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Analysing passenger behaviour towards on perception in-flight food safety and quality

Celile O. Dolekoglu [a], Faculty of Bussines, Adana Science and Technology University, 01180 Adana, Turkey
Puren Veziroglu [b]*, Faculty of Agriculture, Cukurova University, 01330 Adana, Turkey
Sinan Keiyinci [c], School of Civil Aviation, Cukurova University, 01330 Adana, Turkey

Abstract

This research criticises airline passengers' perception on food and beverage safety (F&B) and passengers' preference towards in-flight meals. Hot drinks, alcoholic drinks, sandwiches and regional foods are preferred in domestic flights. Freshness and healthiness of the food served is important for the passengers. 84.9% of passengers show medium and high 'positive perception' for food safety. It can be added that passengers do not have high expectations of F&B service during their flights. This can be interpreted as a result of the respondents' preference to fly with low-cost airlines.

Keywords: Inflight meal, food safety, food quality, Turkey, catering service, Likert scale, multinominal logit.

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* ADDRESS FOR CORRESPONDENCE: **Puren Veziroglu,** Faculty of Agriculture, Cukurova University, 01330 Adana, Turkey.
E-mail address: purenveziroglu@gmail.com / Tel.: +905354708802

1. Introduction

Besides its rapidity, air transportation is also a comfortable and safety way of travel. In recent years, as a result of competition between airline companies, ticket prices have declined. For this reason compared to past years, passengers who prefer air transportation had increased. When we look at the passenger statistics, this rapid increase can be seen more clearly. In 2003, Turkey had 26 airports while in 2015 the number nearly doubled and reached 55 airports. The number of passengers carried increased from 35 to 166 million (Anonymous, 2015). The competition among companies resulted in companies having to take into consideration various service factors beyond the price. Including before and after flight services in flight services, another crucial element for competitors is to gain new customers and keep them loyal to the company. During the flight, F & B service is used by companies to draw customers. It can be said that inflight meal is the primary means by which an airline company differs from others. Especially during long-haul flights customers' expectations and demands are different compared to short-haul flights. This reason makes companies to serve various meals for passengers with restrictive diets that are halal, kosher, gluten-free, diabetic, vegetarian, etc. Customer satisfaction in air transportation is affected by various factors. These can be written such as inflight meals (sufficiency, hygiene, and presentation), demand and operations (rapidity, effectiveness), aircraft cabin conditions (cleanness, air condition) inflight entertainment, and cabin crew (behaviour, providing sufficient information during the flight, outfits) (Pekkaya & Akilli, 2013). The in-flight food services now are seen as a part of marketing strategies in attracting business or leisure travellers (Zahari, Salleh, Kamaruddin & Kutut, 2011). The delivery of a high level of service quality (SQ) by airline companies became a marketing requisite in the early 1990s, as competitive pressures continued to increase (Baker, 2013). Building customer loyalty companies differentiated their services such as frequent flyer programmes, cooperation with banks (installment options, etc.), user friendly web sites, smartphone apps.

Furthermore, the literature studies the effects of loyalty programmes discussed. Some studies revealed that consumers did not perceive any differences between companies and give value not to loyalty programmes but to SQ (Ostrowski, O'Brien & Gordon, 1993; Ott, 1993). The flight-catering sector is particularly interesting to study with regard to new product and new service development, because it constitutes a supply chain drawn from three quite separate stakeholders – the airlines, the flight caterers and food manufacturers/suppliers. With regard to the type of innovation being carried out, all three stakeholders tend to think about innovation as 'product' innovation (Jones, 1995). Apart from inflight meals, the SQs of cafes or restaurants in the airport are also important for customer's satisfaction, which has a crucial role that affects their preferences. Del Chiappa, Martin and Roman (2016), analysed how SQ was perceived by passengers consuming food and beverages (F & B) in airport areas. Fuerst, Gross and Klose (2011) pointed out that airports have evolved the number and variety of retail businesses which has increased substantially in venues apart from shops and restaurants. These are convention centres and entertainment facilities, like museums. According to Rowley and Slack (1999), an examination of the environment in airport departure lounges might be expected to offer an insight into the post-modern environment in which time and place are beginning to lose meaning. Retailers have a significant role to play in the creation and shaping of such environments. In their study, Castillo-Manzano and Lopez-Valpuesta (2013) concluded that the factors that most influence a passenger's using a catering establishment during his/her stay at an airport are his/her physiological needs and social reasons. However, contrary to what was anticipated a priori, socio-economic status only has a moderate influence, while having a wide range and variety of foodstuff on offer does not result in passengers consuming more. Consumers' food demand is not limited to their specialised needs, it is also an issue of health risks related to foods. Underlying the importance of healthy diet by the governments, NGOs and other organisations, consumers started to pay very serious attention to health risks and diseases related to foods that they consume. As a result of this attention, mass produced foods factories/caterers are in the centre of attention where airline companies supplies their service.

