

The role of the certificates on consumers chicken meat and egg choice in Antalya central districts

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Abstract

Purpose: The aim of this study is to determine whether food certificates, including organic, Good Agricultural Practices, and Halal labelled products, plus cooperative-owned brands for eggs, have an important role in consumer choice decisions and whether there exist different consumer segments.

Design/Methodology/Approach: The data used in the research was collected via a face-to-face survey conducted with 282 respondents responsible for household food purchases in three central districts of Antalya in the autumn of 2021. The data obtained by the survey consist of behavioural, socio-economic, and demographic variables and were analysed with multivariate statistics.

Findings: The results of factor analysis indicate that three factors account for 74% of the variance in chicken meat choice: certifications (36.3%), economy (23.1%), and freshness (14.7%). For eggs, three factors account for 73% of the variance: certifications (33.7%), freshness (24.2%), and economy (15.0%). The K-means cluster analysis with the factor score data resulted in three clusters for chicken meat and two clusters for eggs being adequate. This study revealed that certification is the primary major factor explaining variance in consumer choice decisions in both chicken and eggs. The segmentation result indicates that freshness and price are still primary discriminatory variables for about 90 per cent of consumers in both products.

Originality/Value: This study attempts to contribute to the gap in the national literature with respect to broiler meat and eggs. The results can serve as a basis for strategy development by policymakers, producers and downstream value chain actors and enhance consumers' knowledge about product labels, including the meaning of various certificates.

Keywords: Chicken meat consumer, egg consumer, food consumer behaviour, food market segmentation.

Antalya merkez ilçelerinde tüketicilerin tavuk eti ve yumurta tercihinde sertifikaların rolü

Özet

Amaç: Bu çalışmanın amacı; organik, iyi tarım uygulamaları ve helal etiketli ürünler ile yumurtada kooperatif markasının tüketici tavuk eti ve yumurta tercih kararında önemli bir rolü olup olmadığını ve farklı tüketici segmentlerinin olup olmadığını belirlemektir.

Tasarım/Metodoloji /Yaklaşım: Araştırmada kullanılan veriler, 2021 sonbaharında Antalya'nın üç merkez ilçesinde hanehalkı gıda satın alımından sorumlu 282 katılımcıyla yapılan yüz yüze anket yoluyla toplanmıştır. Anket yoluyla elde edilen veriler davranışsal, sosyoekonomik ve demografik değişkenlerden oluşmakta olup çok değişkenli istatistiklerle analiz edilmiştir.

Bulgular: Faktör analizi sonuçları, tavuk eti tercihindeki varyansın %74'ünün üç faktörden kaynaklandığını göstermektedir: sertifikalar (%36,3), ekonomi (%23,1) ve tazelik (%14,7). Yumurtalar için varyansın %73'ünü üç faktör oluşturmaktadır: sertifikalar (%33,7), tazelik (%24,2) ve ekonomi (%15,0). Faktör puanı verileriyle yapılan K-ortalamalar kümeleme analizi, tavuk eti için üç kümenin ve yumurta için iki kümenin yeterli olduğunu ortaya koydu. Bu çalışma, sertifikasyonun hem tavuk hem de yumurtada tüketici tercih kararındaki varyansı açıklayan en önemli faktör olduğunu ortaya koydu. Segmentasyon sonucu, tazelik ve fiyatın her iki üründe de tüketicilerin yaklaşık %90'ı için hala birincil ayırt edici değişkenler olduğunu gösteriyor.

Özgünlük/Değer: Bu çalışma, piliç eti ve yumurta ile ilgili ulusal literatürdeki boşluğa katkıda bulunmayı amaçlamaktadır. Sonuçlar, politika yapımcılar, üreticiler ve değer zinciri aktörleri tarafından strateji geliştirme ve tüketicilerin çeşitli sertifikaların anlamı dahil olmak üzere ürün etiketleri hakkındaki bilgilerini artırmada altlık olarak kullanılabilir.

Anahtar kelimeler: Tavuk eti tüketicisi, yumurta tüketicisi, gıda tüketici davranışı, gıda pazar segmentasyonu.

INTRODUCTION

The ongoing technological and industrial revolution has had a significant role in various dimensions of people's lives, including food habits, the environment, and society (Islam et al., 2018). The pattern of food consumption, particularly meat consumption, is continuously changing due to several factors, such as socioeconomic and cultural drivers as well as the differentiated lifestyles of consumers (Bernués et al., 2012). The progress in technology, corporate strategies, and public policy, together with urbanisation, increasing prosperity, and social changes, are global factors that contribute to the observed dietary changes (Vermeulen et al., 2020). Peoples have been increasing their consumption of animal-based food, sugar, fats and oils, refined cereals, and processed foods because of higher income and urban development (Hawkes et al., 2017). Multinational-transnational companies have an increasing role in what is produced and what people consume, which have been converging on Western-style diets, which are heavy in calories, proteins, and animal-based meals (Ranganathan et al., 2016). According to Kearney (2010), food consumption is influenced by various factors, including food availability, accessibility, and choice. Besides food availability, food demand has increased due to real per capita income rising and declining real food prices (Kearney, 2010). As people migrate away from cereals and starch crops, food diets tend to diversify in terms of both healthy and unhealthy foods. Intakes of nutrient-dense foods such as fruits and vegetables, dairy, chicken, and fish tend to rise, reflecting an increase in dietary diversity and nutrient sufficiency (intake of bioavailable vital vitamins and minerals) changes (Brouwer et al., 2021). It has observed five key consumer trends and factors that influence food choice: food safety and health benefits, corporate social responsibility (CSR), production methods and innovation, sustainability, and food origin (Lappo et al., 2015). In recent decades, people's consumption patterns have been rapidly changing due to increased awareness of the significance of food safety, health advantages, environmental impacts, and animal welfare. Consequently, people develop an interest in organic food (Yeh et al., 2020).

