VILNIUS GEDIMINAS TECHNICAL UNIVERSITY
BUSINESS MANAGEMENT FACULTY
SOCIAL ECONOMY AND MANAGEMENT DEPARTMENT

Julija Michalčenko

RESEARCH OF AIRLINES SERVICE QUALITY IMPACT ON ITS DEMAND
ORO BENDROVĖS PASLAUGŲ KOKYBĖS ĮTAKOS JŲ PAKLAUSAI TYRIMAS

Master‘s degree Thesis

Engineering Economics and Management, 621N20024
Aviation Management specialisation
Management study field

Vilnius, 2017

VILNIUS GEDIMINAS TECHNICAL UNIVERSITY
BUSINESS MANAGEMENT FACULTY
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THE OBJECTIVES: to examine the influence of airline service quality on passenger satisfaction and loyalty; to analyse scientific literature on airlines service quality; to analyse factors having impact on aviation business sectors; to define the importance of service quality for passenger satisfaction; to review the main methods of qualitative and quantitative research suitable for airlines service quality; to describe selected research methodology and verify validity and reliability of measurement; in accordance with used qualitative data and qualitative data analysis, to identify key factors of service quality; to summarize the results of theoretical and practical research and make conclusions and recommendations.

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ACADEMIC SUPERVISOR'S REVIEW
ABOUT MASTER THESIS

.....

Student Julija Michalčenko in her Masters degree thesis examined the influence of airline service quality on passenger satisfaction and loyalty. For this objective she analyzed scientific literature on airline service quality defined the importance of them for passengers, made review of main research methods, used qualitative and quantitative methods, identified key factors. Julija Michalčenko master degree thesis meet the requirements and is offered for public defence.
Evaluation 9 (very good)

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Annotation

The growing airline industry shows the higher demand of flying these days. Airlines compete with each other to stay profitable. One of the ways the airlines choose to be different and attract more passengers is a service quality. This research focuses on the service quality provided by the airlines. The problem is the relations between the passengers and the airlines, passengers' loyalty. The thesis consists of three main chapters: theoretical approach of airline service quality, airline's service quality evaluation methods, qualitative research in-depth interview and quantitative research passengers' experience analysis. The research is completed by formulating the formed assumptions and raising the hypothesis - the service quality has the direct impact on the airline's demand. The data collection was effected mainly by interview method using fully structured questionnaires.The total of 400 respondents questioned. The analysis is based on the SERVQUAL method for evaluating airline's service quality. The in-depth interview performed with Small Planet Airlines. The factors having an impact on the aviation industry are considered. The passengers data results of two low cost airlines are compared. The data denies the hypothesis that the service quality has the direct impact on the airline's demand. This is a more complex matrix. In accordance with the data analysed, especially, the comparison of passengers' expectations and perception of two airlines; the gap between the dimensions expectations and perception; the respondents monthly gross salary; the average Lithuanian gross earning, the greatest impact on the customer has the price. The last chapter consist conclusions and recommendations. It is recommended that airline management should consider developing various strategies for improving service quality based on demographic characteristics of the customers such as occupation, age, gender and education level. The company has to establish the system for the passengers' satisfaction evaluation.

Keywords: Service quality, airline's demand, aviation market, customers experience, comfort, service provider, SERVQUAL quality evaluation method, fuzzy set theory

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Anotacija

Augantis aviacijos sektorius parodo didesnį poreikį skraidyti. Aviakompanijos konkuruoja tarpusavyje, siekdamos pelno. Paslaugų kokybė – vienas iš būdų, kurį pasirenka oro bendrovės, būti kitokiomis ir pritraukti keleivius. Šiame baigiamajame darbe kreipiamas dėmesys oro bendrovių teikiamai paslaugų kokybei. Iškeliama problema tarp keleivių ir aviakompanijų, keleivių lojalumo. Šis darbas suskirstytas į tris pagrindinius skyrius: oro bendrovių paslaugų kokybė teoriniu požiūriu, oro bendrovių paslaugų kokybės vertinimo metodai, kokybinio interviu tyrimo metodo ir kokybinio keleivių potyrio tyrimo analizė. Tyrimas atliktas sudarant prielaidas ir iškeliant hipotezę – paslaugų kokybė turi tiesioginę įtaką oro bendrovių paklausai. Tyrimo duomenys buvo surinkti apklausos ir interviu metodu. Iš viso buvo apklausta 400 keleivių. Teikiamų paslaugų kokybės tyrimo analizė atlikta naudojant SERVQUAL metodą. Interviu metodu apklaustas Small Planet Airlines marketingo departamento vadovas. Analizuojant atkreiptas dėmesys į veiksnius, kurie turi įtakos aviacijos sektoriui. Dviejų pigių skrydžių oro bendrovių keleivių paslaugų kokybės tyrimo rezultatai palyginti. Gauti duomenys paneigia hipotezę, kad paslaugų kokybė turi tiesioginę įtaką aviakompanijų paklausai. Tai yra sudėtingesnė matrica. Dviejų oro bendrovių keleivių paslaugų kokybės lūkesčių ir potyrių palyginimas, atitrūkimas tarp lūkesčių ir potyrių nustatymas, apklaustųjų mėnesinis darbo užmokestis, vidutinis Lietuvos darbo užmokestis parodo, kad didžiausią įtaką keleivio pasirinkimui turi kaina. Paskutiniame baigiamojo darbo skyriuje pateikta darbo išvados ir rekomendacijos. Viena iš rekomendacijų, kad aviakompanijų vadovai turi įtraukti paslaugų kokybę kuriant bendrovės strategiją, atsižvelgiant į demografinius rodiklius, vartotojų užimtumą, amžių, lytį, išsilavinimą. Bendrovei privalu įdiegti keleivių paslaugų kokybės vertinimo sistemą.

Prasminiai žodžiai: Paslaugų kokybė, aviakompanija, paklausa, aviacijos sektorius, vartotojų potyris, patogumas, paslaugų tiekėjas, SERVQUAL paslaugų kokybės metodas, napibrėžtumo aibės teorija

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DECLARATION OF AUTHORSHIP IN THE FINAL DEGREE PAPER

January 4, 2017

I declare that my Final Degree Paper entitled „Research on Impact of Airline Service Quality for Its Demand" is entirely my own work. The title was confirmed on November 25, 2015 by Faculty Dean's order No. 203ai. I have clearly signalled the presence of quoted or paraphrased material and referenced all sources.

I have acknowledged appropriately any assistance I have received by the following professionals/advisers: Gabrielė Masiulionienė.

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CONTENT

LIST OF TABLES, FIGURES AND CHARTS 8
INTRODUCTION 9
1. THEORETICAL APPROACH OF SERVICE QUALITY 11
1.1. The service quality in aviation sector 11
1.2. Factors having impact on aviation industry 16
2. RESEARCH METHODOLOGY 22
2.1. Quantitative research - airline‘s service quality evaluation methods 23
2.2. Concept of Fuzzy set theory 26
2.3. Qualitative research of airlines service quality: in – depth interview method 28
2.4. The sample size 29
3. RESULTS AND DATA ANALYSIS 31
3.1. Passengers’ experience analysis using a quantitative research method 31
3.2. The findings of in-depth interview with Small Planet Airline’s head of marketing department using a qualitative method 52
CONCLUSIONS AND RECOMMENDATIONS 54
REFERENCES 57
APPENDEXES 63
A. The SERVQUAL questionnaire dimensions for airline services 63
B. The arithmetic operations on fuzzy numbers 66
C. Questionnaire for in-depth interview 69

LIST OF TABLES, FIGURES AND CHARTS

Fig. 1. An overview of the eight factors of passenger comfort in relation to their concerns, defined by Ahmadpour *et al*., (2014). 14
Fig. 2. Exchange rate-adjusted jet fuel prices (Source: IATA, Platts, ... 17
Thomson Reuters Datastream). 17
Fig. 3. Break-even and achieved load factors (Source: IATA, ICAO). 18
Table 1. Employment rate, % 20
Table.2. Average earnings monthly in Euros..... 21
Table 3. Passengers carried to/from Lithuanian airports 21
Fig. 4. Five dimensions of the SERVQUAL method..... 23
(*Source*: modified by author. Zeithaml *et al*. 1990). 23
Fig. 5. Means-end chain approach (Source: Zeithaml , 1988). 24
Fig. 6. The SERVPEX includes three dimensions 24
(*Source*: modified by author, Hung-Che *et al*. 2013). 24
Fig. 7. The graded mean *h*-level of fuzzy number A 26
(C.-C. Chou *et. al*., 2011) 26
Table 4. Arriving/ departing number of passengers. 30
Fig. 8. Five dimensions of service quality..... 32
(*Source*: modified by author, Parasuraman *et al*. 1988). 32
Table 5. Linguistic variables for expectations and perception 33
Table 6. Linguistic variables for importance weight of criteria..... 33
Chart 1. The survey statistics for the participants age in percentage. 34
Chart 2. The survey statistics for the participants' education in percentage. 34
Chart 3. The survey statistics for the participants' monthly salary. 35
Chart 4. The survey statistics for the participants flights per year. 36
Chart 5. The survey statistics for the participants type of 36
flights: leisure or work travel. 36
Table 7. The scores of expectations and perceptions of Low Cost Airline1. 39
Table 8. The weight of service items of Low Cost Airline1..... 43
Table 9. The scores of expectations and perceptions of Low Cost Airline2. 45
Table 10. The result's comparison of *Low Cost Airline1* and *Low Cost Airline2* gaps and ranks. .. 48
Table. 11. The research data comparison of two airlines. 50

INTRODUCTION

The Importance of thesis. The growing airline industry shows the higher demand of flying these days. Airlines compete with each other to stay profitable. One of the ways the airlines choose to be different and attract more passengers is a service quality. Airlines' service quality is becoming the driving force of the companies. The airlines is making more important investigations of the ways helping service providers to keep relations with passengers and find the best service quality evaluation methods.

This research **focuses** on the service quality provided by the airlines. The problem is the relations between the passengers and the airlines, passengers' loyalty. What are the factors and dimensions, which creates the long term relations for the passengers? How the service quality determines the customers' loyalty and has the influence on the market.

The general objective of this study is to examine the influence of airline service quality on passenger satisfaction and loyalty.

To achieve this, the main tasks of the thesis are:

- To analyse scientific literature on airlines service quality;
- To analyse factors having impact on aviation business sectors;
- To define the importance of service quality for passenger satisfaction;
- To review the main methods of qualitative and quantitative research suitable for airlines service quality;
- To describe selected research methodology and verify validity and reliability of measurement;
- In accordance with used qualitative data and qualitative data analysis, to identify key factors of service quality.