This study, aimed to present passengers' inflight meal preferences and the factors that affect their preferences that passed through Sakirpasa Airport. Furthermore, this study differs from other studies in the literature by measuring inflight meal safety and quality with a focus of traditional and local food concept.

2. Material and Method

This study is based on a sample of 300 passengers. Data were collected with questionnaires administered face to face at Adana Sakirpasa Airport in April 2015. Respondents were chosen randomly from the people in the terminal building and in the boarding areas, the fact that respondents were interviewed while waiting for their departure increased their willingness to answer the questionnaires. Adana Sakirpasa Airport is the sixth largest airport in Turkey in terms of passenger capacity. The number of fare-paying passengers can be determined approximately, but the population of the study is harder to estimate. In cases where it is difficult or impossible to determine the sampling frame, non-random sampling is preferred (Nakip, 2006). For this reason, a simple random sampling method was used in this study.

Considering previous studies of measuring perception of passengers on food safety and food quality, five-point Likert scale was used with 28 propositions. As mentioned before, no such study measured food safety and quality of inflight meals for that reason scale of the study is not used in the past studies. Since there was no scale for the food safety perception that tested previously, it has been originally proposed for this study. Since they have not been tested before, attitude holdings should be examined in terms of their ability to be consistent, stable, and stimulate the reactions that are desired to be observed (Tezbasaran, 2008).

If attitude propositions were not tested before it should be considered very carefully about the power of reliability. Assessment of the scale is based on the following steps:

- 26 questions were divided into three groups as safety-quality, hygiene and personal preference by removing control questions in the scale.
- The power to measure each item's attitude to be measured has been determined. Likert originally proposed two types of 'item analysis' methods to evaluate the ability of the individual items to measure the attribute measured by the total scale; correlation analysis and analysis based on the 'criterion of internal consistency' (Carmines & McIver, 1981).
- In this study correlation-based analysis was used, as a result of the analysis two propositions in the safety and quality group and three propositions in the personal preference group excluded. Correlation-based analysis tries to measure the power and affect of the items which builds the scale. Items which are minus or zero are excluded in the analysis (Tezbasaran, 2004).
- In this study Cronbach Alpha value of 21 items was found to be 0.695. Considering the debate in the literature on Cronbach Alpha values, this value can be identified as items are 'reliable' (Nakip, 2006).
- Percentile values and group averages were used to construct perception groups for food safety. 16% values in the normal distribution table were accepted as sling values. The portion corresponding to approximately 68% of the total data (2.91 – 4.16) was taken as the mean value. The mean value and the perception according to the median were divided into 3 groups as low, medium and high according to the standard deviation value between + 2 and – 2 (see Table 4).
- Multinomial logistic regression was applied with socio-demographic variables (age, gender, working status, education level), hygiene, trips taken per year, free catering preference and special meal choice as predictors for food safety-quality. When the dependent variable consists of several categories that are not ordinal (i.e., they have no natural ordering), the ordinary least square estimator cannot be used. Instead, a maximum likelihood estimator like multinomial logit or probit should be used (Kwak & Clayton-Matthews, 2002).

In the multinomial logit model we assume that the log-odds of each response follow a linear model.

$$Ln\left(\frac{P}{1-P}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_k X_k \tag{1}$$

3. Results

According to the descriptive statistics, 59% of passengers are male, 68.7% are in the 18–33 age bracket, 50.4% of passengers graduated from university or above and 61% of passengers are active workers. 28.6% of active worker passengers are white collar, 9.6% of them is blue collar worker. Furthermore, the monthly income of 70.4% passengers is below 3,000 Turkish Liras. 46% of passengers preferred plane for their travel with an average of 1–3 times in the past year, and 24.3% of passengers took trips 4–6 times by year. Regarding the reason for travelling, 51.5% of passengers were taking leisure trips, 31.9% was for work and 11.5% was for education. When it is asked to respondents that 'if complimentary in flight F &.B have affect on choosing Airline Company' more than half of the respondents (63.6%) agreed on that statement (see Table 1).