In Türkiye, demographic, socioeconomics, economic and lifestyles factors affecting dietary transition and consumer purchase decisions have undergone significant changes over the past few decades as observed in worldwide. However, the country's population reached 85.7 million persons at the end of 2024 (TurkStat, 2025). In addition to the citizens, foreign populations holding residency permission exceeded 1,480 thousand inhabitants in 2024 (TurkStat, 2025) and Syrians Refugees with temporary protection status exceeded 3,536 thousand at the end of 2022 (RASAS, 2023). Considering demographic changes, as of 2024, percentage of aging population has reached 11% while average size of household has dropped to 3.1 person (TurkStat, 2025). The proportion of the people residing in provincial and district centres climbed from 65 percent in 2000 to 77 percent in 2012 and 93.4 percent in 2024 (TurkStat, 2025). As a consumer prosperity measure, per capita gross domestic product (GDP) in Türkiye increased from US dollars 4,249 in 2000 to 13,243 in 2023 (TurkStat, 2024a). In conjunction with per capita income growth, share of food and non-alcoholic beverage in household consumption expenditure has declined from 26.7 % in 2002 to 20.6% in 2023 (TurkStat, 2024b). The proportions of meat-fish-seafood and dairy products-eggs in household food and non-alcoholic beverage expenditures were calculated as 19.4% and 13.3%, respectively in 2019 (TurkStat, 2020). In 2021, per capita annual disappearance consumption of chicken meat and eggs was calculated to be 20.1 kg and 12.7 kg, respectively. In the human history, animal-based foods intake per capita has had a significant contribution to nutritional diversity-quality and consumption culture. Within animal-sourced food category, poultry has held a prominent position. The increase in chicken meat consumption was driven by real price decline of chicken, innovative packaging like tray packs and health concerns in USA (Onyango et al., 2009). The globally per capita daily egg consumption levels measured in Kg recorded a two-fold increase, particularly in developing countries (Kearney, 2010). Egg become the main suitable staple food with its moderate calorie (each 100 gr includes 150 kcal) and affordable rich protein sources for dietary needs of peoples in worldwide (Rondoni et al., 2020). As observed in worldwide, food demand changes have also occurred with respect to production system in Türkiye. As a matter of fact, Organic egg production exceed 134 million pieces in 2023 which constitute just 0.65 percent of total production in 2023. Organic chicken meat output reached 3,349 metric tons (only 0.14 percent of overall production) in 2023 (MoAF, 2025). Good Agricultural Practice (GAP) labelled chicken meat output realized as 571 million kg (24.5% of total) in 2023 (MoAF, 2025). The share of GAP labelled eggs was recorded only 57.5 million pieces (0.27 % of total) in the same year. Food label (certificates) such as organic agriculture, good agricultural practice (free-range), and Halal (based on feed content and slaughtering practices) are used to differentiate products (both by producers and retailers) and to meet rising consumers' demand towards to quality, food safety, environmental sustainability, and cultural values. In addition, some supermarket chains including cooperatives' owned supermarkets sell agricultural cooperative-branded eggs (both organic and non-organic label) as part of a product diversity and differentiation strategy. As observed in worldwide, chicken meat and eggs are the primary sources of animal protein for consumers, and chicken meat accounts for over two-thirds of the nation's

total meat consumption in Türkiye. In contrary to increasing importance of food labels in food value chain, the influence of them including also cooperative-owned brands on consumer chicken meat and egg has not been well studied. Therefore, this study aims to determine the role of certificates (health and environmental sustainability, animal welfare, and cultural values) and cooperatives' owned brand (in the case of eggs) on consumers' choice decisions when purchasing chicken meat and eggs, as well as whether there are statistically significant consumer segments based on behavioural, socioeconomic, and demographic variables. The results of this study can serve as a basis of strategy development by producers, policy makers and value chain actors to target to various consumer segments and enhancing consumers' knowledge about product's labels including meaning of various certificates.

The second section of this study reports the literature review. Section three describes the data used in the study and the empirical approach. In section four, the results of empirical analysis are discussed. Section five presents the main conclusions and recommendations derived from the results.

Literature Review

Searching literature via Google Scholar using terms such as "factor affecting (impacting, determining, etc.) chicken meat (egg) consumer behaviour and segmentation of chicken meat (egg) consumers" revealed a limited number of studies published, particularly for eggs. Here, the main results from the most relevant literature are listed by publication date and alphabetical order, along with the study's goals, the data used, the sampling size and data collection tool, the analytical method, and the main data from each study.

Onyango et al. (2009) conducted a study in the USA that classified consumers of chicken meat based on the perception-preference relationship. The study used a nationally representative survey (n=1200) that included two questions to measure the public's knowledge, attitudes, and behaviours regarding the threat of avian influenza (AI). The survey data was analysed by principal component analysis. The results of the study confirmed that how safe people think chicken is has a big effect on their decision to eat it during an AI outbreak. The poultry meat product market was classified into three categories based on perceived safety. In Turkey's Erzurum province, a study was done to look into the things that make people think and act differently about buying chicken meat (Topcu et al., 2015). In this study, principal component factor analysis and K-means cluster analysis were used to examine the rating scores based on five-point Likert scale assessments of 49 variables supposedly associated with consumers' chicken meat purchasing decisions. The study, based on a "food-related lifestyle," examined the habits of purchasing and consuming chicken breast in Spain (Ripoll García et al., 2015). They utilised data from an online survey in 2013, which included a valid sample size of 1237 individuals in Spain. The survey instrument included questions regarding socioeconomic and food-related lifestyle variables. We presented the questions about food-related habits and chicken perception as dichotomous true/false statements. The consumers were categorised into four age segments. The study used lifestyle and attitude variables about chicken breast to find groups that were similar (clusters). Subsequently, we examined the relationship between sociodemographic variables and the clusters using cross-tabulation (the chi-square test) to identify the profiles of the clusters. Finally, the study identified four clusters for chicken breast.