In order to accomplish the main tasks and to reach the main objective of study, theoretical and empirical analyses were performed. Theoretical part of the study is mainly based on literature relating to airlines services quality defining. Research was guided by specific objectives to which data collection was carried out mainly by interview method using fully structured questionnaires. The purpose of the thesis is to define the main factors, which are important for the passengers, when making the decision of choosing the airline they want to travel with, what is done by the airlines to increase the service quality provided to the customers, to reach the higher passenger satisfaction score.

Methodology used in the thesis: systematic analysis of science literature on airlines service quality. The literature reviewed on service experience research, which showed the importance of interaction with other customers and the physical environment in enhancing the customer's experience. The analysis and comparison of SERVQUAL, SERVPAL, SERPERF and SERVPEX quality evaluation methods were made, which of them can be better applied for the airlines' service quality measurement. Service quality can be regarded as a composite of various attributes. It not only consists of tangible attributes, but also intangible/subjective attributes such as safety, comfort, which are difficult to measure accurately. Different individual usually has wide range of perceptions toward quality service, depending on their preference structures and roles in process (service providers/receivers). To measure service quality, conventional measurement tools are devised on cardinal or ordinal scales. Most of the criticism about scale based on measurement is that scores do not necessarily represent user preference. This is because respondents have to internally convert preference to scores and the conversion may introduce distortion of the preference being captured. There are many factors, which have an influence on the service quality in an airline business, that's why it is hard to evaluate it. The purposes of this study are twofold: (a) to propose a conceptual model of service quality in the airline industry, and (b) to test the psychometric properties of the proposed model by developing a scale for measuring service quality in the airline industry.

The thesis consists of three main chapters: theoretical approach of airline service quality, airline's service quality evaluation methods, qualitative research in-depth interview and quantitative research passengers' experience analysis.

1. THEORETICAL APPROACH OF SERVICE QUALITY

1.1. The service quality in aviation sector

Air travel is now more affordable, especially comparing the situation during the economic recession in 2008 (Jou *et al*. 2008). There are different type of passengers, the ones who choose the low cost carries to take them from point A to point B, and the type, who wants to get the higher quality service during the journey. According to Chen (2008), the airlines have to show the higher quality standards to be able to compete in an airline industry, in the other words, it is the main goal to keep the airline profitable and sustainable for the future development. Promoting service quality has played a key role in generating profits (Hung-Che Wu *et. al*. 2013). Mustafa, Fong, Lim, and Hamid (2005), state that the most important factor is the improvement of service quality to their passengers. Furthermore, to provide higher service quality, also known as passenger experience, has been considered to be the priority for all airlines to remain competitive. The companies compete with each other's for the passengers carried. Likewise, service quality has been introduced as one of the competitive marketing strategies, considering focus on customer, innovation, "different" service and striving towards excellent service in the airline industry (Andotra *et. al*. 2008). Therefore, the airline services are homogeneous; it has been characterized by customer segmentation, customized services, guarantees, continuous customer feedback and comprehensive measurement of company performance (Albrecht, 1992). The various service demands are introduced to the market to stay competitive. Flight scheduling, ticket prices, in-flight services, employees' attitudes, facilities and ticketing procedures have not played key roles in determining airline service quality and influencing passengers' choice of airlines (Andotra *et al*., 2008). Hung-Che Wu, Ching-Chan Cheng (2013) say that is important not only to understand how passengers evaluate the integrated service process, but also to identify the critical primary and sub dimensions with which to measure integrated service quality in the airline industry. Service providers have to find the measurement for the service quality (Robledo, 2001). Park, Robertson, and Wu (2004) indicate that many airlines have difficulty in using a proper scale to evaluate service quality in order to appropriately assess and improve their service performance. Consequently, it is necessary to develop a unit of measurement to determine which aspects of a particular service define its quality. The proposed instrument incorporates performance-based measures on the basis of scales developed by Dabholkar, Thorpe, & Rentz's (1996) and Brady and Cronin's (2001) studies. The purposes of this study are twofold: (a) to propose a conceptual model of service quality in the airline industry, and (b) to test the

psychometric properties of the proposed model by developing a scale for measuring service quality in the airline industry.

Szwarc, (2005) states that satisfied customer leads to customer loyalty, which increases the companies' profit, all this leads to the conventional marketing theory. Under this conceptualization why service quality matters is clear—a satisfied customer leads to loyalty, repurchase behaviour and a recommendation to other customers (Harris *et. al*., 2007; Ringle *et. al*. 2011; Saha *et. al*., 2009). The Net Promoter Score (NPS) system is perhaps the most extreme conceptualization of this process. The NPS argues that while service quality and customer satisfaction are important, in reality satisfaction surveys and tracking studies do not predict loyalty or the customer repurchase behaviour that firms seek to foster (Blaise P.Waguespack *et. al*., 2014). Nowadays one of the important key factors is the recommendation from the friends or colleagues (Reichheld, 2003;), which drives the airline's growth. Airlines such as Southwest and JetBlue use the question in their post flight customer surveys to find the 'promoters' who support airline growth (Bain & Company, 2013; Reichheld, 2003).

Besides, there is the literature on service experience research. Schembri (2006) believe that the customers' service experience should be the focus of research, as it is the key factor of the service delivered to the customer. The 'Customer Experience' concept has developed within the airline industry. Providing superior products and excellent service are critical factors in today's business world. Customers are becoming more and more experience-oriented and airline companies have to be aware of the factors that have an influence on customer experience (Naseem Ahmadpour *et. al*. 2015). Frow and Payne (2007), in their research study examined the concept of customer experience and suggested strategies for achieving outstanding customer experience at an affordable cost, leading to customer loyalty. Verhoef *et al.* (2009) examined the customer experience by proposing a conceptual model to discuss the various determinants of customer experience. The results revealed that prior customer experience will influence future customer experiences. Kim, Ritchie and McCormick (2012) developed a valid and reliable measurement scale, which consists of seven domains viz., hedonism, refreshment, local culture, meaningfulness, knowledge, involvement, and novelty. Pareigis *et al.* (2011) identified and described that various dimensions like customer involvement, safety and physical artefacts that are important for the customer experience as the travellers. The results showed the importance of interactions with other customers and the physical environment in enhancing the customer's experience. Tsiros and Parasuraman (2006) theory supports the customer's experience concept, they found out that interactions among customers can have profound effects on the service experience. Pentina *et al*. (2011) came up with

the idea that online shopping, which correspond the online booking of the flights, satisfy customer with the online browsing and increases the sales. Klaus and Maklan (2012) empirically validated multiple-item scale for measuring customers' service experience and found that the service experience has a significant impact on customer satisfaction, loyalty and word-of-mouth intentions. Lemke, Clark and Wilson (2010) in their study proposed a conceptual model for customer experience quality and found that customer experience positively influenced customer relationship outcomes. Bel's (2005) study of experience marketing in the airline industry proves the importance of the customer experience in the managerial area. The framework accounts for the sequential unfolding of the air travel experience and provide a customer-centric perspective of the air travel experience. Grace and Cass (2004) found that the customer experience plays significantly on the customer feelings, satisfaction and brand attitudes. Moufakkir (2010) empirically examined policy of pay for in-flight food and drinks on travellers' experience. Most travellers did not support this policy and related issues, such as intention to pay, pay arrangement, and desired mode of payment. Xu and Chan (2010) explored service experience in the context of package tours and split it into four dimensions namely 'recognition and escapism', 'peace of mind and relaxation', 'hedonics' and 'involvement', which have direct influence on overall tourist satisfaction and behavioural intention. Jensen (2012) in a research paper investigates how consumers' travel experience and shopping orientation toward travel shopping influences their tendency to shop for travel products on the internet. Using data from 256 respondents, who was interviewed by Jensen (2012), the results revealed that shopping orientation and travel experience both influence travellers' intentions to shop travel products online. Ruiping and Yujuan (2006) found that the service based on the customer experience, has an impact on the service delivery and an improvement on the profitability. Vinay Chauhan, Deepak Manhas (2014) made a conclusion of the findings related to the customer experience, is that the customer experience directly influences service quality, customer relationship, customer satisfaction, sales, feelings, satisfaction and brand attitudes, behavioural intention, enormous economic value for firms, and profitability of customers. Marketers today believe that enhancing customer experience and lasting customer loyalty are important for maintaining customer focus and creating customer preference.

Richards *et al*., (1978) for the first time mentioned the passenger comfort experience by air travel, after this publication only a few others have proposed a framework for its subjective and experiential aspects. For instance, Kremser et al. (2012) defined passengers' wellbeing in relation to their sitting posture based on ten subjective descriptors categorized as postural sensation, spatial perception, privacy and mood. Those were then linked to the optimum seat pitch range and

the eye-height level which provide a comfortable visual impression. Rossi *et al*. (2012) and Greghi *et al*. (2012) used survey and observation techniques to address passenger comfort in terms of postural discomfort experienced while performing different activities during the flights and therefore appropriating the allocation of physical space to each passenger. Vink and Brauer (2011) and Vink *et al.* (2012) prioritized the impact of several environmental factors on passenger comfort during the flight, and though not directly linked to comfort.

