Journal of Air Transport Management 83 (2020) 101764

Contents lists available at ScienceDirect

Journal of Air Transport Management

journal homepage: http://www.elsevier.com/locate/jairtraman

Evaluation of passenger satisfaction with service quality: A consecutive method applied to the airline industry

Sahar Tahanisaz *, Sajjad shokuhyar

Faculty of management and accounting, Shahid beheshti University, Daneshjo Blvd., Tehran, Iran

ARTICLE INFO

Keywords:
Service quality
Customer satisfaction
Airline industry
Kano model
RFM model

ABSTRACT

Passengers' dissatisfaction with service quality is one of the crucial factors affecting the market share loss of airlines. This study aims to find out how airlines become capable of satisfying their passengers by considering the diversity of pre-purchase expectations. Therefore, the study proposes a novel model for clustering air passengers to identify passengers with similar expectations. Thus, the passengers' expectations of the service quality attributes in each cluster were measured and converted into quantitative degrees of customer satisfaction by applying the Kano model. Finally, Importance-Satisfaction Analysis (ISA) was employed to finding that which service quality indicators fall into the "Keep up the proper work"," Concentrate here"," Possible overkill", and "Low priority" category for eliciting applicable marketing strategies.

1. Introduction

Airline industry is a potential part of the global economy, which has experienced exponential growth in recent years(Ganiyu, 2017). The airline industry provides the ground for economic development, global trade, tourism, and global investment. In general, such growth contributes to various businesses that depend on airlines, such as hotels, retail, and transportation (Ganiyu, 2017; Ishutkina and Hansman, 2008). According to the annual reports made on the carried passengers that have been published by Iran Civil Aviation Organization ("www.cao.ir," n.d.), average annual growth rate of the number of the carried passengers by international airlines has been 14.1% from 2014 to 2018, which demonstrates the Iranian passengers' desire to fly with the mentioned carriers. This data gives us a clue that Iranian airlines have been facing a crisis leading to market share loss.

In order to overcome this crisis, domestic airlines should pay attention to the passenger's expectations of their services. Airlines need to discover new ways to emphasize essential service items and reduce the time and energy consumed on less important service items (Liou et al., 2011). The approach, by which airlines allocate services to their customers in order to increase their satisfaction, has always been a crucial issue for the aforementioned companies. Most authors suggested a meaningful association between aspects of service quality and customer satisfaction (Ali et al., 2015).

Several studies attempted to determine some service quality dimensions in the airline industry (Y.-H. Chang and Yeh, 2002; Chen and Chang, 2005; Liou and Tzeng, 2007; Park et al., 2004; Tsaur et al., 2002). However, not all service dimensions are equally important to all passengers, because no two passengers are accurately alike, especially when demographics; the purposes of travel and ethnic background is considered (Gilbert and Wong, 2003). Since the past research revealed the fact that satisfaction can be considered as a function of pre-purchase expectation and perception of disconfirmation (Oliver, 1980), an intriguing question raised: How do airlines become capable of satisfying their customers with regard to their different pre-purchase expectations (Füller and Matzler, 2008)?

The present study answers to above question that without considering various needs and expectations of different customers, increasing the quality of service does not lead to customers' satisfaction at all. Thus, this study argues that customers should be segmented based on their expectations into distinctive groups in order to determine the satisfaction attributes of each class. Since, customer segmentation is usually the first step towards the analysis of customer behaviors in service companies (Yang et al., 2002). Moreover, if service providers examine the customers' needs, they will have adequate capacity to meet their requirements (Porter, 1980). Therefore, a service company should identify groups of customers with homogenous behaviors and try to adapt their offer as much as possible to the unique needs of the segment members (Kara and Kaynak, 1997).

Therefore, this study suggested a novel model of customer

* Corresponding author.
E-mail addresses: s.tahanisaz@mail.sbu.ac.ir, s.asadi@modares.ac.ir (S. Tahanisaz), s_shokouhyar@sbu.ac.ir (S. shokuhyar).

https://doi.org/10.1016/j.jairtraman.2020.101764
Received 1 June 2019; Received in revised form 18 December 2019; Accepted 4 January 2020
Available online 17 January 2020

segmentation based on behavioral variables in order to provide distinctive groups of customers by similar expectations for the airline industry. Since different levels of expectation will be related to different customer behavior and these expectation influence customer-perceived service quality, which is nowadays considered to be a key factor to obtain a competitive advantage(Diaz-Martin et al., 2000).

Previous research used RFM model (Recency, Frequency, and Monetary) to cluster customers. It is one of the most prominent models of clustering that adjusts an effective market segmentation for increasing the duration of the customer's lifecycle (Linoff and Berry, 2002). Teichert et al. (2008) proposed that behavioral variables should be added to the traditional socio-demographic and socio-economic variables in order to segment airline passengers. Moreover, Teichert et al. (2008) revised RFM model to incorporate attitudinal variables. Chiang (2014) proposed FMCN model by adding cancelation times and the number of family members as behavioral variables. DehghaniZadeh et al. (2018) revised RFM model to LDCFR, and added length and combination of distance and class rate to it. The present research proposed the ICF model with the aim of designing behavioral variables that cluster customers based on their common expectations. Thus, we selected flight intent, flight class, and frequency as the variables.

This study aimed to extract several service quality attributes by reviewing the related literature and conducting some deep interviews in order to identify the most relevant attributes according to the SERVQUAL in the Iranian airlines market. Even though, a number of researches applied SERVQUAL for measuring the quality of airline service, this study specifically measured customer satisfaction with the quality of airline service quality in each cluster of passengers.

The study design is presented here. The next section briefly reviews the relevant literature. Section 3 describes clustering with the ICF model, customization of service quality attributes, Kano model, Importance-Satisfaction analysis, and data collection. Section 4 reports and discusses the results. Ultimately, Section 5 provides conclusions and limitations of the study.