Table 1. Descriptive statistics

Sex	%	Employment status	%
Female	41.3	Working	61.0
Male	58.7	Not working	35.0
Age	%	Retired	4.0
18–25	37.7	Designation	%
26–33	31.0	White collar	28.6
34–41	12.7	Blue collar	9.6
42–49	7.3	Freelance	31.5
Over 50	11.3	Other	27.9
Education	%	Income (month/person)	%
Literate + primary school	6.3	<1.500 TL	38.7
Secondary school	7.7	1.500–3.000 TL	31.7
High school	35.7	3.001–5.000 TL	19.3
University	47.7	5.001–7.000 TL	3.7
Master's degree	2.7	7.001–10.000 TL	2.7
		10.001 TL and above	4.0
Reason for travel	%	Trips taken per year	%
Leisure	51.5	1–3 times	46.0
Work	31.9	4–6 times	24.3
Education	11.5	7–10 times	9.3
Other	5.1	11–14 times	7.3
		> 15 times	13.3

3.1. Preferences for inflight meals

In the study, inflight meals have an important affect for airline preferences of passengers (63.6%). On the other hand food is unlikely to be the deciding factor in a passenger's airline choice. In the survey of the study, passengers are asked to rank their top three choices for inflight meals during their domestic and international flights. For domestic flights, local foods (17%), fruits (15.7%) and sandwiches (13.7%) are ranked in top three choices. Considering international flights as long haul flights, passengers preferred Turkish cuisine in the first place (23.3%). Comparing these to results it can be said that in domestic flights passengers prefer foods which are easy and quick to eat. In contrast to domestic flights in international flight passengers prefer cuisines. Furhermore, this contrast also can be seen in drink preferences. In domestic flights passengers' non alcholic beverages preference rate found smaller than international flights'(see Table 2).

Table 2. Preferences of inflight meal alternatives

Alternatives	Domestic (%)			International (%)		
	1	2	3	1	2	3
Local foods	17.0	3.0	5.7	16.0	5.3	5.7
International cuisine	3.0	0.7	1.7	8.3	1.0	5.0
Snacks	10.0	8.3	8.7	4.0	5.7	5.7
Fruits	15.7	13.7	11.3	7.3	12.0	12.7
Organic products	3.7	8.3	4.7	2.3	5.7	4.0
Bakery	2.3	4.3	8.0	2.0	5.7	9.7
Salads	4.0	6.0	5.3	3.7	7.7	6.0
Sandwiches	13.7	13.3	12.7	5.0	7.0	7.3
Hot drinks	7.3	18.3	12.3	4.3	14.0	11.3
Appetizer	1.0	2.0	3.7	4.3	6.3	5.3
Turkish cuisine	7.0	7.3	6.3	23.3	12.0	7.3
Alcoholic drinks	4.3	3.7	4.7	9.3	7.3	7.3
Non-alcoholic drinks	9.7	9.3	13.7	8.7	9.0	11.3

Considering other diet types such as religious and medical diets, passengers preferences are affected as they prefers pre order options for their meals. In addition, some airline companies offer a restaurant experience with their flying chefs. In contrast with western style consumption such as fast foods, preservative added foods, local and raw foods consumption are also increasing. In the study passengers were asked if they experienced inflight meal plans with local food, 87.3% of them were negative. This result can also interprete as airline companies should add more local foods such as dried apricots, raisins, nuts etc. that could be additional benefit for passengers to prefer their company. In Table 3 it can be clearly seen that local foods which are easy to keep and eat such as apricots, raisins, nuts and pistachios were highly preferred.

Table 3: Ranking of the local foods preference by passengers

Local foods	Preference ranking (%)		
	1	2	3
Dried apricot	20.0	5.3	6.0
Raisins	12.7	7.7	6.3
Dried fig	12.0	9.7	7.7
Turkish nuts	16.7	16.0	7.0
Pistachio	15.3	22.7	10.0
Walnut	8.3	18.0	18.0
Peanut	4.0	7.7	9.7
Roasted chickpea	1.7	3.3	6.7
Turkish delight	8.0	8.0	22.7
Kunefe (kunafah)	0.3	-	-
Baklava	-	0.3	0.3
Turnip juice	-	0.3	0.3
Almond	-	-	1.2
Others			

Local foods, which have a big role in traditional food consumption patterns are also important for local development of the region as a whole for the country.