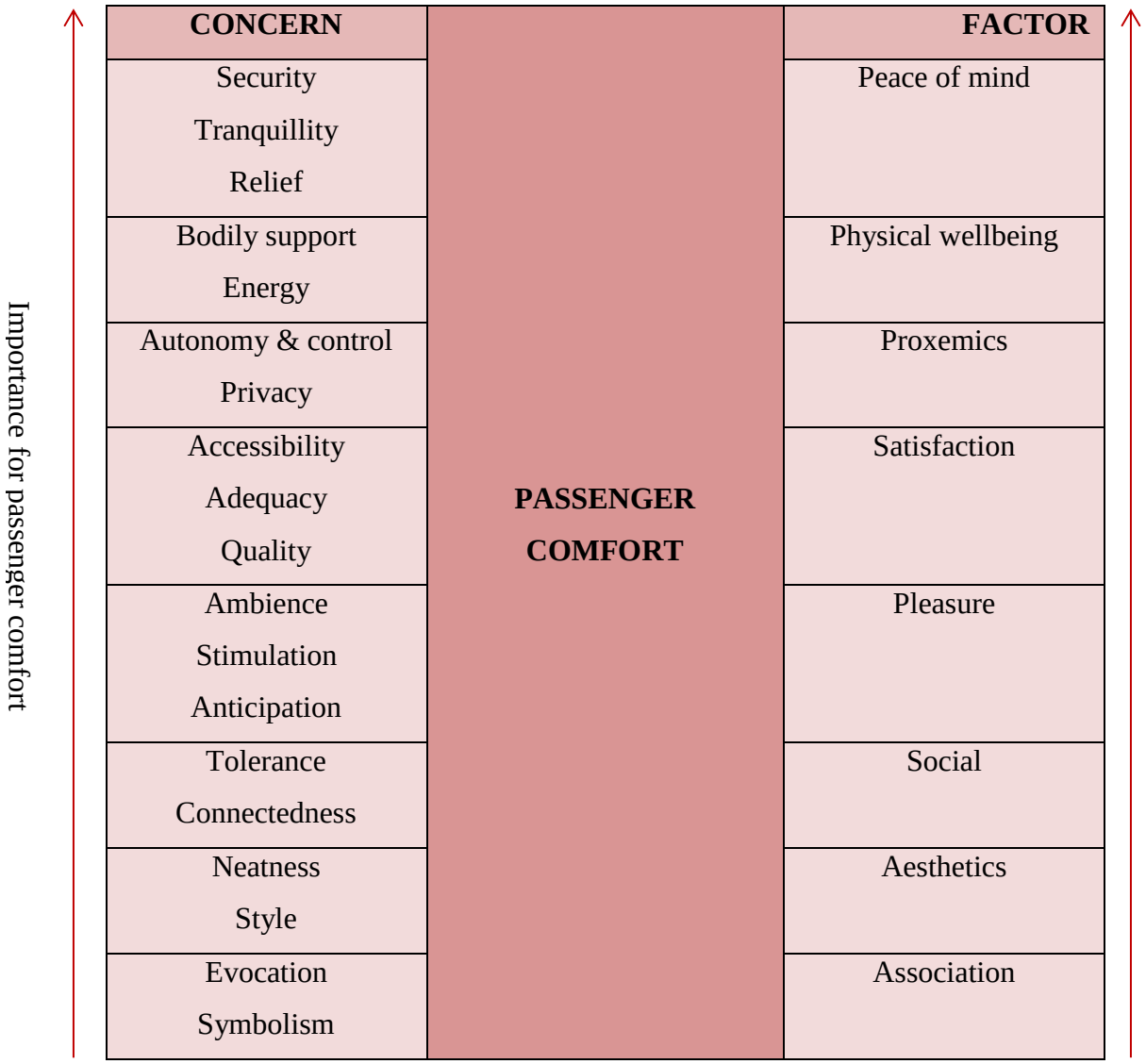


Fig. 1. An overview of the eight factors of passenger comfort in relation to their concerns, defined by Ahmadpour *et al*., (2014).

In those cases, the elicited factors were first validated in order to ascertain their effectiveness in capturing the users' experiences and then used for developing tools (e.g. questionnaires) to assess comfort experience. Following that line of research eight factors describing the comfort experience of passengers were introduced in a study of Ahmadpour et al., (2014a).

Service quality is visible for the passengers, taking this into account, passengers can use it for judging the airlines, and choosing the airlines they want to travel with.

Sunil Babbar et. al. (2008) study empirically examine the impact of service provided by the company together with the customer satisfaction with the airline. Human – or people – related factors were identified; individual attention, helpfulness, courtesy, and promptness that shape the element of 'personal touch' in the service provided by contact employees and examine their role as determinants of customer satisfaction with the airline.

Jan Carlzon, responsible for turning Scandinavian Air Systems (SAS) into a customer-driven company, first introduced the concept he referred to as 'moment of truth' (Peters and Austin, 1985). Carlzon defines a moment of truth as 'an episode in which a customer comes into contact with any aspect of the company, however remote, and thereby has an opportunity to form an impression' (Collier, 1994). In his book, Moments of Truth, Carlzon (1987, p. 3) writes, 'Last year each of our ten million customers came in contact with approximately five SAS employees'.

By changing the company's outlook from one of flying 'airplanes' to one of flying 'people', he emphasised the critical role of employees, the determination in customer satisfaction (Sunil Babbar, 2008). Behaviours and attitudes of contact employees can significantly shape the customers' experience with the service provided and their assessment of its quality (Parasuraman et al., 1985, 1988; Haywood-Farmer, 1988; King and Garey, 1997; Winsted, 2000; Yoon et al., 2001). Actions which the employees take can shape the customers' perceptions of the firm itself (Zeithaml *et. al*., 2000).

Customers have been found to evaluate quality of service based on the level of concern and civility (Winsted, 2000) and listening and understanding demonstrated by employees (Chandon et al., 1997). Further, individual attention (Vandermerwe, 1994), cheerfulness (Harvey, 1998), friendliness (Brown *et. al*.1994) and courtesy (Goodwin *et. al*. 1990) have also been recognized as determinants of customer satisfaction with the service experience.

1.2. Factors having impact on aviation industry

IATA (International Air Transport Association) has established the special work group, which evaluates the passenger experience. The main factors are divided into: Departure, Flight and Arrival. Departure consists of: Pre-travel, Ticket Issuance, Check-in, Document Scanning, Authorisation to proceed, Baggage processing, Immigration exit control, Security access, Security screening, Fight re-booking, Boarding. All service, which you can get on board the aircraft, together with the comfort, goes to Flight phase. Arrival has 3 subgroups: Immigration entry control, Baggage collection and Customs. Passenger experience is closely related to service quality, which can be named as the same definition. Nowadays, passenger experience might become discomfort rather than comfort, due to the situation in the world. Talking about the terror acts, especially ISIS (the Islamic State of Iraq and Syria) threats. Passenger should understand and take into account, that all screening, immigration, security, customs might take more time, but all this is done for their own safety. As well as, the behaviour is closely monitored not only during all this procedures, but during the flight as well, and any uncertain person, might be taken as a potential hazard and be double-checked or offloaded from the flight with a further investigation.

IATA focuses on the global standards. The main pillar is a global standard in safety. The second is to have a global standard in consumer rights. The organization also searches for the opportunities to improve the main function of IATA. The organization monitors and fosters the financial systems; continual upgrades in the on-time performance and cost-efficiency of processing airline funds.

According to IATA's statistics, in the year 2015, the world's airlines safely transported 3.5 billion people and 51 million metric tons of cargo. They accomplished this with a workforce of nearly 10 million people managing a fleet of 26,000 aircraft averaging 100,000 flights a day over a global network of 51,000 routes.

IATA states that even more impressive than the scale of these operational numbers is the contribution of aviation to prosperity. The industry supports the livelihoods of 63 million people and underpins $2.7 trillion of GDP (gross domestic product).

IATA's annual review 2016, says that a major milestone was achieved in a financial performance of 2015. At the industry level, airlines generated a return on invested capital exceeding the cost of that capital. For the first time in history, airlines made a normal level of profitability. In real terms, a $35.3 billion net profit on revenues of $718 billion. Therefore, profitable airlines are able to invest in product improvements, fund the growth of stronger networks, and purchase

modern, fuel-efficient aircraft. It helps passengers to continue to enjoy great deals on air travel, the cost of which has fallen to 57% over the last two decades.

The fall in the oil price is a major driver of improved profitability. That has been reinforced by airline efforts that have raised load factors to all-times highs, increased ancillary revenues, and improved aircraft utilization (IATA data).

As stated in annual review 2016, the sharp decline in jet fuel prices which occurred in late 2014 and continued in 2015, such that the average price of barrel of jet fuel in 2015 was 42% lower than in 2014. Jet fuel prices fell further in the final months of 2015 and ended the year at around $48 a barrel – the lowest level in more than 11 years.

The lower jet fuel prices were not felt equally across airlines and regions globally. Due to the different hedging practices within the aviation industry. There is a possible delay to feel the lower unit costs benefitting from of lower oil prices.

Another factor, which had an influence on the fuel prices - the drop in the value of many currencies against the US dollar in 2015. This was strongly felt in Brazil and Russia, whose currencies fell 30 – 40% against the US dollar (see Fig. 2).

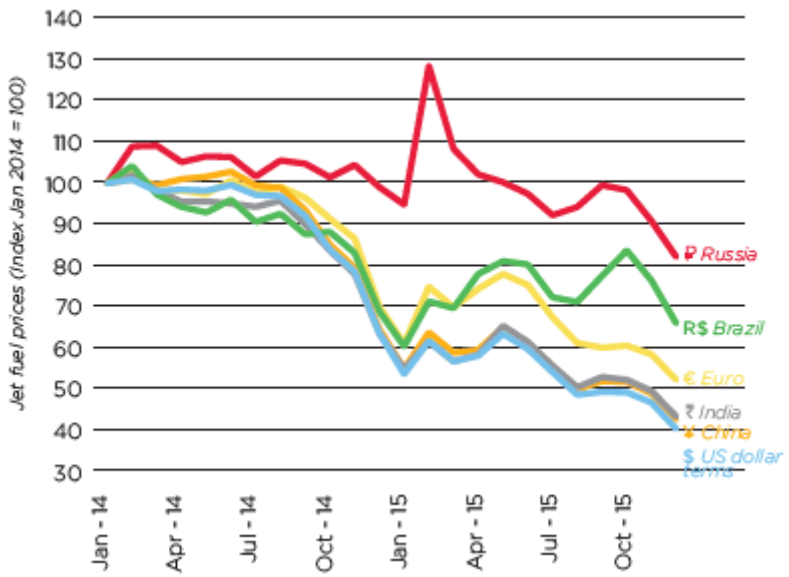


Fig. 2. Exchange rate-adjusted jet fuel prices (Source: IATA, Platts, Thomson Reuters Datastream).

Fuel is a major expense for airlines and accounted for, on average, 27% of an airline's costs in 2015. This means that the reduction in fuel costs in 2015 lowered the industry-wide break-even load factor (see Fig. 3).

