, and 62.5% of the consumers had information about the products with GI (Table 2).

The definition of the product with GI was provided in the questionnaire to clearly understand the concept of the product with GI and it was ensured that the definition was read before answering the questions about consumption. After these explanations, it was determined that 58.9% of consumers consume food with GI (Table 2). Contrary to this study, other studies have observed that having information about a geographically indicated product is quite low. For example, Teuber (2011) found that Hessian consumers' GIs awareness and knowledge were very limited. Meral and Şahin (2013) found that 23.7% of consumers living in Kahramanmaraş Province, Turkey had information about the product with GI. In a study conducted in Bang-

kok, 16.2% of consumers had knowledge of geographical indication (Lee *et al.*, 2020).

Participants were asked to respond to nine propositions using a 5-point Likert scale to determine the product with GI perception and to examine the purchase intention of the product with GI. Consumers agree with the proposition that “products with GI contribute to the producer and the economy of the region” (3.95), “products with GI are more reliable” (3.68), “consume products with GI in the future” (3.66) and “products with GI are of higher quality” (3.64), respectively (Table 3). In the studies conducted, consumers found that geographically marked products were superior to others (Van Ittersum *et al.*, 2000; Teuber, 2011; Vecchio and Annunziata, 2011; Verbeke *et al.*, 2012; Likoudis *et al.*, 2016; Kokthi *et al.*, 2016; Ahrendsen and Majewski, 2017; Kos Skubic *et al.*, 2018; Roselli *et al.*, 2018; Dokuzlu *et al.*, 2020; Lee *et al.*, 2020; Lu and Saijiki, 2021).

Table 2 - Having information about product with GI and its consumption.

	Knowing the products with the GI		Consumption status the products with the GI	
	Frequency	%	Frequency	%
Yes	240	62.5	226	58.9
No	144	37.5	158	41.1
Total	384	100.0	384	100.0

Table 3 - Perception and purchase intention on products with GI.

Code	Explanation	Min.	Max.	Mean	Std. Dev.
<i>Food with GI perception</i>					
c1	Foods with GI contribute to the producer and the economy of the region	1	5	3.95	1.052
c2	Foods with GI are more delicious	1	5	3.48	1.163
c3	Foods with GI are of higher quality	1	5	3.64	1.096
c4	Foods with GI are healthier	1	5	3.60	1.131
c5	Foods with GI are more reliable	1	5	3.68	1.097
c6	The production of foods with GI is more troublesome.	1	5	3.47	1.151
<i>Food with GI purchase intention</i>					
c7	I can pay more for the foods with GI	1	5	3.27	1.180
c8	I will consume foods with GI in the future	1	5	3.66	1.101
c9	I will increase the consumption of foods with GI in the future	1	5	3.63	1.098

1: Strongly Disagree, 2: Slightly Agree, 3: Moderately Agree, 4: Quite Agree, 5: Strongly Agree.

3.3. Model results

According to the results of the reliability analysis, nine variables to be used in the structural equation model are quite reliable ($\alpha=0.954$) and it is found that the means of the questions are different from each other (Hotelling's $T^2=201.127$; $p<0.01$). As a result of the confirmatory factor analysis, when the standard coefficients of the data belonging to the latent variable of GI perception and purchase intention were examined, the variables took values between 0.714-0.957 and all observed variables were used in path analysis because the coefficients were greater than 0.70 (Table 4).

The chi-square statistic, which was accepted as the initial fit index, was found to be statistically significant at the 1% significance level ($p<0.01$). If the χ^2/sd value is less than 3, even if the chi-square result is meaningful, the general fit of the model is a good fit ($\chi^2/sd<3$). When ex-

amining other fit values for the model, it can be seen that the model had a good fit (CFI=0.991, NFI=0.985, IFI=0.992, RMSEA= 0.059, RMR= 0.022) (Table 4).

After evaluating the fit criteria for the validity of the model, information on the non-standardized regression coefficients of the variables is given in Table 5. One of the observed variables was defined as 1 to measure the relationship between latent variables and observed variables, and the other variables were calculated according to this variable. "←" shows the direction of influence between variables. The regression coefficients of all observed variables were statistically significant ($p<0.01$).

The latent variable of food with GI perception was expressed with six observed variables, and all variables were found to be statistically significant, and the path coefficients were positive. All variables have a high effect on the perception of GI, but observed variables with the most impact are that "Foods with GI is healthier" (0.940), "Foods with GI is of higher quality" (0.925), and "Foods with GI is more reliable" (0.898), respectively (Table 6). As consumers' level of agreement with these statements increases, the perception of geographical sign increases positively.

The latent variable of intention to purchase food with GI was expressed using three observed variables (Figure 2). Based on the model, it was concluded that all observed variables have positive and statistically significant coefficients. Moreover, all the observed variables are highly influential on purchasing intentions (Table 6).

Table 4 - Model Fit Values.

	<i>Value</i>	<i>Fit criteria</i>
χ^2 (CMIN)	51.421	
P	0.000	
sd	22	
χ^2/sd	2.337	Good Fit
CFI	0.991	Good Fit
NFI	0.985	Good Fit
IFI	0.992	Good Fit
RMSEA	0.059	Good Fit
RMR	0.022	Good Fit

Table 5 - Non-standardized regression coefficients of variables used in the model.