3.2. Inflight meal safety

Over the past 20 years, food quality and safety has grown into a significant sector, in the public opinion and the media because of various food scares and serious lack of confidence. It has been an

important issue that all sectors should have to be concerned about. Food safety is a fundamental and on-going issue. Food safety is a part of food security and can be described briefly as transportation of food to consumers in ways that prevent foodborne illness. Since food is considered as a major risk source, especially the catering services have entered into areas of greater scope. In terms of airway management, the flexibility of location and service offered is low, and the effectiveness of this potential health risk creates a food safety feature.

In this study, results were given according to the attitude groups that were established to measure consumer perception in this area and to find out whether it differs according to consumer characteristics.

Table 4. Classification of perception groups

		Preference	Hygiene[4]	Safety and quality
N	Valid	299	299	299
	Missing	1	1	1
Mean		3.5546	4.3729	3.7820
Median		3.6667	4.2500	3.8182
Std. Deviation		0.63794	.53146	.53414
Percentiles	16	2.8333	4.0000	3.2727
	25	3.1667	4.0000	3.4545
	50	3.6667	4.2500	3.8182
	75	4.0000	5.0000	4.0909
	84	4.1667	5.0000	4.2727
Low		< 2.92	< 3.72	< 3.25
Medium		2.93–4.17	3.73–4.47	3.26–4.28
High		> 4.18	> 4.48	> 4.29

*The median was used instead of the mean because of hygiene did not provide normality

Considering the mean values items score which represent hygiene are found high. 93% of the passengers' perception level on hygiene was found to be medium and above. However, it has been determined that safety and quality are moderately high. Passengers do not have high expectations for personal preferences during in-flight catering. It is accurate when considering domestic/short-haul flights (see Table 5).

Table 5: Distribution of perception groups

Level	Preference		Hygiene		Safety and quality	
	Frequency	Per cent	Frequency	Per cent	Frequency	Per cent
Low	48	16.1	21	7.0	45	15.1
Medium	212	70.9	136	45.5	207	69.2
High	39	13.0	142	47.5	47	15.7

The perception of food safety-quality was analysed with socio demographic variables, free catering, hygiene, trips taken as a year and meal choice as predictors by multinomial logit model (see Table 6).

The model established in the study is as follows.

Li = β_0+ β_1 age+ β_2 gender+ β_3 education+ β_4 employment status+ β_5 free catering + β_6 trips taken per year + β_7 meal choice+ β_8 hygiene.

Li = safety and quality levels

The probability of membership in other categories is compared to the probability of membership in the reference category. Reference category for the independent values was determined last category.

Table 6. Parameter estimates

			B	Std. Error	Wald	Sig.
Medium	Intercept			34.794	2.346	219.942	0.000
	Hygiene			0.612	0.291	4.435	0.035
	Age groups	18–25		0.134	0.899	0.022	0.882
		26–33		0.854	0.900	0.901	0.343
		34–41		0.892	0.984	0.823	0.364
		42–49		0.860	1.157	0.552	0.458
	Gender female			0.120	0.378	0.101	0.750
	Education	Literate/Primary School		−17.036	1.993	73.062	0.000
		Secondary School		−16.972	1.854	83.767	0.000
		High School		−18.221	1.824	99.796	0.000
		University		−18.500	1.500	152.082	0.000
	Employment status	Working		−17.825	1.220	213.640	0.000
	Not working			−17.731	1.140	241/995	0.000
	Special Meal Choice	Yes		16.876	3864.840	0.000	0.997
	Trips taken per year	1–3 times		−0.216	0.567	0.146	0.703
		4–6 times		−0.464	0.591	0.615	0.433
		7–10 times		−0.107	0.772	0.019	0.890
		11–14 times		1.134	1.164	0.949	0.330
	Free catering preference	no		0.530	0.382	1.928	0.165
	Free catering preference	not usual		0.885	0.828	1.144	0.285
High	Intercept			29.916	2.138	195.762	0.000
	Hygiene			1.714	0.430	15.852	0.000
	Age groups	18–25		−1.424	1.068	1.776	0.183
		26–33		−0.305	1.063	0.082	0.774
		34–41		−0.249	1.155	0.047	0.829
		42–49		0.931	1.316	0.500	0.479
	Gender female			1.051	0.515	4.175	0.041
	Education	Literate/Primary School		−37.461	2777.506	0.000	0.989
		Secondary school		−18.390	1.500	150.353	0.000
		High school		−20.004	1.458	188.286	0.000
		University		−19.747	0.000		
	Employment status	working		−16.621	0.635	685.092	0.000
		Not working		−16.677	0.000		
	Special meal choice	Yes		17.541	3864.840	0.000	0.996
	Trips taken per year	1–3 times		0.362	0.775	0.218	0.640
		4–6 times		−0.867	0.844	1.056	0.304
		7–10 times		−1.032	1.099	0.882	0.348
		11–14 times		0.257	1.388	0.034	0.853
	Free catering preference	no		2.547	0.693	13.521	0.000
	Free catering preference	not usual		2.352	1.153	4.163	0.041