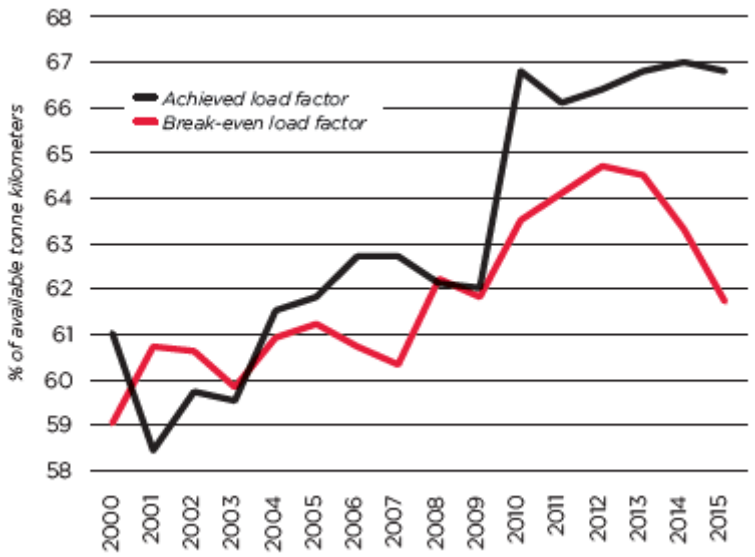


Fig. 3. Break-even and achieved load factors (Source: IATA, ICAO).

Changes in industry structure and more returns-focused behaviour on the part of airlines also exerted downward pressure on the break-even load factor and helped to keep load factors at historically high levels. The industry, moreover, has seen an upward capital productivity trend over the past few years, with airlines generating increasing revenue from the capital bases.

IATA's annual review 2016 emphasises the wide choice, lower costs to consumers. There is a link between the increase in economics and air transport. The higher economics lead to the higher need of air travel. The ongoing increase in unique city-pair routes has enabled a corresponding increase in the flow of goods, people, capital, technology, and ideas. Time savings and more nonstop connections have increased choice for consumers. The number of unique city-pair connections exceeded 16,600 in 2015, 350 more than in 2014 and almost double the connectivity by air 20 years ago. Meanwhile, for users the price of air transport continues to fall, after adjusting for inflation. Compared with 20 years ago, real transport costs have more than halved.

Air transport is a vital link for international trade and plays a critical role in facilitating tourism. Lower transport costs and improving connectivity have boosted trade flows by globalizing supply chains and associated investment.

The Airbus Company published *Global Market Forecast, Mapping Demand 2016 – 2035* - states that economic headwinds are not enough to blow European aviation of course.

Economic growth has been edging upwards in Europe, supported by easing credit conditions, a competitive euro, lower oil prices, and reduced fiscal headwinds. Whilst long term challenges remain, real GDP growth is forecast to grow about 1.8% per year between 2015 – 2035 period, largely reflecting changing demographics.

Despite hesitant economic grow within a number of European countries; air transport has continued to grow impressively. The ratio of air traffic growth to GDP in Europe is higher than in the world average. Traffic to/from/within Europe has grown 59% since 2005, which has not felt the financial crisis in 2008/2009.

Consumer confidence, European traffic enlargement, and the growth in low cost carriers all helped simulate these developments. Nowadays, low cost carries (LCCs) represent almost 40% of the Available Seat Kilometers flown between European countries or domestically. To meet this demand LCCs have added seats faster than flights, meaning that the aircraft they are using are getting bigger either through larger equipment or by adding more seats to existing cabins. A trend *Airbus* expects to continue especially as the routes they are expected to operate range further afield.

Fuel remains the largest single contribution to operating cost even in a low fuel environment. A $50 per barrel it is still around 17% for an average airline rising to roughly 30% at $100 per barrel. Being an average hides the fact that airline business models that have focussed on minimising costs like the LCCs (Low Cost Airlines) can have fuel as a significantly higher proportion of their costs.

New, fuel efficient aircraft provide a natural hedge against this most unpredictable of cost drivers and at the same time provide a better passenger experience and enhance the Green credentials of the airline.

The Hungarian low cost carrier *Wizz Air*, in its annual strategic report and accounts of 2015, states that according to market research consistently demonstrates that the most important driver of customer's choice of airline is ticket price. The 500 million plus people that live in Central and Eastern Europe have traditionally had very poor access to air travel. *Wizz Air* is helping to change this by bringing affordable air travel to the region. The airline is operating in the ultra-low cost model, at the same time remains focused on offering passengers safe, reliable services to a broad range of destinations, at the lowest possible prices.

However, the company also recognizes that everyone is different and customers have varying requirements in terms of how they access *Wizz Air's* services and what is important to them

when they travel. Beyond the basic product of flying costumers from A to B, *Wizz Air* offers a range of products and services that enable passengers to customise their trip to meet their own individual needs. *Wizz Air* fleet consists of Airbus A320 and A321 aircraft. Currently, there are 180 passenger seats on A320 aircraft configuration and 230 passenger seats on A321 aircraft. The airline ordered the new configuration for the A320 with the increased passenger seat configuration with 189 seats and A321 aircraft with 240 passenger seats. This is to achieve the higher Available Seat Kilometers.

Wizz Air has started the operation in Poland, followed by the entrance to Hungarian market. Nevertheless, Poland and Hungary have the bigger market for the airline, as the population reaches 38,5 millions in Poland and 9,8 millions of people in Hungary (source: www.worldometers.com/world-population), the low cost airline entered to Lithuania business in 2011.

According to data published in Official Statistics Portal, at the beginning of December in 2014 there were 2,922,943 residents and in December 2015 there were 2,890,985 residents of Lithuania.

In accordance with data of Ministry of Social Security and Labour of Republic of Lithuania published for the year 2014; 1,329 million of population were employed, or 26,200 (2%) more than in 2013. In 2014, employed population by gender were distributed as follows: 647,100 men and 671,900 women.

Table 1. Employment rate, %

Year	15-64 year old population	Male	Female	15-24 year old population	20-64 year old population	55-64 year old population
2014	65.7	66.5	64.9	27.6	71.8	56.2

Source: Data of the Statistics Department of Lithuania

Table 1 shows that employment rate of 15-64 year old population was 65.7% in 2014, it increased by 2% during the year. In 2014, the employment rate of 15-64 year old male population was 66.5%, female 64.9%, and the latter rates increased by 1.8% and 2.1% respectively. Youth employment rate was 27.6% in 2014. Employment rate of 55-64 year old population increased by 2.8% and accounted for 56.2%.

According to the Lithuanian Labour Exchange, territorial labour exchange offices had registered 263,600 unemployed in 2014.

Table.2. Average earnings monthly in Euros

Year	**Whole economy including individual enterprises**		**Public sector**		**Private sector including individual enterprises**	
	Gross	Net	Gross	Net	Gross	Net
2014	677.4	527.2	721.3	558.8	654.9	511.0
2015	714.1	553.9	750.3	580.0	696.1	541.0

Source: Official Statistics Portal

During the year 2015, Lithuania has joined the euro area, which is an important step of being the part of European Union. The minimum monthly wage has increased in the same year. Besides, the pensions have been raised, the first time during the six year period. The average gross monthly earning for the whole economy including individual enterprises has increased by 5.42% comparing with the year 2014; the average net monthly earning has increased by 5.06% (see Table 2).

The growth of the income is one of the factors, which lead to growing number of passengers carried to/ from Lithuanian airports (see Table 3). The other factor is the number of emigrated citizens of Lithuania. According, the Official Statistics Portal, there were 31,958 residents of Lithuania less in 2015 comparing with 2014.

Table 3. Passengers carried to/from Lithuanian airports

Year	**Passenger**
2014	2,942,670
2015	3,336,084

Source: www.vno.lt/lt/apie-mus/statistika. Date 5th of November, 2016

2. RESEARCH METHODOLOGY

The first part of the master thesis analyzes scientific articles, overviews the statistical data of State Statistics Departments of Lithuania, airlines and aircraft manufactures forecasts. This analysis forms the assumptions about the service quality provided by airlines, the importance of it, and the impact it has on the airline's demand.

The research is completed by formulating the formed assumptions and raising the hypothesis. Kardelis (1985) stated that hypothesis is the final statement, which the research seeks to prove with the achieved results.

According to Kerling (1970), the hypothesis has an important part in the research. The correctly chosen methodology has the influence on the results. Firstly, the hypothesis should be formulated, which should be confirmed or denied.

Hypothesis: the service quality has the direct impact on the airline's demand.

This hypothesis helps to prove or deny: how important the raised problem is, how much the airlines pay attention to the service quality, the programs for the service quality improvement, how the airlines seek to have loyal passengers and what the service quality impact has on the airline's demand.

This chapter of the master thesis examines the tendency of research and the methodology, which is used to determine the service quality in the aviation sector. There are different opinions from the different authors about the features, which separate the type of the research methods. Two research methods are discussed – the quantitative and qualitative methods. Alasuutari (1985) stated that the data is provided in numbers for the quantitative research method; and contrary to the qualitative research method the data is provided in words and images during the qualitative research method.

As reported by Junkuviene the hypothesis has to be verified with the quantitative research method. The fuzzy set theory is chosen to evaluate the data collected from the questionnaires for the quantitative research method. Likewise, the induction of logic applied in the qualitative research method.

The general objective of this study is to examine the influence of airline's service quality on passengers' satisfaction and loyalty.

2.1. Quantitative research - airline‘s service quality evaluation methods

There are few service quality evaluation methods, used to monitor, how well the customers’ expectations have been met by the airline.

Firstly, Parasuraman *et al.* proposed the SERVQUAL method. The SERVQUAL has five dimensions to measure service quality (fig. 4. Zeithaml *et. al*. 1990).

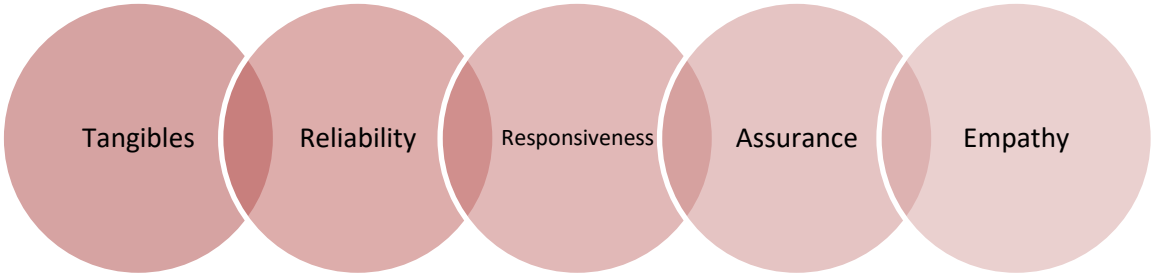


Fig. 4. Five dimensions of the SERVQUAL method
(*Source*: modified by author. Zeithaml *et al*. 1990).

The SERVQUAL method evaluates customers’ expectations and perceptions of the service quality. A quality is a subjective customer evaluation, as service is an experience, and you can not measure it as a physical item (Parasuraman *et. al*. 1988, Gronroos *et. al*. 1990).