2. Conceptual background and review of the literature

2.1. Service quality

Parasuraman et al. (1988) explained that "service quality" is a function of the differences among customers' expectations from services and their understanding of the real service provided. To ascertain service quality, Anantharanthan Parasuraman et al. (1985) suggested a 10-dimension instrument for measuring service quality: responsiveness, tangible, communication, credibility, reliability, understanding the customers, courtesy, security, accessibility, and competence. Then, Ananthanarayanan Parasuraman et al. (1988) omitted the last seven dimensions and added 2 novel dimensions known as empathy and assurance. This instrument, which is called SERVQUAL, is a widely employed device to measure service quality. Due to the fact that numerous researches have revealed that airline service quality plays a vital role in airline selection by passengers, we reviewed (Ostrowski, O'Brien and Gordon, 1993; Truitt and Haynes, 1994), previous research conducted on service quality of airlines throughout the world, and found that most of them applied the SERVQUAL (Carlos Martín, Román and Espino, 2008; Chen and Chang, 2005; Gilbert and Wong, 2003; Liou et al., 2011; Nadiri et al., 2008; Ostrowski et al., 1993; Park et al., 2004; Rhoades and Waguespack Jr, 2005; Strombeck and Wakefield, 2008; Zins, 2001). Service quality attributes in the airline industry have been extracted from studies shown in Table 1.

Tsaur et al. (2002) established a scale by incorporating 15 airline quality factors into five dimensions that completely overlapped with SERVQUAL dimensions. They concluded that "tangible" is the most prominent aspect of service quality including the seats cleanness and comfort, food, on-board entertainment and crew's appearance. Moreover, Gilbert and Wong (2003) found that passengers with various

Table 1
Attributes of service quality in airline industry.

Research	Service Quality Attributes	country
Tsaur et al. (2002)	Crew's Language Skills, Actively Providing Service, Comfort & Cleanness of Seat, Food, Convenient Ticketing Process, Crew's Appearance, Crew's Professional Skills, Timeliness, Safety, Crew's Responsiveness, Customer Complaints Handing, Convenient Departure & Arrival Time, Extended Travel Service, On-board Entertainment, Crew's Courtesy.	–
Gilbert & Wong (2003)	Knowledge to respond questions, Safety, Employees' Behavior, Efficient baggage handling services, Employees' willingness for assistance, Prompt service, Courteous employees, Clean & comfortable seat, In-flight entertainment, Service right the first time, Neat & tidy employees, Individual attention to passengers, Convenient flight schedule, Non-stop flights, Understanding passengers' special needs, Food & beverage, On-time departure & arrival, In-flight phone/email/ fax internet/facilities, Availability of global alliance partners' network.	Hong Kong
Park et al. (2004)	Up to date aircraft & in-flight facility, Pay passengers personal attention, Meal service, Seating comfort, Check-in service, Seat space & Legroom, Safety record, In-flight entertainment services, Reservation & ticketing, Frequent flyer program, On-time performance, Promptness & accuracy of baggage deliver, The amount imposed for overweight baggage, Providing seats that passengers prefer, Employees' neat appearance, Willingness for helping passengers, Employees' Courtesy, Convenient flight schedule, Promptness & accuracy of reservation & ticketing, Knowledge for answering the questions of passengers, Non-stop flight, Sincere interests in solving problems.	Korea
Chen & Chang (2005)	Clear & precise cabin announcements, In-flight snack service, Seat comfort, Good cabin equipment conditions, Appearance of cabin crew, Inspection of passengers' seat belts, Cabin crew are proactive, The cabin crew's courtesy, Cabin crew's ability to handle unexpected situations, In-flight entertainment, Clean & pleasant interior, Speed at which in-flight snack service is provided, Cabin crew's ability to manage customer complaints, Cabin safety demonstration.	Taiwan
Liou & Tzeng (2007)	Employees' appearance, Customers complaints handling, Language skill of employees, Free ticket & upgrading, In-flight entertainment service, Meal service, Take-off, arriving, & transferring time, Safety record, Promptness & accuracy of baggage delivery, Service efficiency of airline personnel, On-time performance.	Taiwan
Pakdil & Aydın (2007)	In-flight entertainment programs, Understanding passengers' special needs, Employees' behavior, Employees' speed handling request, Employees' knowledge, Flight problems, Availability of waiting lounges, Employees' Courtesy, Neat & tidy employees, In-flight email/internet/phone/ fax, Employees' behavior to delayed passenger, Efficient baggage handling services, The reservation services quality, Willingness to help, Safety, Consistent services, Handling of delays, Convenient flight schedule, frequencies Non-stop flights, Availability of global alliance partners' network, Performing the services right at the	Turkey

(continued on next page)

Table 1 (*continued*)

Research	Service Quality Attributes	country
	first time, Employees' approach to unexpected situations, Individual attention to passengers, Handling of the fare problems, On-time departure & arrival, Food & beverage quality.	
Strombeck & Wakefield (2008)	Performance consistency, The use of humor to make the experience pleasant, Willingness & readiness for providing services, Quick or prompt acts, Immediate responses, Easy contact with employees, Adaptation of services to individual's needs, Convenient service hours, Telling customers about problems, Friendly service, Consideration for customers, Good comfort, Keeping customers informed, Explaining details, Honest & trustworthy employees, Keeping promises, Dependability, Frank & open about a situation, Seeking to understand customer, Acting for preventing problems, Giving individual attention, Keeping personal information confidential, Being able to do the job efficiently, Taking responsibility for a situation, Offering a solution before asking, Knowledgeable & skillful in providing services, Accuracy in record keeping, Bending service rules for customers, Extending service hours when necessary, Providing service with a smile, Financial & personal safety of the customers, Respectful & polite employees, High quality facilities, Adequate space in facilities, Good layout, Nice interior design, High quality amenities, Employee appearance	U.S Southwest
Nejati et al. (2009)	Safety of flight, With no delay flights, Seriousness in solving passengers' problems, Good appearance of flight crew, Friendly behavior of flight crew to passengers, Availability of enough flight staffs & crew, Comfortable chairs with sufficient space for sitting, Up to date internet web site, Clean rest-rooms, Suitable food services during the flight, Booking & buying a ticket through internet, Flight crew's speed of providing services, Providing flight information during flight, Avoiding flight cancellation, Providing Up to date newspapers, magazines, Appropriate transfer & delivery of cargo & luggage, Quick announcement of flight schedules & availability of alternative flights in the case of delay or cancellation, Quick responses to the passengers' needs.	Iran
Wu & Cheng (2013)	Waiting time, Conduct, Problem-solving, Convenience, Security & Safety, Cleanliness, Comfort, Information, Expertise, Tangibility and Valence.	Taiwan
Saei da Ardakani et al. (2015)	Quality & type of airplane, Diverse offering travel services, In-flight entertainment, Easy purchase of the tickets, Appearance of flight crew, Flight timeliness, Flight safety, Politeness & modesty of flight crew, Responsiveness of flight crew, Comfort & cleanness of the seats, Appropriate departure & arrival times, Specialized skills of flight crew, Proficiency of flight crew in the intended languages, Managing customers' complaints, Enthusiastic offer of services.	Iran
Jiang & Zhang (2016)	Flight booking & type of payment, Courtesy of flights attendants, Baggage handling, Seat choice, Newspapers & magazines on board, Self-check-in facilities, Check-in information, Boarding announcement, Facilities at airport lounge, Boarding process, Courtesy of boarding employee, Capability & helpfulness of flight attendants, Courtesy of Check-in employee, Special services for children or disabled travelers, Flight punctuality, Comfort of seats, Responsiveness in a case of delay, In-flight entertainment, In-flight food & drinks,	China