Pearson goodness of fit: Prob > χ^2 = 0.590

Number of observations = 299

Pseudo R^2 = 0.307 (Nagelkerke)

Classification of per cent correct: 70.1%

Log likelihood =

The perception of food safety-quality was defined as a dependent variable and the 'low quality' level was defined as the reference category. The p value (Pearson goodness of fit) for the model consisted of 299 observations is greater than 0.590 > 0.05, which is the fit model. $R2$ value is the measure of the relationship between dependent variables and independent variables. $R2$ was found 0.307, and the age, gender, education, trips taken per year, free catering, hygiene perception and working status explained 31% of the safety and quality perception.

The parameters for the medium level of safety-quality perception, the hygiene effect is 0.035 < 0.05 and it makes a meaningful contribution. The 1 unit increase in hygiene perception will affect safety and quality increase of 0.612. The level of education is 0.00 < 0.05 and it has a meaningful contribution and it will cause −1 unit decrease in the quality of 1 unit change in Literate + Primary school in education levels. Secondary school will result in a change in quality of 1 unit of − 16.972. High school will result in a change in quality of 1 unit of − 18.221. This is true for the reference variable decentralised frame. At the university, 1 unit change will cause − 18.500 decrease in quality. Increasing the level of education leads to a lower level of safety perception. The similar situation is the same as the working situation. The run-in state is 0.00 < 0.05 and the model provides a meaningful contribution.

For the high level of safety-quality perception the hygiene effect is 0.00 < 0.05 and it makes a meaningful contribution. 1 unit increase in hygiene effect will cause an increase in quality of 1.714. Secondary school will result in a 1-unit change in quality of − 18.390. The change in quality of 1 unit in high school will be − 20.004 reasons. Working will result in a decrease of − 16.621 in 1 unit change quality.

4. Conclusion

The flight catering industry is developing and global activity and that unlike any other sector of the catering industry comparing condition of storage, preparation, and servicing systems. However, it can be distinctive for the passengers when they plan their journey. Some airlines use food as a marketing tool and some airlines use food as price policy tool which named 'no-frills policy'. No meals are served on board flights within no-frill policy such as JetBlue, Southwest, Ryanair, EasyJet, Tiger, and Bangkok Air. In Turkey Onur Air and Pegasus offer low price options that is unfeasible and there is no inflight food between domestic and abroad destinations.

According to result for 300 passengers, that the passenger profile was made up from the young population and that there was no great income difference between those benefitting from the service.

This study has the importance of being the first study conducted about inflight food safety & quality. However, a limitation was that the number of the respondents flying long haul flights were low, for that reason it was applied only to passengers flying short haul/domestic flights.

This study has several limitations. First, due to limitations in data collection and scale that had been used first for the inflight meal. This study had a relatively difficult condition. Respondents were not willing to answer the questions. Considering that the fact of travel stress this result could be acceptable. Furthermore, the study should conduct in the other important airports of Turkey (such as Ataturk Airport in Istanbul and Esenboga Airport in Ankara) and combined with the respondents flying long haul flights. The results will completely different also if some of the respondents are foreigners. As it mentioned before the study is gaining its originality for being the first study in the literature about this issue. Moreover, study could offer opportunity to other researchers for improving scale of food safety and quality.

Funding

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