A choice experiment based study in Norway (Gerini et al., 2016) with online survey panel data conducted 2013 aimed to analysed consumers' egg choice. The sample comprises 948 Norwegian consumers' household main food purchasers. The choice experiment used attributes included four production technique, two package size, eight price level, and two different size (medium and large). The choice experiment had been conducted without a no-choice option and required respondents to rate four egg cartons, labelled A, B, C, and D, in order of preference from 1 indicating most preferred to 4 indicating the least preferred carton. A rank-ordered mixed logit model with a random utility function was used to estimate the choice experiment data. The survey questionnaire incorporated the frequency of organic food purchases. To examine the perspectives of the three behavioural segments, the researcher requested from participants to indicate the level of importance using a 6-point scale. The elaboration of the data reveals that the segment consuming the highest amount of organic food is, as anticipated, willing to pay a substantial premium for organic eggs compared to animal-welfare certified eggs. Findings also indicate existence a segment that actively seeks to reluctant to purchasing organic eggs if its price is equal to that of non-organic eggs. A study conducted in Poland aimed to determine the composition of consumer preferences regarding farming practices and nutritional improvements in eggs (Żakowska-Biemans & Tekień, 2017). The study utilised data gathered by computer assisted personal interviews (CAPI) from a countrywide representative survey (n=935) with individuals aged 21 years and older who are responsible for food shopping in their households. A conjoint analysis based discrete choice technique was employed to determine consumer preferences about several product attributes. The experimental choice design displayed on screen (without non-choice option) incorporated the following attributes: farming system, breed, health

benefits claim, egg size, packaging size, and price. A hierarchical cluster analysis was employed to determine consumer segmentation, resulting in the identification of four distinct clusters. The study results indicated that price and farming system had the highest mean importance in influencing consumers' preferences. In Italy, consumer segmented with employing actual purchase information (revealed preferences) on sustainability and health-related product labelling data obtained from grocery chains (Sarti et al., 2018). In this study, products were differentiated based on the value provided by the product label (public, private, or both), and five types of labels, including four food labels (social equity, health, organic, and vegan) and one non-food label (ecology). After defining the categories, an indicator was developed that accounted for the proportion of consumers that purchased the five sustainability and health-related labelled product categories relative to total expenditures in each category during a 30-month period in Italy. Subsequently, cluster numbers were determined using a non-hierarchical clustering (k-means) method. A study realized a study to assess consumer behaviour, sensory perception, and characteristics of farm eggs produced in Chile/Los Ríos (Berkhoff et al., 2020). The study collected data from 197 respondents (≥ 18 years) via an online survey. Additionally, a sensory evaluation was conducted with the untrained panellists. The evaluation included four types of eggs. The sensory panel data was analysed by principal component analysis (PCA). The results indicated that egg price and size account for 31% of the criteria influencing survey participant's egg purchasing decisions and yolk colour is the most significant attribute among the physical attributes. The farm eggs (either brown or blue) were received the highest sensory evaluation. The study revealed that brown farm eggs were the preferred choice by the most respondents (40%) in both the sensory evaluation and the survey. A systematic and comprehensive literature survey used published literature to examine consumer behaviour, attitudes, and preferences regarding eggs (Rondoni et al., 2020). The systematic literature review exclusively relied on 34 empirical research published in scientific journals over the years 2010-2019. These publications were written in English and examined several aspects of consumer behaviour, including perceptions, attitudes, preferences, and willingness to pay for eggs. The primary findings and conclusions were derived from the review: consumer preferences for eggs are primarily influenced by intrinsic and external attributes, as well as socio-cultural variables. Although pricing has significant importance, particularly in developing nations, the method of production in developed countries is a significant product attributes influencing consumers' perceptions of the health, safety, and sensory characteristics of eggs. The consumers' organic egg buying intension was explored using SEM model (Onurlubaş et al., 2020) in İstanbul/Türkiye. The authors of the study considered that food safety, information source, nutritional quality and health consciousness affects eggs buying intension. The data was obtained from 220 consumers by convenience sampling method in İstanbul, 2019. The study result indicates that food safety, nutritional value and health consciousness have a statistically significant effect on the intention of consumers to purchase organic eggs. It was assessed preferences of customer's eggs purchasing in Hungary and Italy in 2018 (Yeh et al., 2020). The researchers collected survey data from a sample of 430 individuals in Hungary and 404 individuals in Italy during the summer of 2018. The researchers utilised random parameters logit models to analyse the outcomes of a discrete choice experiment (DCE). The DCE design was based on the process and product characteristics: organic labelling (no-label and EU label), four nutrition and health claims, and four price levels. The investigation revealed that the price is the primary attribute, followed by the nutritional and health claim and the organic label for both Hungarian and Italian consumers. Using latent class models, three distinct segments of egg consumers in each country were identified. Both countries had similar consumer groupings, referred to as "price sensitive", "quality-optimising opportunist", and "health conscious". According to the authors' interpretation, health-conscious shoppers in Hungary (46%) and Italy (49%) showed a greater preference for eggs with organic labels and nutritional claims compared to other labels. These buyers were also willing to pay a higher price premium for such eggs. The study carried out in Spain (Escobedo del Bosque et al., 2021) aimed to understand the underlying attitudes and social norms that influence chicken meat choices. The study used the data obtained ($n=934$ valid sample size) via an online survey (using quota sampling based on gender, age, education, and income) conducted in 2018. The survey instrument included a discrete choice experiment (DCE) design, consisting of four alternatives, and incorporated aspects of the theory of planned behaviour (TPB). The design options for the DCE were determined by considering factors such as breeding (two types), specific breeds (three options), pricing level, origin (three options), and feed origin (three options). During the survey, participants were initially screened to include only those who consume chicken meat. Subsequently, they were asked additional questions regarding their consumption frequency and purchasing patterns in terms of product attributes. The DCE was provided with 10 sets of choices, each containing 3 products along with the alternative option of "I would not buy any of these products". The responses of the participants to the 21 questions related to the extended TPB construct were evaluated using confirmatory factor analysis. The study divided customers into several groups based on their responses in the DCE; thereafter, a latent class analysis was conducted to ascertain distinct consumer segments. The LCA identified three distinct consumer groups: price-sensitive consumers (22.8%), price-sensitive and origin-orientated customers (20.0%), and origin-orientated consumers