According to Zeithaml (1988) means end chain approach to understanding the cognitive structure of customers, service information is retained in memory at four levels of abstraction as in Fig. 5.

The service is assessed by four different levels. Chien-Chang Choua *et al*. (2010) looked through the service personal value and means-end chain approach from the button to the top. The lowest level – the attribute level, so called simple service attributes. After this level, we have the quality level. This level is followed by the value level and the personal value level at the top of the chain approach. The second level at the top has a significant contribution to the field of service marketing through the development of SERVQUAL (Parasuraman *et al.* 1988). For the third level, we can accept Zeithaml (1988) state, that service value is perception between what is received and what is given to the customer.

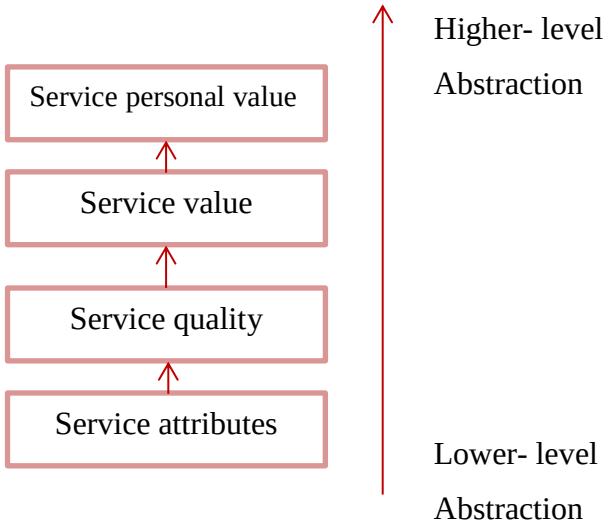


Fig. 5. Means-end chain approach (Source: Zeithaml , 1988).

Finally, at the top level we have the service personal values. Rokeach (1973) classifies these beliefs as terminal values. To understand customer behaviour better, first, you should understand customers' personal values. The last value is more individual, and may differ between each customer's values.

Lages and Fernandes (2005) provided the other service marketing method – the SERPAL. The SERPAL has a new service scale at the personal value level.

Cronin and Taylor (1992) developed a performance based model of service quality based only on customers' perception. The SERVPERF method is suitable for the service quality measurement in an airline industry.

This method measures satisfaction related to a specific transaction (Parasuraman *et al.* 1988).



Fig. 6. The SERVPEX includes three dimensions
(*Source*: modified by author, Hung-Che *et al*. 2013).

On the other hand, Cunningham, Young and Lee (2004), state that SERVPERF is not suitable to capture industry-specific dimensions underlying passengers' perceptions of quality in the airline industry.

From this method another method called the SERVPEX has emerged. Robledo (2001), Ling, Lin and Lu (2000) agree that the SERVPEX is a measurement scale to define airline service quality. The scale goes from much worse than expected to much better than expected (Hung-Che *et al*. 2013).

Lu and Ling (2008) note that this measure is more easily understood by passengers, when evaluating airlines, service quality, taking into account their expectations and experiences.

Comparing the SERVQUAL, SERVPAL, SERPERF and SERVPEX, SERVPEX is better applied for the airlines' service quality measurement. SERVPEX performs better in terms of its validity and reliability (Robledo, 2001), as well as provides a more valid explanation of service quality, explains a higher proportion of service quality.

Service quality can be regarded as a composite of various attributes. It consists not only of tangible attributes, but also intangible/subjective attributes such as safety, comfort, which are difficult to measure accurately. Different individuals usually have a wide range of perceptions toward quality service, depending on their preference structures and roles in process (service providers/receivers). To measure service quality, conventional measurement tools are devised on cardinal or ordinal scales. Most of the criticism about scale based measurement is that scores do not necessarily represent user preference. This is because respondents have to internally convert preference to scores and the conversion may introduce distortion of the preference being captured. There are many factors, which have an influence on the service quality in an airline business, that's why it is hard to evaluate it. Most of the studies are done by using the statistical methods (James J.H. Liou *et. al*. 2011). Sheng-Hshiung *et. al.* (2002) suggests to use the fuzzy Multiple Criteria Decision-Making (MCDM) theory to strengthen the comprehensiveness and reasonless of the decision-making process.

In James J.H. Liou *et. al*. (2011) research: Grey theory was developed by Deng (1982) to study the degree of relationship between various criteria in an MCDM (multiple-criteria decision-making method) problem. Grey theory is a very useful mathematical tool for dealing with system analysis with limited information. In comparison with conventional methods, which require massive amounts of data, Grey analysis possesses the following advantages (Deng, 1982; Shi, 1990): (1) it uses simple and easy calculations; (2) it requires a only reasonable amount of sample data; (3) it does not require a typical distribution of samples; (4) the quantified outcomes from the grey

relational grade do not result in conclusions that are contradictory with the qualitative analysis; (5) the grey relational grade model is a transfer functional model, which is very suitable and effective in dealing with discrete data (Sheng-Hshiung Tsaura *et. al*. 2002).

2.2. Concept of Fuzzy set theory

Zadeh (1965) introduced the fuzzy set theory. The theory claims that the key elements in human thinking are not numbers, but linguistic terms or labels of fuzzy sets. This method might be used for the SERVQUAL method, to evaluate the airline service quality.

C.-C. Chou *et al*. (2011) in their work introduced the concept of fuzzy number.

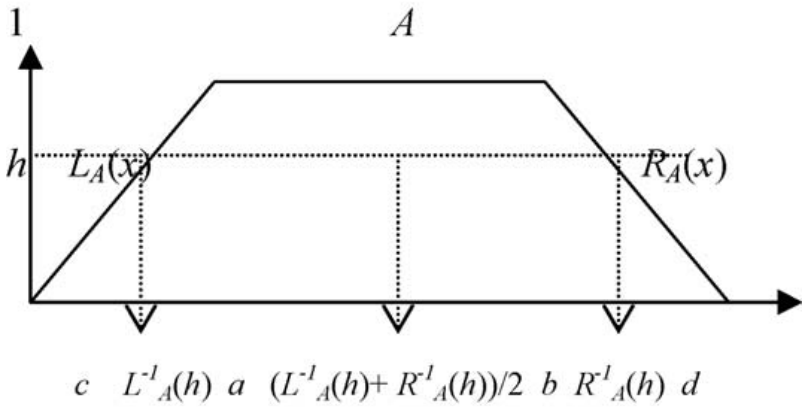


Fig. 7. The graded mean *h*-level of fuzzy number A
(C.-C. Chou *et. al*., 2011)

In Fig. 7, let A=(c, a, b, d) be a trapezoidal fuzzy number. Function of A is $f_A(x)$.

$$f_A(x)\begin{cases}\dfrac{(x-c)}{(a-c)} \\ 1, \\ \dfrac{(x-d)}{(b-d)} \\ 0,\end{cases}, c \le x \le a, \text{a}\le\text{x}\le\text{b}, \text{b}\le\text{x}\le\text{d}, \text{otherwise.}$$

$$L_A(x) = \frac{(x-c)}{(a-c)}, \text{c}\le\text{x}\le\text{a}, L_A^{-1}(h) = c + (a-c)h, 0 \le h \le 1.$$

$$R_A(x) = \frac{(x-d)}{(b-d)}, \text{b}\leq\text{x}\leq\text{d}, R_A^{-1}(h) = d + (b-d)h, 0 \leq h \leq 1.$$

$L_A(x)$ and $R_A(x)$ the function L and the function R of the trapezoidal fuzzy number A, respectively. $L_A^{-1}(h)$ and $R_A^{-1}(h)$ are the inverse functions of the function $L_A(x)$ and the function $R_A(x)$ at *h*-level, respectively.

From the fig. 7., let the graded mean h-level value of fuzzy number A is:

$h(L_A^{-1}(h) + R_A^{-1}(h))/2.$

From this P(A) is the graded mean integration representation of A.

$P(A) = \int_0^1 \frac{h(L^{-1}(h)+R^{-1}(h))}{2} dh / \int_0^1 hdh = \int_0^1 \frac{h(c+(a-c)h+d+(b-d)h)}{2} dh / \int_0^1 hdh = \frac{1}{6}(c + 2a + 2b + d)$

The triangular fuzzy number Y=(c, a, b) is a special case of generalized trapezoidal fuzzy number. Y becomes:

$P(Y) = \frac{1}{6}(c + 4a + b)$ *(1)*

C.-C. Chou *et. al*. (2011) state that passenger's subjective satisfaction can be expressed in linguistic variables during their research. Their research is based on the linear membership function. The arithmetic operations on fuzzy numbers are explained in appendix B (see appendixes).

2.3. Qualitative research of airlines service quality: in – depth interview method

A service quality can be assessed either by quantitative research method, as described in the previous chapter, or by qualitative research. The in-depth interview has been conducted to gather the primary qualitative data in one of Lithuanian aviation charter companies – *Small Planet Airlines*.

According to Boyce and Neale (2006), *in-depth interviewing* is a qualitative research technique that involves conducting intensive individual interviews with a small number of respondents to explore their perspectives on a particular idea, program, or situation. This technique is often used to provide context to other data in order to get more complete picture of the issue and its reasons. This is the primary advantage of in-depth interviews, against, for example, surveys which provide much more detailed information, what you can get from the interviewer during the session.

The interview was a face-to-face meeting and took approximately one hour. It was held in the main headquarters of the company. Before the interview took place, there was a short introduction about the company.

Small Planet Airlines started operations in 2009 and since then became one of the fastest growing independent leisure airlines in Europe. The company has offices in 4 countries: Lithuania, Poland, Germany and Thailand.

The company announces on its website 'What makes *Small Planet Airlines* a different charter airline company? In fact, it is a simple and powerful question that is rarely asked in boardrooms and aisles of the airline companies: a 'Why not?' question.'

The company has decided to go in a different way, have a charter airline that challenges airline business conventions in a big way, have a business model to offer lowest prices for European quality service, behave as a partner and go an extra mile for passengers. The company has an interest in the way their direct clients are approached and the interaction with the passengers.

Since 2009, *Small Planet Airlines*, has grown their fleet from 3 to 21 aircraft. Since 2016, the company is an Airbus - only carrier. The average fleet age is 13 years. There are 15 Airbus A320 aircraft and 4 Airbus A321.

The company states to have been profitable since 2013. In year 2013 the revenue was 126 million Euros, in 2014 – 143 million Euros and in 2015 – 182 million Euros.