Table 1 (*continued*)

Research	Service Quality Attributes	country
	Convenience of baggage claim, Flight schedule, Convenience of check-in, Response to complaints.	
Gupta (2018)	Comfort & cleanness of seats, On-board entertainment, Convenient ticket reservation, On board food, Crew's Professional skill, On-time performance, Baggage losses & handling, Safety record, Extended travel service, Appropriate on board safety equipment, Crew's courtesy, Crew's Problem solving, Providing seats that passengers prefer, Convenient departure & arrival time, Crew's language skill, Employee's knowledge, The amount imposed for overweight baggage, Suitable signs to guide passengers, Availability of global alliance partners' network, Crew's appearance & neatness, Availability of waiting lounges, Specific services for disabled people & patients, Check-in & Waiting time.	India

ethnicities or nationalities have a variety of expectations. Moreover, they found that passengers invariably ranked 'assurance' as the most significant service. Furthermore, Pakdil and Aydın (2007) used the weighted SERVEQUAL scores to measure the quality of services of a Turkish airline. The results demonstrated availability and responsiveness as the least and most significant elements, respectively. Gupta (2018) used the 'Best Worst Method' to rank attributes of service quality for the Indian airline industry and found "tangible" the most prominent feature of services quality.

Few studies examined quality of services within Iranian airlines. One of the important studies (Venus and Mada di Yekta, 2005), dealt with the level of satisfaction of the Iranian passengers of Iran Air. The researchers used SERVQUAL method, and determined and evaluated the effect of different agents on passengers' satisfaction and their current contentment with services provided in national flights of Iran Air. They found a significant difference between optimum situation and services reliability, empathy, and responsiveness. Moreover, other factors had a negative effect on the passengers' satisfaction in Iran Air domestic flights, except for tangible variables (Venus and Mada di Yekta, 2005). Nejati et al. (2009) used Fuzzy TOPSIS model to rank service quality factors in the Iranian airline industry. The results showed that 'safety of flight', suitable appearance of the flight crew', and 'providing the highest possible quality services to customers 24 h/day' have been the most significant variables of the airline services quality for the Iranian customers. It is interesting that passengers marked the least prominent variable of quality is 'the possibility of checking flight schedule through telephone'. Saei da Ardakani et al. (2015) identified and ranked factors of service quality, which might increase the level of services offered by different carriers. The perspective of passengers showed that 'safety', 'timeliness', and 'variety and type of airplane' are of high importance in terms of factors of service quality. In addition, 'responsiveness' and 'tangible' were respectively identified as the least and most significant aspects of the quality of services.

2.2. Customer satisfaction

Customer satisfaction refers to the customers' sense of either enjoyment or displeasure, which results from a comparison between function of the product and customer's expectations (Kotler and Caslione, 2009). Customer satisfaction has been a crucial focus area in behavioral studies. This concept is on the basis of the belief that customers should be satisfied so that a business can have both sustainability and profitability (Radović-Marković et al., 2017).

Sophisticated aspects of human behavior and perception have made the concept of customer satisfaction an interesting research area in a

myriad of industries (Izogo and Ogba, 2015; Shabbir et al., 2016). Because of its subjective nature, a comprehensive understanding of customer satisfaction is hard to achieve (Qin et al., 2010). Since service organizations are inherently multi-layered and sophisticated, they face serious difficulties to attain and hold customer satisfaction (Han and Ryu, 2012; Li et al., 2017). Multi-dimensional aspects of service quality affect customer satisfaction in airline industry, involving baggage handling, pre-flight, in-flight, in-flight digital, and post-flight services (Archana and Subha, 2012).

2.3. Market segmentation and RFM model in the airline industry

Marketing theory and real-world applications have been dominantly involved in the notion of market segmentation (Khan and Rahman, 2014). When the same consumers are grouped into certain segments, more customized services can be offered, which leads to increased sales and revenue (Moroko and Uncles, 2009). To achieve this goal, several studies have revealed how people may be categorized into homogenous groups with the same behavioral features and purchase preferences (Alfansi and Sargeant, 2000).

There are two main types of segmentation. The first type is based on the easily identifiable socio-demographical variables, such as age, gender, and geographic location (Hassan and Craft, 2005). However, this type of segmentation has been widely applied, it suffers from serious limitations (Chetthamrongchai and Davies, 2000; Dolničar, 2004; Harrison, 1995; Quinn et al., 2007). The second one is a cluster-derived segmentation approach based on microsegment, including customer advantages, customer purchase behavior, and customer decision-making styles (Rao et al., 2015). Applying the second approach, this study attempted to detect behavioral variables in the airline industry.

One of the most important and traditional behavioral variables in the airline passenger segmentation is 'journey purpose' (Shaw, 2016). Division based on 'Journey purpose' lies between business and leisure journeys. Teichert et al. (2008) added behavioral variables to the traditional socio-demographic and socio-economic variables in order to segment airline passengers. They identified four customer segments (i.e., economy class/leisure reason, business class/leisure reason, business class/business reason and economy class/business reason) instead of two classes as expected in traditional passenger segmentation. In fact, the authors disagreed with the convention that business passengers usually choose business class, and leisure passengers usually prefer flying via economy class flights, believing that it is not comprehensive. According to Teichert et al. (2008), novel methods of segmentation are required for the segments, which indicate homogeneous customer preferences.