(57.2%). An analysis was performed with survey data on chicken and turkey meat consumption, including processed forms, to segment Spanish consumers (Puig et al., 2021). The survey conducted with adult respondents residing in mainland Spain resulted in a sample size of 625. The survey instrument included a shortened version of the "food-related lifestyles (FRL)" item questions, buying behaviour, and socioeconomics and demographics. The statistical analysis employed for analysis consists of univariate, bivariate, and multivariate techniques such as principal component factor analysis and K-means cluster analysis. The elements that are encompassed in the FRLs were assessed utilising a 5-point Likert scale. The survey data analysis identified and categorised five customer segments. The consumer preferences and their willingness to pay on organic eggs and juice were examined in Belgium/Flanders (Van Loo et al., 2021). They employed a latent class model (LCM) in the data analysis. The study realised a cross-sectional consumer survey with 693 individuals (≥ 18 years old) responsible for household food expenditure in Belgium/Flanders in 2013. The survey instrument comprises three sections: discrete choice experiment (DCE) design questions, consumers' attitudes towards organic food and private brands, including trust and perceived quality, and sociodemographic questions. The DCE design incorporated three key variables in consumer food choices: brand (national vs. private), presence of the EU organic label (present vs. absent), and pricing (four levels per pack with 10 pieces). The LCM analysis explored diversity in consumer preferences for the production method and brand and found three distinct segments. The first segment consists of 50% of consumers who choose private label organic eggs, while the second segment consists of 25% who prefer organic eggs, and the remaining 25% were found to be indifferent between the brand and organic options. The factors that influence customers' purchasing decisions for fresh eggs were examined in Taiwan (Yang & Nugraha, 2021). The research aimed to categorise egg buyers, identify each segment, and determine the consumer willingness-to-pay (WTP) for several characteristics of fresh eggs, such as colour, traceability, animal welfare, brand, and price. The study gathered data by employing both online surveys utilising Facebook advertisements and offline surveys conducted in locations near markets, schools, and train stations around Taiwan between July and September in 2020. A total of 1115 valid replies were obtained from the target respondents, who were specifically fresh egg customers. In addition to sociodemographic data and screening questions, the survey instrument incorporated a choice experiment (CE) design with five attribute levels: brand (farm, private), colour (white, brown), traceability (with QR code, not provided), animal welfare (provided certified label, not labelled), and price (four levels per box). The LCM was utilised to analyse the CE data. The findings indicated that Taiwanese customers have a willingness to pay a premium for attributes related to animal welfare, traceability, farm brand, and brown-coloured eggs. The attribute of animal welfare has a notable impact on consumers' decision-making, with the animal welfare label being the most influential, followed by the traceability label, farm brand, and brown-coloured eggs. Three customer segments were found through analysis. The consumer behaviour in relation to Halal labelled chicken meat was studied in Indonesia (Rizkina et al., 2022). The model was constructed based on the "theory of planned behaviour (TPB)". The study collected data by distributing questionnaires to 120 respondents (determined by convenience and snowball sampling) to assess various dimensions of the extended TPB model, including attitudes, subjective norms, behavioural control, knowledge, and religious commitment towards purchasing chicken meat with a halal label. The extended TPB has six latent variables that correspond to 18 observable variables. These observed variables measure respondent attitudes using a 5-point Likert scale. The hypothesis related to the expanded TPB was tested using a Structural Equation Model (SEM). The SEM analysis reveals that behavioural control and religious commitment have a substantial impact on the purchasing behaviour of chicken meat with the Halal label. A study realised in the Czech Republic (Špička & Náglová, 2022) segmented the meat market with cross-section data obtained from a computer-supported online survey with 1021 people subject to sex, age and region quotas; a total number of 992 respondents (18 to 65 years old) were verified as appropriate for analysis. In the study, a 19-item questionnaire with dichotomous (yes=1 or no=0) self-reporting questions was employed. The questions were classified into three distinct categories: visual attributes, experience attributes, and credence attributes. The respondents' socio-demographic characteristics encompass age, number of children, presence of children under 18 years old, household size, sex, education, occupation, income category, municipality size, and region. Since its suitability for dichotomous variables, an exploratory latent class analysis (LCA) was used to evaluate the data and categorise consumers. The analysis yielded three main segments referred to as quality-conscious (39.3%), self-conscious (34.7%) and health-conscious (26.0%). In Germany, consumers' actual purchases of fresh meat cuts obtained from nationally representative household scanner data (validated sample = 11,487) were used for consumer segmentation. The scanner data was collected by the GfK Consumer Panel built on nonprobability quota (socio-demographic) sampling (Thies et al., 2023). The study utilised exploratory principal component analysis (PCA). In the second stage, a two-step cluster analysis was conducted using both hierarchical and non-hierarchical methods. The monthly purchase shares of the product categories, obtained from the PCA, are aggregated and utilised as inputs for the segmentation process. The distinct segments were initially described by evaluating statistically significant differences in purchased quantity,

expenditures, unit value, and shopping locations using a Kruskal-Wallis H test. To provide a more detailed characterisation of the clusters, a multinomial logistic regression (MNL) was estimated, with the cluster type being the variable of interest. The independent variables include socio-demographics, total purchased quantity, shopping locations, and attitudinal remarks. The study revealed four clusters.