Furthermore, the airline has an increase of carried passengers, at the same time they emphasize the growth is fast, but has the stable passenger satisfaction, in accordance with the company's research. In year 2013 the airline carried 1 million passengers, in 2014 it reached 1,5 million passengers and in 2015 – 1,7 million passengers.

In-depth interview was conducted with the head of marketing department. He has been working in this position for two years, and has the five years' experience in aviation marketing sector, and much more in marketing itself.

Interview was structured and included 21 questions. The questions were related to the service quality, service quality program, the company's strategy in relation with the service heights. All questions were open-ended in order to avoid bias in participant replies. Interview was recorded and afterwards the transcription has been made (see appendix B). The interview was held in English to avoid misunderstandings during translation. Furthermore, it is well known, that aviation language is English. There are many specific terms in aviation, which have no equivalent in Lithuanian language.

2.4. The sample size

The sample size for the research, according Cohen, Manion (1989) should not be less than 30 experiments. To determine more accurate values the formula is introduced:

$$n = \frac{1}{\Delta^2 + \frac{1}{N}},$$

where n – chance number in the observation group;

N – the majority of carried passengers by five airlines (one way);

Δ - allowable inaccuracy.

In this work we want to have the reliability of the survey answers of 95 %. According the tables to have it, Δ=0.05 (Kardelis, 2002).

One of the International Lithuanian airports served 2,942,670 arriving/departing passengers in 2014 (the airport is not identified due to the confidential agreement). There was a growth of 13.37% comparing with previous year in 2015, the total of 3,336,084 passengers. As we are interested in passengers of *Legacy Carrier1*, *Legacy Carrier2*, *Low Cost A*irline1, *Low Cost Airline2* and *Charter Company* (the real airlines are known for the researcher, the names are changed due to the airport's media representative request).This five airlines have the biggest part of Lithuanian aviation market. Respectively, there were 1,630,345 passengers in 2014 and 2,026,271 passengers in 2015 (see table 4). We assume that there was equal arriving and departing passengers' number in 2015, which gives us the total of 1,013,135 passengers.

Table 4. Arriving/ departing number of passengers.

Year	**Passengers served**
2014	2,942,670
2015	3,336,084
Growth (%)	13.37

Source: www.vno.lt/lt/apie-mus/statistika/

N=1,013,135 carried passengers of five airlines (one way) - *Legacy Carrier1*, *Legacy Carrier2*, *Low Cost A*irline1, *Low Cost Airline2* and *Charter Company*.

$$n = \frac{1}{0.05^2 + \frac{1}{1{,}013{,}135}} = 400$$

3. RESULTS AND DATA ANALYSIS

3.1. Passengers' experience analysis using a quantitative research method

The general objective of this work was to examine the influence of airline service quality on passenger satisfaction and loyalty. To achieve this, the research was guided by specific objectives to which data collection was effected mainly by interview method using fully structured questionnaires. The analysis, in this work, is based on the SERVQUAL method for evaluating airline service quality.

This research adapted the SERVQUAL scale to the specific context of aviation by generating additional quality related measures or items other than the ones already included in the SERVQUAL instrument, as per C. Chou et al (2011). The measurement items and the dimensions were changed to develop a more appropriate scale for measuring airline service quality.

To develop airline service quality measures, the surveys were held in one of International Lithuanian airports. There was a decision to interview passengers, who travel with the airlines: *Legacy Carrier1*, *Legacy Carrier2*, *Low Cost A*irline1, *Low Cost Airline2* and *Charter Company* (the real airlines are known for the researcher, the names are changed due to the airport's media representative request).

The surveys were completed using the online survey questionnaires. The survey was uploaded on the website. The final questionnaire contained 27 measurement items (see Attachment A). For the first part of the research, the passengers were approached in the departure, check – in area. Using the touchpad and the internet connection, the passengers were asked to complete the questionnaires. The aim for the first research part is to get the passenger experience – to obtain the expectations of the service quality. Respondents were asked about their expectations, what service quality they expect from the airline.

The second part of the research was to gather the information from the passengers about their perception of the service quality provided by the airline they flew with. The second part of the research was completed using the same online questionnaires. The passengers were approached in the arrival. Respondents were asked to fill the survey on the touchpad.

In the questionnaires, respondents were asked about airline services – particularly what kind of services airlines provide and passengers receive from flight reservation to arriving at the

final destination. In addition, they were asked SERVQUAL's dimensions and items, which were adapted to measure airline service quality. Respondents were also asked to suggest service quality items that were not included in the SERVQUAL instrument. A number of samples of passengers who have recent experience of international travel were asked to complete the questionnaire and give their overall comments about the questionnaire. Based on the passengers' comments, several passengers mentioned that two items, variety of routes' and 'understanding the specific needs of passengers', were difficult to evaluate with their experience and knowledge.

During the research, total of 400 respondents were asked to fill in the survey. Passengers were approached in the departure and arrival areas, but only the passengers were interviewed and requested to fill in the survey from the selected five airlines, mentioned before. Passengers were informed that the survey is a research for the master thesis. The aim is to find the relation of the service quality provided by the airlines and the passengers' choice and loyalty.

During the survey, participants were asked to mark the sex, age, education, monthly salary, how often do they fly per year, the reason of the flights.

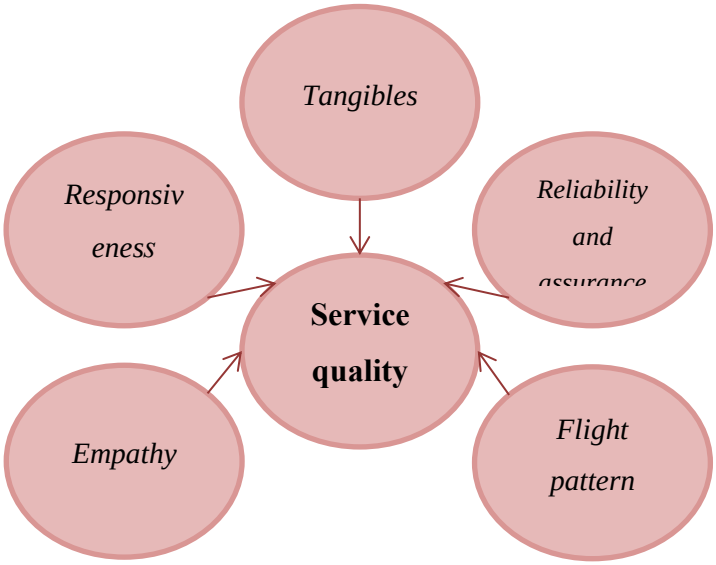


Fig. 8. Five dimensions of service quality
(*Source*: modified by author, Parasuraman *et al*. 1988).

The questionnaire included five dimensions: *tangibles, responsiveness, reliability and assurance, empathy, flight pattern* (fig. 8). These five dimensions were divided into factors - related flight/ service.

The respondents were asked how much these five dimensions are important for participants as being a passenger (see appendix A).

Table 5. Linguistic variables for expectations and perception

Very Poor	(0.0, 1.0, 2.0)
Poor	(1.0, 2.0, 3.0)
Fair	(2.0, 3.0, 4.0)
Good	(3.0, 4.0, 5.0)
Very Good	(4.5, 5.0, 5.0)

The SERVQUAL questionnaire addressing expectations and perceptions are rated using linguistic variables scale.

The linguistic variables for the expectations and perception evaluation were set for the questionnaire of five dimensions, Table 5.

The linguistic variables for passengers' expectations and perceptions include "Very Poor", "Poor", "Fair", "Good" and "Very Good" variables.

The linguistic variables for importance weight of evaluation criteria include "Very Low", "Low", "Fair", "High" and "Very High".

Table 6. Linguistic variables for importance weight of criteria.

Very Low	(0.0, 1.0, 2.0)
Low	(1.0, 2.0, 3.0)
Fair	(2.0, 3.0, 4.0)
High	(3.0, 4.0, 5.0)
Very High	(4.5, 5.0, 5.0)

The linguistic variables for the importance weight evaluation were set for the questionnaire of five dimensions, Table 6.

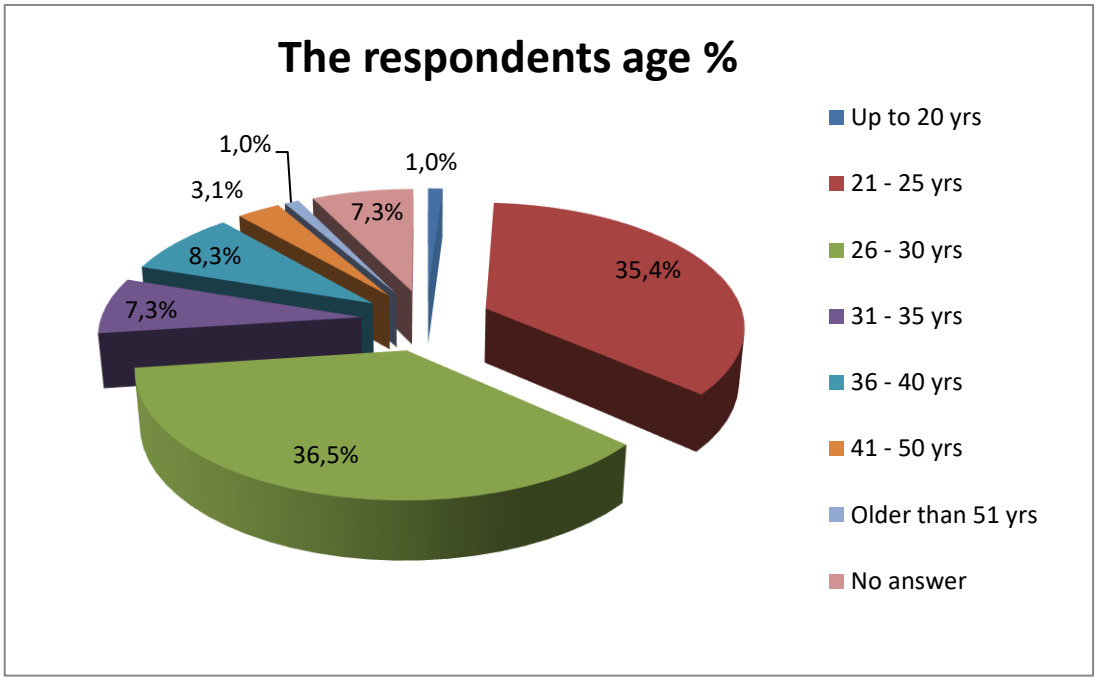


Chart 1. The survey statistics for the participants age in percentage.