One of the renowned segmentation techniques, which is broadly applied in customer clustering is the RFM model (E.-C. Chang, Huang and Wu, 2010). The RFM model stands for Recency (last purchasing time in a specific period), Frequency (purchasing frequency in a specific period), and Monetary (amount of purchasing in a specific period) (Hughes, 2000). RFM model is not persistently fixed and may be changed and customized based on the specific characteristics of industries (Chiang, 2014). Moreover, there were some revisions of the RFM model in the airline industry, which are worth mentioning:

Chiang (2014) introduced FDPN model with two positive variables of frequency and destination, which lead to profitability for airlines, and two negative profit variables of price discount and no-show, which cause loss to airlines. Another RFM-based model called FMCN was proposed by Chiang (2014). The model included frequency, monetary, cancelations, and number of family members. LDCFR model incorporates length (time elapsed between the first and last purchase), distance (the total distance traveled by the passenger in a particular time period), frequency (number of travels by a customer in a particular period), and recency (time elapsed since the customers' last purchase to the present) (DehghaniZadeh et al., 2018).

3. Research methodology

This study applied a four-phase methodology for making managerial decisions to improve service quality provided by the Iranian airlines. Now, each of the phases in the research methodology are explained.

3.1. Clustering

As mentioned in the review of literature, passengers are categorized into 10 clusters in the first phase, and similar characteristics are attributed to them by employing the ICF Model (based on the RFM model). The variables include:

- Flight Intention: The reasons by which passengers travel from an origin to a destination, including leisure, business, and education.
- Cabin class: Which cabin class a passenger often chooses for his travel (economy or business).
- Frequency of flights: The number of international flights during one year that a passenger maybe has (high or low).

3.2. Customization of service quality attributes (SQAs)

Several service quality attributes were extracted from the SERVQUAL model utilized in various fields of airline studies. Then, 45 SQAs were derived. A questionnaire comprising these SQAs were distributed among eight experts who occupied positions in the Iranian airline industry. Finally, 18 specific Service Quality Attributes (SQAs) derived from them by Delphi Method as shown in Table 3.

3.3. The concept of Kano Model

Kano (1984) proposed a two-way quality model to elucidate the association between function of a product or service and customer satisfaction. According to Fig. 1, the x-axis represents the amount of the quality elements (functional presence and dysfunctional absence), and the y-axis indicates satisfaction of customers. In terms of the pattern shown in Fig. 1, quality categories are divided into five distinct categories, all of which are explained below.

(1) Attributes of attractive quality (A): If these features exist, Customers experience a positive satisfaction while if these features lack, customers are not dissatisfied at all.
(2) One-dimensional quality attributes (O): Customers will be satisfied when the attributes are met, and if they are not fulfilled, customers will be dissatisfied.
(3) Must-be quality attributes (M): The features that won't lead to more satisfaction, but customers will be dissatisfied when they are absent.
(4) Indifferent quality attributes (I): Whether these features lack or exist, they won't have an effect on satisfaction.

Table 2
Passenger clustering based on ICF model.

Clusters	Flight Intention	Cabin Class	Frequency of Flights (in a Year)
C1	Leisure	Business Class	Low
C2	Leisure	Business Class	High
C3	Leisure	Economy Class	Low
C4	Leisure	Economy Class	High
C5	Business	Business Class	Low
C6	Business	Business Class	High
C7	Business	Economy Class	Low
C8	Business	Economy Class	High
C9	Education	Business Class	Low
C10	Education	Economy Class	Low

Table 3
Definitions of service attributes in the airline industry.

SQAs	Definitions of Service Attributes
A1	Flight safety
A2	Variety and quality of in-flight entertainment
A3	Cleanness on the plane
A4	Responsiveness to complaints
A5	Appearance of flight crew
A6	Language skills
A7	Courtesy of flight crew
A8	Compensatory service for damaged baggage
A9	Pillows and blankets/covers
A10	Extra travel service (i.e., visa service)
A11	Punctuality
A12	Flight schedule
A13	Food and drink options
A14	Possibility to choose food and drink before flight
A15	Access to in-flight Internet
A16	Access to in-flight electricity
A17	Lounge service
A18	Seat comfort

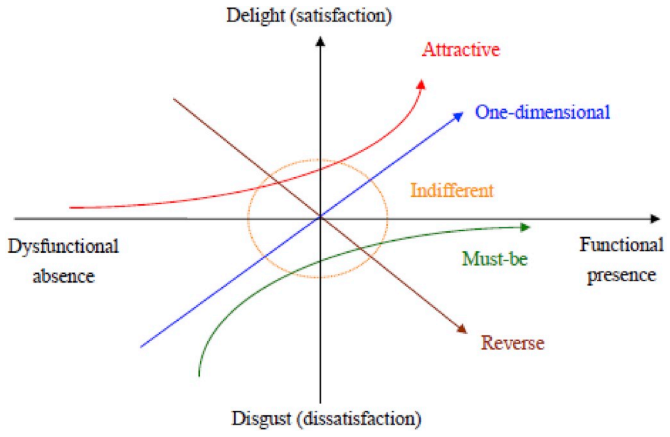

Fig. 1. Original Kano model.

(5) Reverse quality attributes (R): If these features are met, customers will be dissatisfied, and if they are not met, it will lead to customer satisfaction.

Kano (1984) presented a functional and dysfunctional questionnaire. Functional question encapsulates customers' feelings when quality attributes are offered by a product or service, while dysfunctional question functions when quality attributes are not offered. Either way, customers' answers are recorded on a one-to-five scale. Product/service quality elements are classified into five categories mentioned by Kano (Matzler and Hinterhuber, 1998) (see Table 4).

Wang (2013) introduced a set of formulas and quantified the original Kano model. (d_i^+) denotes positive delight of the attribute, (d_j^-) represents negative disgust, and (S_j) is the quantitative degree of satisfaction? (see Eq. (1),2and 3):

$$d_i^+ = \frac{A_j + O_j - R_j}{A_j + O_j + M_j + R_j + I_j} \quad (1)$$

$$d_i^- = -\frac{M_j + O_j - R_j}{A_j + O_j + M_j + R_j + I_j} \quad (2)$$

$$S_j = P_j d_i^+ + (1 - P_j) d_i^- \quad (3)$$

where A_j, O_j, M_j, R_j *and* I_j imply the related percent for Kano categories for attribute j. Then, attribute j's performance rating (P_j) that has been derived from the first question in a sample questionnaire (Wang, 2016), is normalized to a value between 0 and 1. According to Fig. 2, degrees of satisfaction (S_j) is identified by interposing the two end points. $(d_i^+ \text{ and } d_i^-)$.