MATERIAL AND METHOD

The data of this study was collected with a face-to-face survey conducted with 284 people (age > 18, responsible for food shopping) belonging to households located in three central districts of Antalya province (namely, Kepez, Muratpaşa and Konyaaltı) in Türkiye. These three districts constitute almost 50 per cent of the province's population as of 2021 (TurkStat, 2022). The survey was realised in front of the five different supermarket chains' outlets at different locations. The ethical approval for these forms was obtained from the Research Ethics Committee of Selçuk University Agriculture Faculty on 18.07.2023. The sampling method employed to determine the sample size is given by equation (1) below (Cochran, 1977; Oğuz & Karakayacı, 2017; Yamane, 2001).

$$n = \frac{N*(1-p)}{(N-1)*D^2 + p*(1-p)} \quad [1]$$

In equation (1), lower case n stands for sample size, capital N stands for total household numbers in central districts, p represents the ratio of consumers regularly and frequently purchasing cooperative branded food products in the population (assumed to be 0.5), and $\frac{d}{t}$ represents variance, d represents permitted error (0.1), and t stands for assumed confidence level (90%). In the field study, five per cent more respondents were interviewed than the sample size, so a total of 284 fully completed questionnaires were achieved. The survey study was implemented during October through December in 2021. The instrument used in data gathering includes questions on socioeconomic-demographic variables and scaled questions about consumer food choice behaviour with respect to chicken meat and eggs. A ratio scale was used to obtain the rating score of consumers on chicken meat and egg purchasing-related attributes. The following question was asked to the respondent to obtain their ratings on the variables related to product choice decisions. "How important are the following features to you when purchasing chicken meat and eggs? (Please answer using the scale given below.)" The metric variables obtained using a ratio scale from 0 (not at all important) to 10 (very important).

The primary goal of market segmentation is to separate a broad target market into distinct groups of consumers who possess similar needs, expectations, and interests (Huseynov & Özkan Yıldırım, 2019). Segmentation is the process of dividing actual or potential customers in each market into distinct groups. It leverages variations among groups in their responses to market variables that reflect values and lifestyles, as well as a list of values (Onyango et al., 2009). A variety of factors has a role in consumer heterogeneity (in terms of their views, behaviour, and habits), such as product-related attributes, environmental factors, and media exposure, among others. In this context, cluster analysis is a useful statistical technique to obtain insights into the preferences and needs of diverse consumers (Franco Lucas et al., 2023). In the literature, variables of consumers' segmentation are categorised by geographic, demographic, psychographic and behavioural (Huang & Chien, 2006; Huseynov & Özkan Yıldırım, 2019). The behavioural segmentation approach uses consumers' actual behaviour and the way they respond to use or know of a product (Gazdecki et al., 2021). Consumers' purchasing history, product usage habits, brand loyalty and purchase reasoning are the variables used in the behavioural approach (John et al., 2012). Behavioural segmentation can be subdivided into different types, including purchasing behaviour (consumer disposition such as pricing, variety, differences relative to alternatives, and so on), benefits offered, buyers' journey, customer engagement (using habits) and timing (Formplus, 2023). Consumers' preferences, behaviours and perceptions about meat and meat products are heterogeneous and affected by multidisciplinary aspects, including psychological, sensory and marketing aspects (Font-i-Furnols & Guerrero, 2014). Psychological factors consist of attitudes, risk, expectations, socio-cultural and lifestyle values. Product visual appearance, odour, flavour, and in-mouth texture constitute sensory attributes of a product. Marketing aspects include price, availability, label, and brand of product (Font-i-Furnols & Guerrero, 2014). Four main factors which affect the consumer buying behaviour are personal, psychological, social and economic (Qazzafi, 2020). In this study, the attributes listed in the instrument for data gathering are consistent with purchasing behaviour variables and socioeconomic-demographic variables; therefore, this study was built on a "behavioural segmentation" approach. But the number of attributes only includes a subset of the attributes used in the literature because of considering the difficulties of face-to-face interview-based questionnaire implementation during the COVID-19 pandemic period. The hypotheses of the study are as follows. H1: Certificates or product labels (organic,

good agricultural practices-GAP, Halal and cooperatives' owned brand in the case of eggs) are important factors for explaining consumer chicken meat and egg choice/purchasing behaviour. H2: There exist at least two or three consumer segments (statistically significant) which have different profiles, and product labels (certificates) have at least an important role in one of these segments.

In the first stage of this study, a factor analysis technique is employed to reveal the role of the factors on consumer decision attributes when they are shopping for chicken meat and eggs. The factor score of the varimax-rotated factor solution is saved for further multivariate statistical analysis, such as K-means cluster analysis, to determine cluster number. Cluster profile is identified according to the cross-tabulation (Chi-Square) and one-way ANOVA results between clusters and socioeconomic and demographic variables (Hair et al., 2010).

RESULTS AND DISCUSSION

Descriptive statistics of the survey conducted with 282 respondents are given in Table 1.