<i>Variables</i>	<i>Effect</i>	<i>Variables</i>	<i>Estimate</i>	<i>S.E.</i>	<i>C.R.</i>	<i>P</i>
GI_purc_inten	←	GI_perception	1.086	0.073	14.950	<0.01
c1	←	GI_perception	1.000			
c2	←	GI_perception	1.251	0.070	17.915	<0.01
c3	←	GI_perception	1.280	0.065	19.843	<0.01
c4	←	GI_perception	1.342	0.066	20.205	<0.01
c5	←	GI_perception	1.244	0.065	19.107	<0.01
c6	←	GI_perception	1.038	0.071	14.540	<0.01
c7	←	GI_purc_inten	1.000			
c8	←	GI_purc_inten	1.053	0.058	18.033	<0.01
c9	←	GI_purc_inten	1.038	0.058	17.916	<0.01

Table 6 - Path coefficients of variables in the model.

Variables	Effect	Variables	Estimate
GI_purc_inten	←	GI_perception	0.859
c1	←	GI_perception	0.753
c2	←	GI_perception	0.852
c3	←	GI_perception	0.925
c4	←	GI_perception	0.940
c5	←	GI_perception	0.898
c6	←	GI_perception	0.714
c7	←	GI_purc_inten	0.848
c8	←	GI_purc_inten	0.957
c9	←	GI_purc_inten	0.946

The relationship between GI food perception and GI food purchase intention is shown in Table 5, 6 and Figure 2. According to the model result, food with GI perception had a statistically significant and positive effect on the intention to purchase food with GI (0.86). In this case, our hypothesis “Foods with GI perception affect the intention to purchase foods with GI” is accepted. Increasing the level of participation in food with GI perception by one unit increased the intention to purchase food with GI by 0.86. Many studies support this result. Due to higher quality perception, consumers are willing to pay more for local products than the others, due to higher quality (Vecchio and Annunziata, 2011; Aprile *et al.*, 2012; Deselnicu *et al.*, 2013; Lefèvre, 2014; Bishop and Barber, 2015; Kokthi *et al.*, 2016; Lu and Sajiki, 2021; Zhang *et al.*, 2022).

The study conducted in Albania determined that consumers who pay attention to taste and origin are willing to pay more (Kokthi *et al.*, 2016). According to Lu and Sajiki (2021), con-

sumers are willing to pay an extra 8.2% for Tagonoura Shirasu compared to products that are not certified under the GI protection system. Zhang *et al.* (2022) find that consumers are more willing to purchase hometown GI products than non-hometown GI products. GI products are frequently in higher demand and sold at higher prices than non-GI products (Vecchio and Annunziata, 2011). Consumers are willing to pay the highest premium price for a product with a PDO label, followed by a product with an organic food label, and finally a product with a PGI label (Aprile *et al.*, 2012).

4. Conclusion

This study was designed to determine the effect of consumers’ perceptions of GI on purchasing intention. Information about foods with GI was obtained from the consumers, while the explanations and definitions of GI given in the questionnaire contribute to the increase in consumers’ knowledge and to raise awareness of products with GI. These findings appear to be significant for all market participants involved in the supply chain of GI with food as they may serve as a guide for developing production and marketing strategies.

It is obvious that awareness of the concept of GI is still not fully formed, but according to the studies carried out in the past years, awareness is increasing progressively. In addition, it is understood from the results of the study that the GI promotion and advertising activities of the Turkish Patent and Trademark Office, commodity exchanges and chambers, municipalities, and other registered institutions and organisations

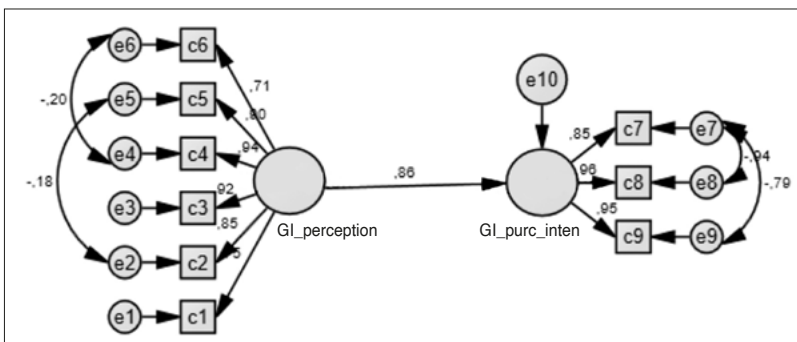


Figure 2 - Path analysis result.

have positive reflections on the product with GI awareness and consumption.

As a result of this research, it has been determined that the contribution of the product with GI to the region and the country's economy, being more delicious, healthy, reliable, and of better quality, will have a positive effect on the intention to purchase foods with GI. Moreover, consumers have positive opinions about foods with GI and are willing to pay more than for other foods. The fact that consumer perception do not change is closely related to the performance of GI foods. Strict monitoring of the production processes of GI foods and ensuring continuity in food production will increase the consumer demand for geographically marked foods. As in this study, in many studies, it has been determined that consumers are willing to pay more for geographically marked foods and are willing to buy. This result can contribute to the income guarantee of farmers and sustainability of production.

Carrying out this research in the provinces located in each region of Turkey and including information about foods with GI makes it important. More information on food with GI would help us to establish a greater degree of accuracy on this matter. Therefore, it is extremely important to focus on other GI product groups in other studies to be carried out, in terms of expanding the subject and guiding researchers and stakeholders working on this subject.

Although this study provides a comprehensive analysis of Turkish consumers' intention to purchase food with geographical indication, given the study's emphasis and scope, some shortcomings deserve further investigation to improve the current study's external validity. We suggest that regionally indicated products be classified into product classes such as milk and dairy products, grains, and handicrafts in future investigations.

In addition, the data for this study were collected in November and December 2020. The fact that the effect of the pandemic was not included in the study is an important shortcoming. Investigating whether the pandemic affects the consumption of geographically marked foods, which are thought to be healthier and of higher quality by consumers, will improve the quality of future studies.

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