Table 4
An illustrated questionnaire applied to Kano model.

KANO questionnaire		Dysfunctional form of the question				
		1)I like it that way	2)It must be that way	3) I am neutral	4)I can live with it that way	5)I dislike it that way
Functional form of the question	**1)I like it that way**	Q	A	A	A	O
	2)It must be that way	R	I	I	I	M
	3) I am neutral	R	I	I	I	M
	4)I can live with it that way	R	I	I	I	M
	5)I dislike it that way	R	R	R	R	Q

3.4. Importance-performance (satisfaction) analysis

Martilla and James (1977) introduced IPA as a technique to shed light on product or service attributes, through which a company can achieve customer satisfaction or finish valuable resources. A two-dimensional matrix is plotted. Horizontal axis represents the degree of performance, and vertical axis shows the degree of importance. Four distinct strategies for customer satisfaction management are derived from the matrix shown in Fig. 3.

Attributes in Quadrant I. They are in an area high in both satisfaction and importance, and are representatives of competitive advantage opportunity.

Attributes in Quadrant II. They are in an area low in satisfaction but high in importance, and are representatives of the points requiring concentration and if ignored, a great threat takes place.

Attributes in Quadrant III. They are in an area low in both satisfaction and importance, and are representatives of the points which do not need allocation of additional efforts.

Attributes in Quadrant IV. They are in an area high in satisfaction and low in importance, and are representatives of "low priority" attributes. Resources allocated to such attributes can be more efficient if they are employed in other attributes.

Matzler et al. (2004) illustrated the relationship between attribute-level performance and overall satisfaction through regression analysis with dummy variables (See Eq. (4)).

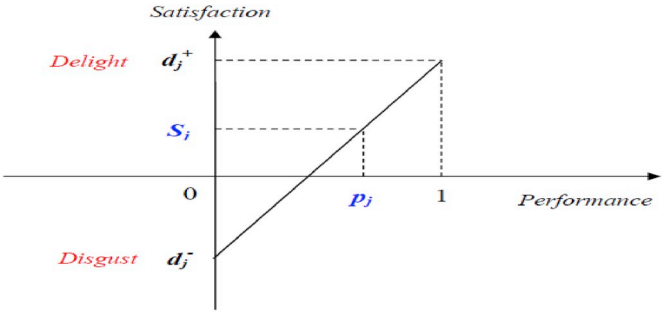

Fig. 2. Converting a SQA performance rating into a quantitative satisfaction degree.

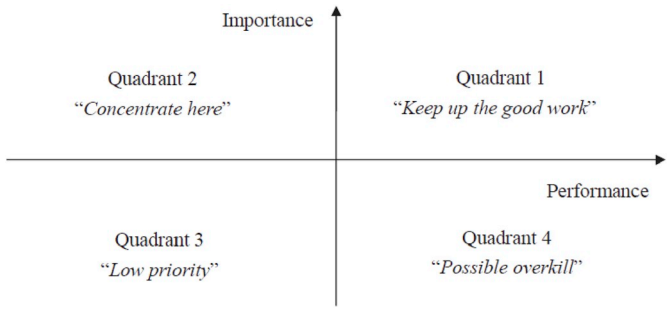

Fig. 3. Importance-performance analysis (IPA).

$$S_i = \sum_{j=1}^{n} S_{ij} = \beta_0 + \beta_1 P_{i1} + \ldots + \beta_n P_{in}, \quad for\ \forall i, \tag{4}$$

where Si represents the entirely customer satisfaction for respondent i, pij explains respondent i's performance scale for attribute j, and βj indicates a regression coefficient. As stated by Wang (2016), Kano model processes a respondent's performance rating (pij) (Eq. (3)) for deriving degrees of their satisfaction with attribute j (Sij). Therefore, IPA is improved by the "Importance-Satisfaction" Analysis (ISA).

3.5. Data collection

The survey was conducted on international flights departing from Iran (2018). Thirteen domestic airlines, including Mahan, Aseman, Iran Air, Kaspian, Ata, Qeshm Air, Kish Air, Puya Air, Meraj, Iran Air tour, Zagros, Naft Iran, and Taban were participated in this study. These airlines operate flights to/from a wide variety of countries in Middle-East, South Asia, Far-East, Europe, and the CIS region. According to the last report revealed by Iran Civil Aviation Organization ("www.cao.ir," n.d.), 87% of more than 3.3 million passengers departed from Iran via domestic airlines, have been departed from three metropolitan cities, including Tehran, Isfahan, and Mashhad. Hence, we distributed an online questionnaire in these cities. A total of 372 passengers completed the questionnaire correctly. It was found that 208 of these respondents traveled for leisure, 121 passengers traveled for business, and 43 of them traveled for education (Table 5).

In order to collect data from passengers, we designed an adaptive online questionnaire consisting of three parts. The first part of the questionnaire aimed to get demographic and behavioral data in order to cluster air passengers. Demographic data included age, job, and gender, and behavioral data were the number of international flights during one year, flight intention, and frequent cabin class. Based on the cabin class chosen by the respondents, different questions were shown to them. The second part included the Kano Questionnaire, which asked the respondents about their feelings in the presence or absence of a definite attribute. As shown in Table 4 respondents were offered five choices; that is, "I like it that way", "It must be that way", "I am neutral", "I can live with it" or "I dislike it that way". Finally, the last part of the questionnaire asked about how the passengers evaluate SQAs performance, and how the passengers feel about the importance degree of SQAs. In this part, respondents answered the questions by attributing a number from 0 to 10 based on their perception (Wang, 2016).

Table 5
Demographic profile of each customer cluster.

Clusters	Descriptions (in percentages)					Number of respondents
	Gender		Age			
	man	woman	under 30	between 30-55	above 55	
C1	53%	47%	23%	71%	6%	17
C2	33%	67%	8%	25%	67%	12
C3	44%	56%	12%	87%	1%	131
C4	48%	52%	25%	50%	25%	48
C5	100%	0%	25%	25%	50%	16
C6	75%	25%	8%	67%	25%	48
C7	50%	50%	83%	17%	0%	24
C8	76%	24%	9%	91%	0%	33
C9	57%	43%	100%	0%	0%	7
C10	72%	28%	94%	6%	0%	36
Total						372

4. Results and discussion

This section firstly discusses behavioral traits of each cluster. Secondly, the result of Kano model and the Important-Satisfaction analyses are reported by drawing some practical figures.