Table 1. Demographic and Socioeconomic Characteristics of Survey Respondents

	Frequency	%
Female	169	59.5
Male	115	40.5
Married	155	54.6
Single	100	35.2
Divorced	16	5.6
Others (married lives apart, wife/husband died)	13	4.6
Primary School	39	13.7
Secondary	7	2.5
High school	95	33.5
Vocational School (or associate degree)	14	4.9
Faculty Graduate	112	39.4
Master and PhD	17	6.0
0-12 (infancy and childhood)	99	15.7
13-18 (adolescent/young)	66	10.5
19-64 (working age population)	453	71.8
65+ (aging population)	13	2.1
Public Servant	67	23.6
Working in the private sector	107	37.7
Works at own business or works	38	13.4
Agriculture producer/employee	2	0.7
Retired	18	6.3
Unemployed	22	7.8
Students	18	6.3
Other (i.e., housewife)	12	4.2
Executive/Manager	19	6.7
Office workers	35	12.3
Artist etc. service worker	8	2.8
Professional occupation	96	33.8
Service and salesperson	44	15.5
Machine operator, assembler and technician	6	2.2
Agriculture, Forestry, Fishing etc. service worker	4	1.4
Unqualified service workers	72	25.4

As seen in Table 1, the average age of respondents is 36.5 years ($Sd = 11.8$), 59.5% of respondents are female, 54.5% of respondents are married, and 35.2% of respondents are single. Respondents are highly educated persons (almost 50% are university graduates and 33.5% are high school graduates); 71.8% are working-age population, and almost one-third of respondents are in professional occupations and one-quarter are unqualified service workers. The mean score of respondents' ratings of attributes of chicken meat and eggs is given in Table 2. As seen from the table, final consumption and production dates are the most important product attributes from the viewpoint of consumers. Product price and price discount/promotion are highly important product attributes when consumers are shopping for these products. The score of certificates is comparatively low when consumers is shopping. This can be related to the number of consumers purchasing products with sustainability (organic) and cultural certificates (halal). Based on these descriptive statistics, it can be said that consumers are very price sensitive. Either final consumption or production dates are highly important product attributes.

Table 2. Respondents' Rating Score of Product Attributes of Chicken Meat and Eggs

Product Attributes	Chicken Meat	Std.	Eggs	Std.
Brand	7.738	2.288	6.975	2.639
Prices	8.301	2.284	8.113	2.215
Price discount/promotion	7.979	2.527	8.004	2.418
Retailer (Seller)	6.723	2.994	6.261	2.886
Expiry date	9.220	2.151	9.180	1.909
Production date/freshness	8.883	1.861	8.641	1.903
Good agriculture practice certificate (GAP)	4.993	2.960	5.271	3.040
Organic product certificate	5.582	2.942	5.820	3.063
Halal certificate	6.422	3.345	NA	
Cooperatives' branded product	NA		4.789	2.792

Note: NA indicates that the attribute was not asked to respondent.

The Cronbach's alpha value of attributes rated by respondents is 0.73, which is greater than the threshold value of 0.7, confirming the consistency of the measurement instrument scale (Hair et al., 2010). Goodness contrasts of factor analysis confirmed both the adequacy of sampling and whether variables are correlated for factor analysis. As a matter of fact, the Kaiser-Meyer-Olkin (KMO) index value found was 0.64, which indicates adequacy of sampling at the margin for analysis since the index value between 0.6 and 0.7 is interpreted as mediocre. Bartlett's test of sphericity indicates that the variables in the factor model are correlated since the Chi-Square value with 21 degrees of freedom is 582.29 with a p-value equal to 0.000 at the 95% confidence level. According to the Eigenvalue (>1), three factors were selected, which explain 74% of cumulative variance. This result is 14 percentage points higher than the minimum acceptable level of variance (60%) in social sciences. The communality value (<0.5) of product brand and retailer variables in the initial solutions stage suggested exclusion of these variables in the rotated factor solution. It was found that retailer and product brand are less important factors in ranking among twenty factors rated by representative broiler meat consumers in the UK (Walley et al., 2014). Varimax orthogonal rotation is preferred since this rotation aims to maximise the variance of the squares of the charges of each factor in the S matrix. As a result, each factor gets several variables with high loadings. Varimax directly simplifies the columns of the load matrix and facilitates the interpretation of factors (Mulaik, 2009). The result of the rotated factor solution, eigenvalues of factors and variance explained by factors are given in Table 3. Reviewing the coefficient of factor-variable pairs, the first factor (F1) is highly correlated with variables of good agricultural practices (free-range chicken), organic products and Halal certificates. Thus, the first factor is called as the "Certificate Factor". The second factor (F2) is highly correlated with price and price discount/promotion. Hence, this factor is named as "Economic Factor".

Table 3. Rotated Factor Solution for Chicken Meat

Variables/Factors	F1 Certificates	F2 Economy	F3 Freshness	h ²
Price	0.05	0.89	0.00	0.79
Product discount/promotion	0.00	0.85	0.25	0.78
Expiry date	0.10	0.19	0.82	0.72
Production date/freshness	0.20	0.03	0.80	0.67
Good agriculture practices certificate	0.88	-0.09	0.23	0.84
Organic product certificate	0.84	-0.08	0.28	0.79
Halal product certificate	0.69	0.33	-0.08	0.59
Eigen value	2.54	1.61	1.03	
Variance	36.30	23.06	14.68	
Cumulative variance	36.30	59.35	74.03	

The third factor, F3, is highly correlated with both expiry and production date (reflecting freshness); therefore, this factor is named the "Freshness Factor". These three factors together explain 74% of the variance of variables affecting consumer chicken meat purchase decisions. Results of factor analysis are consistent with previous studies; as a matter of fact, freshness reflected by expiry date and product safety (health) quality attributes were found to be important variables when consumers purchased chicken meat (Aytop, 2019; Topcu et al., 2015). Previous studies also confirmed that price and promotion-related factors are among the important factors explaining consumer preferences on chicken meat consumption (Topcu et al., 2015). However, a study entitled "Consumer preferences and consumption situation of chicken meat in Ankara Province, Türkiye" used survey (face-to-face interview) data obtained from 450 households and found that the first four product attributes in terms of consumer ranking are price, taste, nutritional quality, and conditions relating to health (Aral et al., 2013). It was also found that consumer ranking of attributes is changing by income level. However, price was taken into place in the first ranking for households having an income lower than the sampling average, and conditions relating to health attributes were found in second place for households