From total of 400 participants, who were asked during the research, there were 168 males and 232 females, which respectively 42.2% and 57.8% (see Chart 1). In terms of age groups, it can be concluded that greatest part (35%) included the people from 26 till 30 years of age. Next important group (34%) consists of people with an age of 21-25 years. Only 1 person was older than 51 years. During the research the residents were picked randomly, at the end it revealed, that 78% of people were the passengers of low cost airlines. Consequently, it can be concluded that the younger people group chooses the low cost airlines as a carrier.

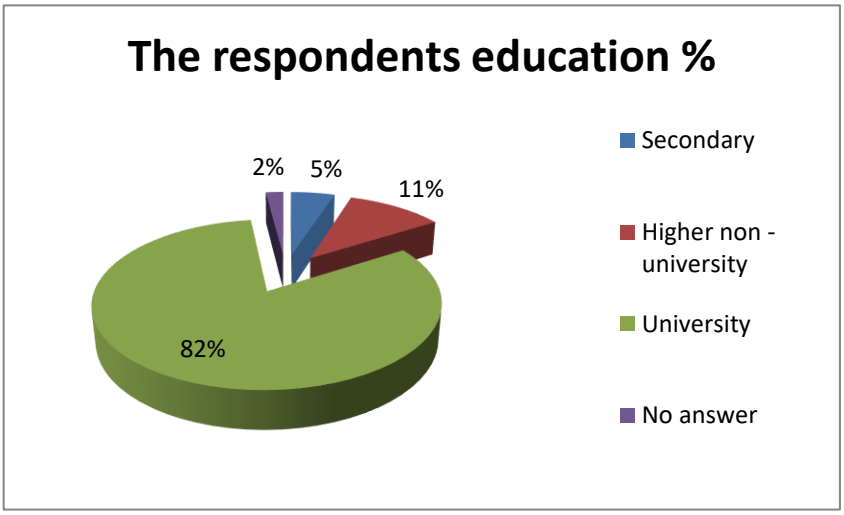


Chart 2. The survey statistics for the participants' education in percentage.

From the Chart 2, we can see that the largest part of the respondents had higher education. Ten per cent of respondents were with higher non-university education and the rest had secondary education.

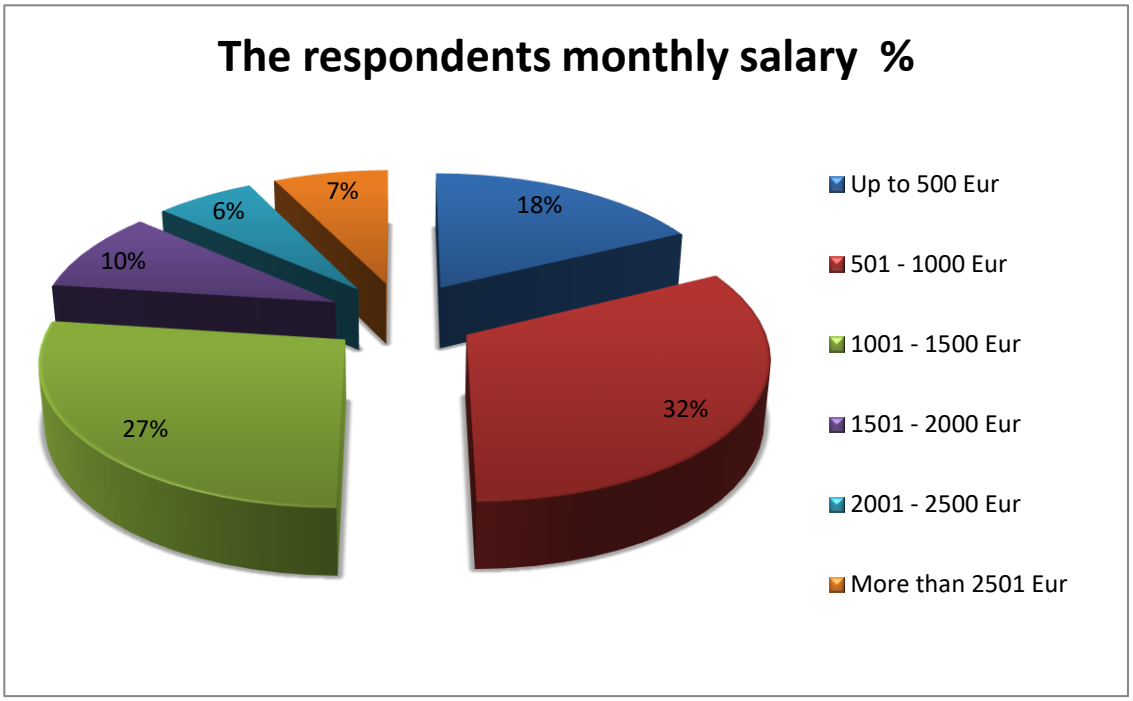


Chart 3. The survey statistics for the participants' monthly salary.

The analysis of survey statistics for the participants' monthly salary in Chart 3, shows that the most popular salary among respondents is from 501 till 1000 Eur and amounts to 31 percent. The next part (26 per cent) is respondents with higher salary – 1001-1500 Eur. Only 7 percent of respondents have a salary of more than 2501 Eur. From this we can state, that the air-transportation is chosen not only by the higher income earning people, but also people with the average monthly salary or lower. This is mainly due to the low cost carriers entering and expending the market in Lithuanian aviation sector.

One of the Low Cost Airline reports states that the competition is one of the key risk to the business but it is good for the consumers. The competitors may seek to protect or gain market share in markets in which the airline operates, perhaps by offering discounted fares or more attractive schedules. The airline admits that competition is good for the industry – both for consumers, who benefit from the lower prices as well as airlines themselves, as they must embrace cost discipline and react to a competitive threat. The key competitive strength is the airline's commitment to driving the cost advantage even lower.

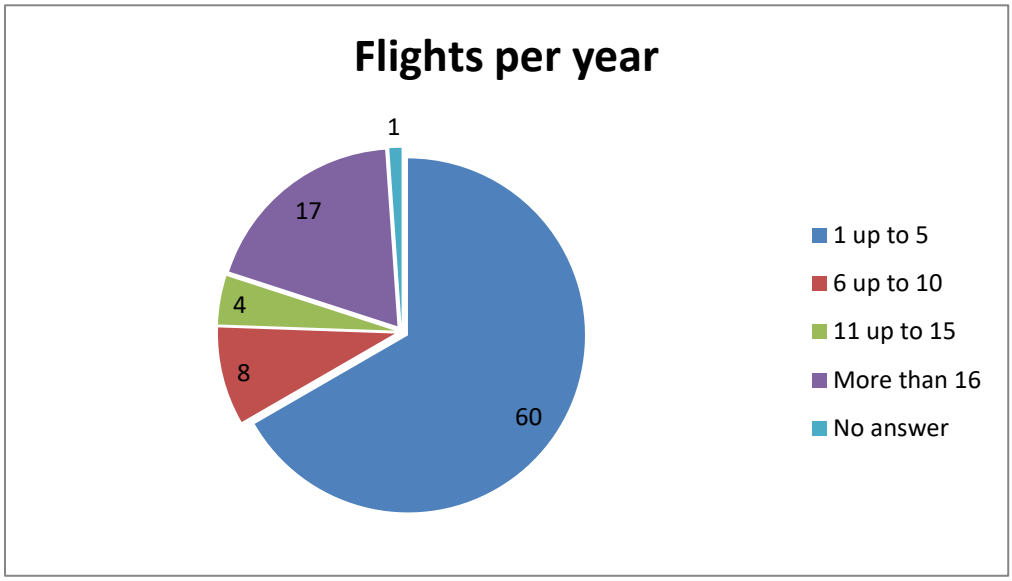


Chart 4. The survey statistics for the participants flights per year.

The analysis of survey statistics for the participants' flights per year from Chart 4 shows that more than a half of respondents have 5 flights per year. But there is a group of respondents (17 per cent), who have more than 16 flights per year. The rest 8 percentages have from 6 up to 10 flights per year. The group of respondents, who answered of having more than 16 flights a year, have jobs related with business travel.

The survey data shows that participants fly not only for business travel, but for leisure too.

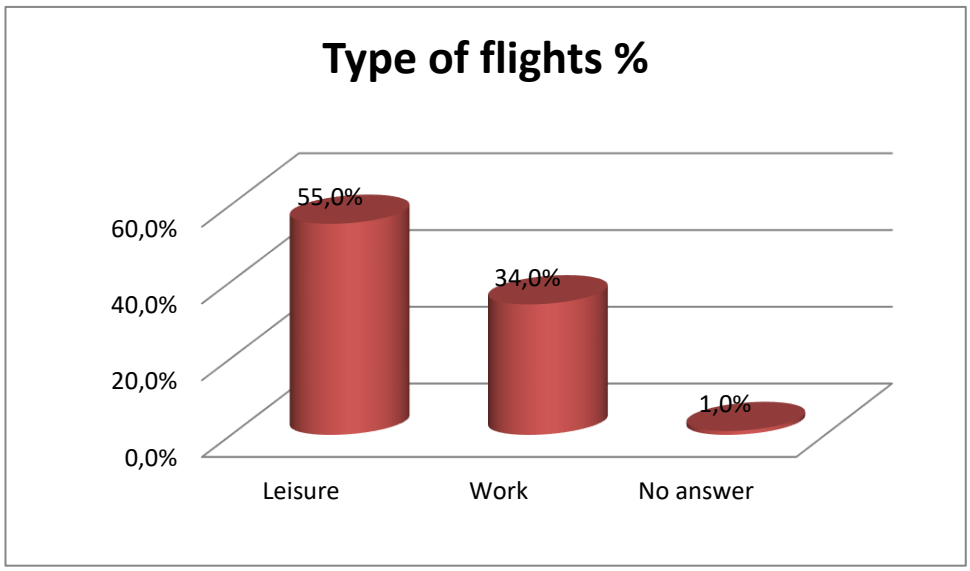


Chart 5. The survey statistics for the participants type of flights: leisure or work travel.

In conclusion, this part of the gathered data from the participants, indicates a tendency, that people with monthly salary of 500 Eur and less can also travel with the air transport. Now air travel is a more affordable way of travel than many years ago. After the bankruptcy of *FlyLAL Lithuanian Airlines*, which went bankrupt in 2009, air travel was poor in Lithuania, there were not many airlines left. The same time Latvian national carrier – *AirBaltic* moved the base and the flights from Vilnius to Riga, leaving the flight from Vilnius via Riga as a connection flights. Lithuanian market was not attractive at that time. Some low cost carries joined the market and expanded the operations to/from Lithuanian airports. This was followed with some other Legacy carriers coming to market, also *AirBaltic* reopened the operation with direct flights from/to Vilnius, mainly after the Lithuanian capital airline – *Lituanica* – bankruptcy.