4.1. Cluster analyses

As shown in Table 2, passengers with the same behavioral characteristics were categorized into 10 clusters, which are explained as follows:

Cluster 1: This cluster involves passengers who fly for leisure via business class flights with low frequency. Passengers of this cluster are almost between 30 and 55 years old and usually, have pre-planned trips once or twice a year for the sake of recreation and shopping.

Cluster 2: This cluster comprises passengers who fly with high frequency. Passengers of this cluster are almost more than 55 years old, and they are from the upper stratum in society who love journeys, and for whom flight comfort is a crucial parameter, so they choose business class flights.

Cluster 3: This cluster includes passengers who fly economy class for leisure with low frequency and are between 30 and 55 years old. This cluster, which constitutes one-third of the whole sample of the study, are price-sensitive passengers as they usually fly via charter flights.

Cluster 4: This cluster comprises passengers who fly economy class for leisure with high frequency. Almost half of them are between 30 and 55 years old. These people seem to be more adventurous travelers.

Cluster 5: This cluster includes passengers who fly for work via business class flights, and most of them are above 55-year-old men flying for business negotiations or making contracts once or twice a year. In addition, they usually come from a rich stratum of the society.

Cluster 6: This cluster comprises passengers who fly via business class flights with high frequency. They import raw materials or goods from foreign countries, and their usual destination country is China. In addition, they experience short-term trips for business purposes.

Cluster 7: This cluster entails passengers engaged in local businesses who fly for work via economy class flights with low frequency. Sometimes, they travel to developed countries for their business improvement.

Cluster 8: This cluster mostly comprises 30-to-55-year-old men who fly for work via economy class flights with high frequency. In addition, they are price-sensitive passengers.

Cluster 9: This cluster consists of passengers who fly for education via business class flights with low frequency. This cluster contains young people under 30 years old from rich families, and they mostly study abroad on their own funds.

Cluster 10: This cluster comprises passengers who fly via economy class flights with low frequency. They are usually from the middle stratum who study abroad, and they fly for either education or visa issues to the adjacent countries.

4.2. The result of Kano Model and Importance-Satisfaction Analysis

As discussed in the Research Methodology section, respondents' expectations led us to classify all examined attributes in five categories of the Kano Model. According to Table 6, each SQA has been placed in

one category of the Kano Model by means of the Mode of the number of respondents. Therefore, according to Equation (3), the satisfaction degree (S_j) of each SQA was measured (see Table 7).

The SQAs were examined separately, and the results extracted from the Kano Model indicated that "Flight safety" is considered in the must-be category for all of the ten clusters. However, almost all of the clusters were dissatisfied with it. Dissatisfaction with "Flight safety" does not necessarily mean that respondents have had a bad flight experience. In fact, due to recent tough political sanctions imposed on Iranian Airlines, which have affected the airlines adversely by confining them in buying new aircraft or in equipping their current fleet, there is an atmosphere of mistrust amongst the Iranians who assume that domestic airlines are not well-equipped and they are hazardous. Moreover, "Cleanliness on the plane" is a must-be attribute for all the clusters as well; nonetheless, it has been fulfilled merely for clusters 5, 6, and 8. According to the "Cluster analyses" section, the mentioned clusters are almost made up of men who are generally considered to be less sensitive than women about cleanness issues.

Furthermore, "Variety and quality of In-flight entertainment" was embedded in "Indifferent category" of the Kano Model for clusters 5, 6, and 8, but it was included in the must-be category for clusters 1 and 2. However, the above attribute was placed in the one-dimensional category for clusters 3, 4, 9, and 10. In general, it can be concluded that passengers flying for leisure consider the "Variety and quality of In-flight entertainment" in either must-be or one-dimensional categories. They will be satisfied when this attribute improves, and they inversely experience dissatisfaction in the absence of it. On the other hand, passengers who travel for Business purposes, consider this attribute to be an indifferent attribute. In addition, clusters 1, 2, 5, 6, 8, and 9 were satisfied with "Variety and quality of In-flight entertainment". These clusters were consisted of passengers who fly business class. It is worth noting that the "Variety and quality of In-flight entertainment", which is not provided at the same level in economy cabins, has led to the dissatisfaction of other clusters.

Regarding the "Appearance of flight crew", it is an attractive feature for cluster 5, which was mainly made up of men above 55, and also for clusters 7 and 10, which was comprised of men under 30. In the meantime, this attribute was considered either in the must-be or in the one-dimensional categories. Furthermore, all the clusters, excluding clusters 3 and 9, who expressed a little dissatisfaction, were satisfied with "appearance of flight crew" attribute. However, due to the fact that these clusters consider such an attribute in the indifferent category, neither improving nor maintaining of this attribute leads to more satisfaction. Additionally, all the clusters were satisfied with "Language skills" and "Courtesy of flight crew". These two SQAs were considered either in must-be or in one-dimensional categories. Among all SQAs, attributes of directly regarding flight crew, such as "Appearance of flight crew", "Language skills", and "Courtesy of flight crew" are the satisfactory ones.

Unlike the most clusters, which were satisfied with the "Possibility to choose food and drink before flight", C4 and C8, for whom this attribute was a must-be attribute, were dissatisfied with the "Possibility to choose food and drink before flight". C4 and C8 comprised of passengers flying economy class with high frequency. As a result, those who were frequent fliers and had flown economy class, got tired of the limited menu and iterative foods and drinks while they were willing to opt for various food and drinks before the flight. Moreover, C1, C2, C5, C6, and C9 were gratified by the offered "Food and drink options". It can be concluded that quality of food and drink in business flights is satisfactory; a fact that is not applied to economy class flights. Moreover, "Food and drink options" were considered either as a must-be or as a one-dimensional quality for both business class and economy class passengers.

All the clusters, excluding the clusters 9 and 10, who expressed a little satisfaction, were dissatisfied with "Responsiveness to complaints". The latter clusters' satisfaction derived from the fact that students fly at a lower frequency per annum. Consequently, they probably do not experience dissatisfactory situations, which cause them to complain. Regarding "compensatory services for damaged baggage", all clusters except C5, for which this SQA was assumed as a one-dimensional quality, were not satisfied. Meanwhile, the "compensatory services for damaged baggage" were the must-be attribute for other clusters.