with an income level higher than the sampling average. Among the product attributes, freshness, production date and product quality were found to be the most important attributes in the ranking of rating scores according to the Likert measurement scale (Parlakay et al., 2022). It was found that the expiration date (end use data) and freshness were the most important factors that consumers paid attention to when purchasing poultry meat (Haskaraca et al., 2022). Product freshness (reflected with use by date) was also found to be the most important factor among the factors impacting the purchase of poultry meat in the UK (Walley et al., 2014). The Cronbach's alpha value of the variables affecting egg purchase decisions was found to be 0.69, which confirms the consistency of the measurement scale used for respondent rating. In the second step, the metric data obtained using the rating scale was analysed by principal component factor analysis with a correlation matrix to determine factors affecting consumer egg purchase decisions. Goodness of fit measures of the explanatory factor analysis confirmed adequacy of sampling and statistically significant interdependent relationships of variables. However, the Kaiser-Meyer-Olkin (KMO) index value was found to be 0.61, which confirms an acceptable level of adequacy of sampling for analysis at the margin. Bartlett's test of sphericity indicates that variables in the factor model are highly correlated since the Chi-Square value with 21 degrees of freedom is 545.90 and the p-value is equal to 0.000 at the 95% confidence level. According to the eigenvalue (>1), three factors were selected, which explains 73% of cumulative variance, well above the acceptable minimum level in social sciences. Communality is valueless if less than 0.5 for product brand and retailer, which are excluded in the rotated factor solution stage. Varimax rotation is preferred since the variance explained by factors is not very skewed. The result of the rotated factor solution, eigenvalues of factors and variance explained by factors are given in Table 4. Reviewing the coefficient of factor-variable pairs, the first factor (F1) is highly correlated with variables of good agricultural practices (free-range) certified products, organic certified products, and cooperatives' branded products. Thus, the first factor is called the certificate factor.

Table 4. Rotated Factor Solution for Eggs

Variables/Factors	F1	F2	F3	h ²
	Certificates	Freshness	Economy	
Price	-0.03	0.14	0.84	0.73
Product discount/promotion	0.03	0.09	0.87	0.76
Expiry date	-0.02	0.83	0.19	0.72
Production date/freshness	0.24	0.82	0.07	0.74
Good agriculture practices certificate	0.88	0.21	-0.12	0.82
Organic product certificate	0.83	0.31	-0.05	0.79
Being a cooperative branded product	0.70	-0.18	0.15	0.55
Eigen value	2.36	1.69	1.05	
Variance	33.74	24.20	15.03	
Cumulative variance	33.74	57.94	72.97	

The second factor (F2) is highly correlated with expiry date and production date (reflecting freshness); therefore, this factor is named the freshness factor. The third factor (F3) is highly correlated with price and price discount/promotion. Hence, this factor is called an economic factor. These three factors together explain 73% of the variance of variables affecting consumer egg purchase decisions. The results are consistent with previous studies focused on egg consumers purchasing behaviour. However, there was found evidence that consumers give importance to branded products (42.5%), healthy products (4.9%) and freshness (10%), respectively (Aytop & Fikret, 2020). The previous analysis applied factor analysis to importance ratings data on nine different attributes, both for chicken meat and eggs. Factor analysis employed principal component analysis based on the correlation matrix with varimax rotation. Based on the communality score (<0.5) in the first stage of factor analysis, both for chicken meat and eggs, product brand and retailer variables were excluded in the rotated solution stages. The rotated solution established three factors for each searched product, and three factor scores were saved as variables in the data file. These three-factor variables are to be the subject of the cluster analysis. In this study, the K-means clustering method was employed using SPSS (version 23). In this study, the K-means clustering analysis resulted in a three-cluster solution for chicken meat and a two-cluster solution for egg. The clusters' identity variables (nominal variable) are saved to the original data file. In addition, each cluster is profiled in terms of factor variables and results of cross-tabulation/one-way ANOVA with some socioeconomic and demographic variables. Consumer profiles of chicken meat are reported in Table 5, which does not include insignificant socioeconomic and demographic variables in terms of the F and Chi-square tests. Based on this information, a profile of each cluster is developed in the form of a description of key characteristics of each cluster. The profile of chicken meat consumers in central towns of Antalya province is reported in Table 5. As seen in the table, respectively, 5.6%, 7.4% and 87% of consumers fall within cluster 1, cluster 2 and cluster 3. The skewed distribution of clusters are not extraordinary or unexpected results in food products consumer segmentation research (Huang & Chien, 2006; Islam et al., 2018; Raimundo & Batalha, 2015; Sarti et al., 2018; Yang

& Nugraha, 2021). Cluster 3 is the most dominant one among the three clusters. Certificates of products are less important to the consumers within cluster 1, while product freshness measured in terms of final consumption date or production date of the product is highly important, as are price-promotion variables. According to the average monthly household income, cluster 3 has a 7,127 TL household income (2.5 times the minimum wage at the time of the survey), which is close to the sample average income level of the household (7,388), and 71% of households in this cluster have less than 10,000 TL monthly income (an average of 1 USD = 11,063.9 TL during the final quarter of 2021), confirming why they are very interested in price and promotion. The previous studies also found the importance of price differs for income level (Aral et al., 2013).

Table 5. *Chicken Meat Consumers' Profile*

Profile variables	Clusters		
	Cluster 1 (n=16)	Cluster 2 (n=21)	Cluster 3 (n=247)
Percentage of respondent (%)	5.63	7.39	86.97
Cluster name	Irrelevant	Value seeker	Economy seeker
Factor Analysis			
Certificates	Low Importance	High Importance	Low Importance
Freshness	Low Importance	Low Importance	High Importance
Price-promotion	Low Importance	High Importance	High Importance
Household Income	Two-third having: 1 and 3 MW	50% is > 10,000 TL	71% is <10,000 TL
(p-value = 0.003)**	(2,850 TL)		
Monthly household income (7,388 TL)	6,503 TL (Std= 3,519)	11,131 TL (Std= 4,128)	7,127 TL (Std=4,006)
Education level	One-third is = or < than	70% college and higher	A bit more than half = > high
(p-value = 0.093)*	primary school	education	school education
Marital status	75% is married	71% is married	61% is married
(p-value = 0.068)*			
Employment status	44% is full time employed	62% is full time employed	60% full time employed
(p-value = 0.090)*			

Note: TL is Turkish Liras (exchange rate TL/United States Dollar was 11,0639). *** and ** indicates significant at 1% and 5% level. The official minimum wages (MW) was 2,850 TL during survey implemented.