Facilities, including "Pillows and blankets/covers" were considered in the must-be category of the Kano Model for C2, C6, C8, and C10, all of which were dissatisfied with the aforementioned SQA. An assumption for this dissatisfaction can be ascribed to the fact that the sole commonality among these clusters is having long haul flights. 30% of them have experienced longer than 8-h flights, and 56% of them have experienced three-to-eight-hour flights. Additionally, "Extra travel services; that is, visa" were placed in the indifferent category of the Kano Model, which did not affect the passenger satisfaction. Generally, visa services are not included as the common services among domestic airlines. As a result, this attribute does not play a vital role in the passengers' perception of satisfaction.

Clusters 6, 7, 8, 9, and 10 that were composed of either students or Business passengers who were dissatisfied with "Flight schedule", which was in must-be category. For whom fly for leisure purposes, "Flight schedule" has been considered in the one-dimensional category. On the other hand, most of the clusters stated that "Punctuality", with which C6

Table 6
The Kano categories.

service quality attributes	Kano category									
	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
Flight safety	M	M	M	M	M	M	M	M	M	M
Variety and quality of in-flight entertainment	M	M	O	O	I	I	M	I	O	O
Cleanness on the plane	M	M	M	M	M	M	M	M	M	M
Responsiveness to complaints	M	O	M	O	M	M	O	M	M	M
Appearance of flight crew	M	O	I	M	A	M	A	O	I	A
Language skills	O	M	M	M	M	M	O	M	M	O
Courtesy of flight crew	O	O	M	M	O	M	O	M	M	M
Compensatory service for damaged baggage	M	M	M	M	O	M	M	M	M	M
Pillows and blankets/covers	O	M	O	O	O	M	O	M	O	M
Extra travel service	I	O	O	I	I	I	I	O	I	I
Punctuality	O	M	M	M	M	M	M	M	M	M
Flight schedule	O	O	O	O	O	M	M	M	M	M
Food and drink options	O	O	O	M	O	M	M	M	M	M
Possibility to choose food and drink before flight	A	M	A	M	O	M	A	M	M	A
Access to in-flight Internet	O	O			A	M			A	
Access to in-flight electricity	M	M			M	M			M	
Lounge service	O	O			I	M			M	
Seat comfort			M	M			M	M		O

Table 7
The amount of delight and disgust.

service quality attributes	Delight & disgust									
	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
Flight safety	0.25	0.33	0.34	0.24	0.25	0.08	0.35	0.49	0.7	0.33
	−0.95	−1	−0.98	−0.87	−0.5	−0.87	−0.66	−1	−1	−0.87
Variety and quality of in-flight entertainment	0.72	0.12	0.67	0.33	0.48	0.16	0.5	0.74	0.51	0.65
	−0.5	−0.65	−0.53	−0.41	−0.49	−0.34	−0.5	−0.63	−0.5	−0.54
Cleanness on the plane	0.23	0.01	0.22	0.09	0.27	0.19	0.33	0.25	0.23	0.21
	−1	−1	−0.94	−0.75	−1	−0.92	−0.98	−0.97	−0.92	−0.88
Responsiveness to complaints	0.73	0.71	0.43	0.41	0.2	0.16	0.67	0.37	0.54	0.23
	−0.95	−0.95	−0.87	−0.66	−0.76	−0.63	−0.91	−0.96	−0.96	−0.79
Appearance of flight crew	0.26	0.6	0.37	0.34	0.5	0.24	0.85	0.75	0.01	0.66
	−0.75	−0.6	−0.53	−0.76	0	−0.75	−0.5	−0.62	−0.48	−0.22
Language skills	0.5	0.6	0.43	0.25	0.24	0.21	0.8	0.34	0.82	0.63
	−0.75	−0.7	−0.59	−0.67	−0.5	−0.62	−0.83	−0.76	−0.55	−0.46
Courtesy of flight crew	0.25	0.2	0.41	0.08	0.26	0.32	0.84	0.38	0.5	0.21
	−0.71	−0.7	−0.68	−0.58	−0.49	−0.75	−0.33	−1	−0.62	−0.06
Compensatory service for damaged baggage	0.45	0.1	0.22	0.25	0.5	0.16	0.17	0.12	0.53	0.33
	−1	−0.98	−1	−0.67	−0.73	−1	−0.98	−1	−0.4	−1
Pillows and blankets/covers	0.25	0.51	0.38	0.33	0.25	0.08	0.67	0.37	0.45	0.65
	−0.45	−0.98	−0.6	−0.83	−1	−0.85	−0.67	−0.6	−1	−0.3
Extra travel service	0.25	0	0.78	0.08	0.24	0.16	0.17	0.5	0.52	0.22
	−0.5	−0.3	−0.56	−0.57	0	−0.42	0.5	0	0	−0.9
Punctuality	0.53	0.28	0.31	0.25	0.76	0.34	0.53	0.25	0.47	0.23
	−1	−1	−0.96	−0.67	−0.98	−1	−0.67	−1	−0.5	−0.79
Flight schedule	0.94	0.3	0.44	0.33	0.75	0	0.51	0.49	0.45	0.46
	−0.97	−0.66	−1	−0.76	−0.97	−0.91	−0.96	0.87	−0.97	−0.66
Food and drink options	1	0.68	0.62	0.33	0.71	0.17	0.33	0.5	0	0.11
	−0.23	−1	−0.7	−0.72	−1	−0.95	−0.64	−1	−1	−0.67
Possibility to choose food and drink before flight	1	0.3	0.66	0.58	0.5	0.21	0.67	0.25	0.98	0.78
	−0.26	−0.7	−0.2	−0.78	−0.5	−0.5	0.02	−0.62	−0.08	−0.34
Access to in-flight Internet	0.75	0.67			0.75	0.5			0.5	
	−0.91	−1			−0.45	−1			−0.5	
Access to in-flight electricity	0.5	0.33			0.23	0.16			0.05	
	−0.87	−0.6			−0.71	−0.95			−0.98	
Lounge service	0.75	0.67			0.24	0.03			0	
	−0.95	−0.72			−0.52	−0.8			−0.45	
Seat comfort			0.48	0.41			0	0.38		0.55
			−0.8	−0.83			0.93	0.95		−0.61

and C9 were satisfied with, is either a must-be or a one-dimensional attribute. Moreover, "Lounge service", "Access to electricity", and "Access to the In-flight internet" were merely demanded in the questionnaires, which were filled out by passengers flying business class. All of these passengers were discontented with "Lounge service"- a must-be or one-dimensional quality. On the other hand, students and Business passengers consider "Access to the In-flight internet" as an attractive service, and leisure passengers take it into account as a one-dimensional attribute. "Access to electricity", with which all the clusters were dissatisfied, was a must-be attribute. On the contrary, attribute of "Seat comfort" was asked merely from economy passengers among whom C7 was the only cluster satisfied with it. All the clusters assumed that "Seat comfort" is in the must-be category of the Kano Model.