In terms of socioeconomic variables, Cluster 3 can be characterised as a bit more than half equal to or greater than a high school education degree, with 61% married, 60% full-time workers/public servants and 14.7% unemployed or students. Cluster 3 is dominantly a “medium-socioeconomic-status family-based household with a high percentage of unemployed and students. They are highly interested in product freshness and price-promotion-favoured consumers. This cluster can be named 'economy seeker. Except for the attribute of freshness, certificates and price promotion are highly important for the second cluster. The average monthly household income of Cluster 2 is higher than the average income (50% higher than average), and half of the households in Cluster 2 have more than 15,000 TL in monthly household income. According to the socioeconomic characteristics of respondents, respectively, 70% have college and higher degree education, 71% are married, and 62% are full-time workers/public servants. Cluster 2 represents “high-socioeconomic-status family households with strong full-time employment status”, and they seem to be highly interested in certificates and economy-favoured consumers. This segment of the population can be named as value seeker since they are most probably comparing certificates (extrinsic quality) with price. Product certificates, freshness and price promotion are of low importance for the consumers who fall within Cluster 1. This cluster are dominantly “low-socioeconomic-status family households with moderate full-time employment status”, and they seem to be highly irrelevant with product attributes. The cluster profile of egg consumers is given in Table 6.

Table 6. Eggs Consumers' Profile

Profile variables	Clusters	
	Cluster1	Cluster2
Percentage of respondent	7.7%	92.3%
Cluster name	Freshness Seeker	Value Seeker
Factor analysis		
Certificates	Low Importance	High Importance
Freshness	High Importance	Low Importance
Price-promotion	Low Importance	High Importance
Marital status (p-value = 0.001) ***	82% is married	52% is married
Education level (p-value = 0.000) ***	82% = or > collage educated	52% =< than high school
Monthly household income (TL) (p-value = 0.015 is significant at 5%)**	50 % has >10,000	81% has <10,000
Average monthly income (TL) (7,388 TL, Std= 4110) p-value=0.000***	10,889 TL	7,094 TL
Food in household monthly expenditure (%)	22.8%	13.9%
Urban/rural linkages (p-value = 0.003) ***	77% rural origin	72% urban origin

*** and ** indicates cross-relation is statistically significant at 5% and 10% level.

As observed from Table 6, there are two clusters; respectively, Cluster 1 represents only a small percentage of consumers (7.7%), and Cluster 2 is the dominant one, representing 92.3% of consumers. Certificates of egg (organic, GAP-including both free range and cage free, and cooperative branded product) and price promotion are of low importance for Cluster 1, while freshness of product is of high importance. Most of the respondents in Cluster 1 are married; his/her household has a higher monthly income than the average monthly household income of the sample and has a relatively high share of food expenditure in total household expenditure, and most of them have strong rural linkages. Cluster 1 are dominantly “high-socioeconomic-status family households with strong rural linkages”, and they are freshness-favoured consumers. For Cluster 2, both product certificates and price promotion have high importance, while freshness has low importance. Average monthly household income in this cluster is less than the average household income of the sample; they spent about 14% of their monthly income on food, and most of them are urban origin. Cluster 2 are dominantly “medium-low-socioeconomic-status households with highly urban origins”, and they seem to be reasonable price and quality seekers. They are most probably value-seeking consumers (comparing quality with price) and pay attention to the value of money in purchasing.

RESULTS

This study attempted to determine the factors affecting a consumer's purchase decision when he/she is buying chicken meat and eggs. The socioeconomic and rating score data of nine product attributes obtained by survey were used in the empirical analysis. The results of factor analysis indicate that for chicken, three factors explain 74% of the variance explained, which are named as certificates (36.3%), economy (23.1%), and freshness (14.7%). For egg three factors, 73% of the variance explained are named as certificates (33.7%), freshness (24.2%), and economy (15.0%). These results confirm that extrinsic attributes (related to health, environment and culture) are important determinants of consumer product choice decisions. The results confirmed that certificates and cooperatives' owned brand (in the case of eggs) have an important role in consumer buying decisions. The K-means clustering result indicated that there are three segments among chicken meat consumers and two segments among egg consumers. This study has fulfilled an important gap in literature in the country context and provides a case study to international literature from an emerging market economy–classified country. The results indicate that about one-third of consumers are interested in the certificates both for chicken meat and eggs. These results can be interpreted by industry players as lack of communication about the certificates.

This study was conducted with several limitations: sampling issues in terms of representativeness, exhibits very local characteristics and does not represent comprehensive cultural diversity of consumers at nationwide, and the number of variables with respect to variables explaining consumer behaviour. Therefore, results of the study can be interpreted and used with caution. Study can be extended using nationwide representative sampling data, different segmentation approaches including demographic, behavioural, physiographic and lifestyle data, different theoretical frameworks (i.e., food-related lifestyles, discrete choice experiments, revealed preferences data) and different statistical tools (i.e., latent class models, multi-nominal probit models, conjoint analysis).

Contribution Rate of Researchers Declaration Summary

The authors declare that they have contributed equally to the article and have not plagiarized.

Conflict of Interest Declaration

The authors of the article declare that there is no conflict of interest between them.

Ethic Declaration

The ethical approval for these forms was obtained from the Research Ethics Committee of Selçuk University Agriculture Faculty on 18.07.2023.

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