In order to extract applicable results for airlines, this paper merged clusters that fly by the same cabin class. Hence, through Importance-Satisfaction Analysis, each of SQAs stands on a specific quadrant (See Table 8).

Table 8
The result of Importance-Satisfaction Analysis (ISA).

Quadrant		Economy Class	Business Class
1	Keep up the proper work	A14, A7, A6, A5, A12	A14, A13, A12, A7, A6, A5, A4, A2
2	Concentrate here	A18, A13, A11, A9, A8, A4, A3, A2, A1	A17, A15, A16, A11, A8, A9, A3, A1
3	Low priority		A10
4	Possible overkill	A10	

5. Conclusions and implications

This paper employed a multi-method approach to conduct the Importance-Satisfaction analysis on the Iranian airlines in order to concentrate on essential service elements and save the time and money spent on less important service attributes. The paper is summarized as follows:

- Air passengers were classified into specified clusters based on the ICF model for extracting expectations of each cluster regarding service quality of domestic airlines.
- Service Quality Attributes (SQAs) for the Iranian airlines were customized based on the Delphi method.
- Passengers' expectations were incorporated into appropriate categories of the Kano Model and converted into quantitative degree of satisfaction.
- The Importance-Satisfaction analysis was employed to illustrate which attribute needs to be firstly improved, well kept, secondly improved, or ignored for better re-allocation of the limited resources.

Taking the combined results of the mentioned steps into consideration, the following managerial insights are provided for the Iranian airlines, so that they can improve quality of the service in order to survive in a tough competition in the market:

- Maintaining some of the current SQAs, including "Appearance of flight crew", "Language skills", "Courtesy of flight crew", and "Possibility to choose food and drink before flight".
- Concentrating on some SQAs, including "Flight safety", "Cleanness on the plane", "Compensatory service for damaged baggage",

"punctuality", "Pillows, and blankets/covers" for improvement of the current situation.

- Several SQAs comprising of "Variety and quality of in-flight entertainment", "Responsiveness to complaints", and "Food and drink options" should be firstly improved in economy cabin. Conversely, these attributes are *incorporated* into "keep up the good work" quadrant of the IPA Model for business cabin.
- Iranian Airlines should have more concentration on the "Access to in-flight Internet", 'Access to in-flight electricity"," Lounge services" for business class passengers, and "Seat comfort" for economy class passengers.
- "Extra travel service; that is, visa service" for passengers who fly economy class could be ignored, so that it had low priority for those who fly business class.

Some marketing insights are generated by this empirical study, which could be formulated and implemented as marketing strategies for Iranian airlines. For instance, as this study proved, a majority of the respondents were concerned about "flight safety", which implies the operation of the old fleet by Iranian airlines. This fact urges the airlines to come up with the solution either by acquiring new aircraft or leasing new ones from other airlines to address this concern properly. In addition, to reduce the fear of fly for passengers who are concerned about the safety of their flight, airlines can use VR[1] headsets. This kind of headsets will be Included in the VR platform are curated therapeutic VR experiences, which include meditation as well as sound therapy. The therapeutic experiences are intended for passengers who may have a fear of flying.

Concentrating on the performance of the Lost and Found Department in the Iranian airlines by providing proper compensatory options, such as providing a suitcase with the necessary travel equipment, payment of cash penalty, and free ticket for future flights, will enable airlines to mitigate dissatisfactions of the passengers who suffered from losing their baggage. While compensatory offers are the minimum obligations for resolving problems, offering incentives are more effective tools for gratifying passengers. As mentioned in Section 5.2, cluster 10 is one of the most dissatisfied clusters that comprise dissatisfied students flying economy class. Accordingly offering, special discounts for booking business class seats and giving students this opportunity to upgrade their seats to business class will result in an experience of high-quality services with more satisfaction for those who are able to distinguish the quality of the provided services well.

For the sake of improving "Variety and quality of in-flight entertainment" item, Iranian airlines should offer an in-flight VR entertainment system. On the VR platform, passengers would have the ability to interact with in-flight entertainment in a conventional 2D format, or alternatively, they could access the 3D. However, it is better that they will run a trial platform on a certain rout especially passengers for cluster 1 and cluster 2 in order to get some feedback from them.

The passengers should be able to choose a film or television episode and download the free video player app simply. In addition, parents should access to the customized kids-only mode for their children. Therefore, passengers should be allowed to stream videos through their own mobile devices for a more comfortable and entertaining viewing experience.

Another highly impressive entertainment is preparing the customized magazine for each passenger. In order to make sure that the content on the inside of the magazine was as interesting as it could possibly be, Iranian airline should be able to gather relevant data about their customers by asking them some questions during the buying process.

As mentioned before, Iranian Airlines should have more concentration on "seat comfort" especially in economic class (clusters 3,4,7,8 and 10). In terms of convenience, the appropriate feature is using smart seats with embedded sensors that measure passenger biometrics like temperature, seat tension, pressure, and passenger movement. Passengers should be able to switch seat settings from watching TV to mealtime to sleep. The sensors also help the smart seat adapt automatically to the passenger's weight, size and type of movement to reduce pressure points.

As with all studies, there are unavoidable limitations to this study that are worth discussing. Several service quality attributes, such as "Limousine service to the airport", "Traveling with animals", "Pick-up/Delivery luggage", "Parking space booking" were ignored in order to make the study less complex. Although we do not expect these attributes have a significant effect on passenger satisfaction as much as attributes that we discussed, it is suggested that these factors be further explored in future research. Moreover, our questionnaire restricted respondents to say their opinion in certain service quality attributes, which drive from Delphi method. It is recommended that future studies could provide grounds for respondents to comment on which services they want more. Another limitation of the study is that it has been only restricted to the Iranian airline industry where the results may not be applicable to other countries. Thus, future studies could examine this multi-method approach in other countries.

[1] Virtual reality.

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