The second step, after the survey – is the calculation of scores of expectations and perceptions. The decision was to divide the data of two Low Cost Airlines and compare the results. All the data collected were calculated using the fuzzy set theory, as per research methodology discussed in previous chapter. The scores of expectations and perceptions, and the gap between expectations and perceptions of passengers are shown in Table 6.

The computation starts with finding the service quality expectation from the *n*th passenger under service item *i*, let it be a fuzzy number A_{ein}. The same applies for the service quality perception from the *n*th passenger under service item i, let it be a fuzzy number A_{pin}. From this we assume, that the fuzzy number TA_{ei} is the total service quality expectations from all passengers under service item *i*. The fuzzy number TA_{pi} – the total service quality perceptions from all passengers under service item *i*.

$$TA_{ei} = \sum_1^N A_{ein} \qquad (2)$$

$$TA_{pi} = \sum_1^N A_{pin} \qquad (3)$$

Now we can find the total service quality expectation from all passengers under service item *i* by using the formulas (7) and (2), see appendix B.

Similar for the total service quality perception from all passengers under service item *i*, using the formulas (8) and (3).

As we want to have the average service quality expectation and perception from all passengers under service item *i*. We introduce another two formulas, there the fuzzy number MA_{ei} and $MA_{p}i$ stands accordingly for the average service quality expectations from all passengers under service item *i* and all passengers perceptions.

$$MA_{ei} = \frac{TA_{ei}}{N} \qquad (4)$$

$$MA_{pi} = \frac{TA_{pi}}{N} \qquad (5)$$

From formulas (9) and (4), see appendix B, we get the average service quality expectation from all passengers under service item *1*.

As for the *Comfort and cleanness of seat:*

MA_{e1}= (1.75; 4.17; 4.77).

The average service quality perception from all passengers under service item 1, we get from formulas (9) and (5), see appendix B.

Comfort and cleanness of seat:

MA_{p1} = (3.52; 3.90; 4.05).

To obtain the service quality gap between the expectation and perception from all passengers under service item i, we assume a fuzzy number G_{api}. Which gives us the equation:

$$G_{api} = MA_{pi} \Theta MA_{ei} \qquad (6)$$

Table 7. The scores of expectations and perceptions of Low Cost Airline1.

DIMENSION	Fuzzy expectation	Fuzzy perceptions	Fuzzy gap	Expectations	Perceptions	Gap
Tangibles	**(1.92; 3.08; 3.93)**	**(2.42; 2.88; 3.41)**	**(-1.49; 0.20; 1.51)**	**3.03**	**2.89**	**-0.14**
Comfort and cleanness of seat	(1.75; 4.17; 4.77)	(3.52; 3.90; 4.05)	(-2.30; 0.27; 1.25)	3.87	3.86	-0.005
Quality of food and bevarage	(2.25; 3.20; 4.10)	(3.10; 3.15; 3.55)	(-1.30; 0.05; 1.00)	3.19	3.21	0.02
In-flight newspaper, magazines and books	(1.52; 2.50; 3.47)	(2.50; 3.10; 3.55)	(-2.03; -0.60; 0.97)	2.50	3.08	0.57
In-flight washroom facility	(2.85; 3.72; 4.47)	(3.00; 3.15; 4.05)	(-1.20; 0.57; 1.47)	3.70	3.28	-0.43
In-flight entertaimant facilities and programs	(1.84; 2.82; 3.76)	(1.45; 2.00; 2.35)	(-0.51; 0.82; 2.31)	2.81	1.97	-0.85
Availability of waiting lounges	(1.47; 2.46; 3.21)	(1.30; 1.95; 2.87)	(-1.40; 0.51; 1.91)	2.42	2.00	-0.47
Size of airplane	(1.74; 2.72; 3.76)	(2.05; 2.89; 3.47)	(-1.73; -0.17; 1.71)	2.73	2.85	0.12
Responsiveness	**(3.12; 3.98; 4.69)**	**(3.52; 4.14; 4.61)**	**(-1.49; -0.16; 1.17)**	**3.96**	**4.12**	**0.16**
Courtesy of crew	(3.25; 4.09; 4.77)	(3.46; 4.10; 4.26)	(-1.01; -0.01; 1.31)	4.06	4.02	0.15
Handling of delay	(3.21; 4.05; 4.70)	(3.99; 4.26; 4.78)	(-1.57; -0.21; 0.71)	4.02	4.30	0.28
Efficient check-in/ baggage handling services	(3.40; 4.20; 4.81)	(3.58; 4.36; 4.55)	(-1.15; -0.16; 1.23)	4.17	4.26	0.09
Crew's speed handling request	(2.84; 3.76; 4.61)	(3.06; 3.76; 4.56)	(-1.72; 0.00; 1.55)	3.75	3.78	0.03
Quality of the reservation services	(3.12; 3.98; 4.70)	(3.76; 4.25; 4.47)	(-1.35; -0.27; 0.94)	3.96	4.21	0.25
Crew's approach against unexpected situations	(3.37; 4.20; 4.86)	(3.56; 4.46; 4.98)	(-1.61; -0.26; 1.30)	4.17	4.40	0.23
Crew's willingness to help	(3.37; 4.18; 4.80)	(3.56; 4.37; 4.82)	(-1.45; -0.19; 1.24)	4.15	4.31	0.16
Appearance of crew	(2.39; 3.36; 4.29)	(3.15; 3.56; 4.42)	(-2.03; -0.20; 1.14)	3.35	3.64	0.28

Table 7. Continued.

Reliability and assurance	**(3.45; 4.23; 4.78)**	**(3.75; 4.45; 4.89)**	**(-1.44; -0.22; 1.03)**	**4.19**	**4.41**	**0.22**
Safety	(3.97; 4.63; 4.94)	(4.03; 4.54; 4.96)	(-0.99; 0.09; 0.91)	4.57	4.53	-0.05
On-time departure and arrival	(3.64; 4.41; 4.94)	(4.06; 4.46; 4.96)	(-1.32; -0.05; 0.88)	4.37	4.48	0.11
Consistent ground/ in-flight services	(2.74; 3.65; 4.47)	(3.15; 4.36; 4.76)	(-2.02; -0.71; 1.32)	3.64	4.23	0.59
Empathy	**(2.85; 3.72; 4.48)**	**(3.12; 3.95; 4.58)**	**(-1.73; -0.23; 1.36)**	**3.70**	**3.92**	**0.22**
Crew's behaviour to delayed passenger	(2.69; 3.59; 4.40)	(2.89; 3.55; 4.15)	(-1.46; 0.04; 1.51)	3.58	3.54	-0.04
Individual attention to passenger	(2.72; 3.64; 4.50)	(2.46; 3.84; 4.83)	(-2.11; -0.20; 2.04)	3.63	3.78	0.15
Understanding of passenger's specific needs	(3.03; 3.89; 4.61)	(3.00; 3.46; 4.89)	(-1.86; 0.43; 1.61)	3.87	3.62	0.66
Extent travel services	(2.01; 2.97; 3.87)	(2.76; 3.65; 3.89)	(-1.88; -0.68; 1.11)	2.96	3.54	0.58
Convenient ticketing process	(3.49; 4.26; 4.80)	(3.76; 4.66; 4.91)	(-1.42; -0.40; 1.04)	4.22	4.55	0.33
Customer complaint handling	(3.14; 3.99; 4.69)	(3.85; 4.54; 4.82)	(-1.68; -0.55; 0.84)	3.97	4.47	0.51
Flight pattern	**(3.50; 4.28; 4.83)**	**(3.87; 4.71; 4.93)**	**(-1.43; -0.43; 0.96)**	**4.24**	**4.61**	**0.37**
Flight problems	(3.55; 4.32; 4.86)	(3.66; 4.75; 4.94)	(-1.39; -0.43; 1.20)	4.28	4.60	0.32
Convenient flight schedules	(3.55; 4.32; 4.86)	(3.97; 4.76; 4.89)	(-1.34; -0.44; 0.89)	4.28	4.65	0.37
Frequancy of flight	(3.26; 4.10; 4.78)	(3.88; 4.56; 4.92)	(-1.66; -0.46; 0.90)	4.07	4.51	0.43
Non-stop flight	(3.65; 4.39; 4.86)	(3.98; 4.78; 4.97)	(-1.32; -0.39; 0.88)	4.35	4.68	0.33
Mean	**(2.97; 3.86; 4.54)**	**(3.34; 4.03; 4.48)**	**(-1.51; -0.17; 1.20)**	**3.83**	**3.99**	**0.17**

According the equations (3) and (10), we can get the gap between the expectation and perception from all passengers under the service item 1.

Fuzzy gap for *Comfort and cleanness of seat:*

G_{api} = (3.52; 3.90; 4.05) Θ (1.75; 4.17; 4.77) = (3.52 – 4.77; 3.90 – 4.17; 4.05 – 1.75) = (-2,30; 0,27; 1,25).

Now, taking the formula (1), we obtain the representation of fuzzy numbers:

MA_{e1} = 3.87 and

MA_{p1} = 3.86.

From this we get G_{ap1} = -0.005.

The gap is with the minus symbol, which means that the passengers are not satissfied with the airline's service quality.

Using this method, we obtain all fuzzy expectations, fuzzy perceptions, fuzzy gaps, expectaions, perceptions and gaps, as shown in Table 7.

During the survey, the participants were asked to set the importance weight for the SERVQUAL questionnaire. The linguistic weight for the service items was allowed to be equilized as for the service quality expectation. The equalization was allowed to simplify the survey for the passengers, not to make it complex. As participants collocated these two items in the same maner.

We introduce a fuzzy number TA_{wi}, which stands for the importance weight of service item from the *n*th passenger under service item *i*.

$$TA_{wi} = \sum_{1}^{N} A_{win} \qquad (11)$$

From the formula (11) we obtain another equation to find the average importance weight from all passengers under service item *i*:

$$MA_{wi} = \frac{TA_{wi}}{N} \qquad (12)$$

The statistical methods conducted in order to analyse data and indicate the main factors of service quality gap between the expectations and perception of *Low Cost Ailine1* (see table 7).

The gap between the expectations and perception with a minus means that customers are not satisfied with the service provided.

There is only one factor from all dimensions which is unsatisfying – the *tangibles* (-0.14 gap). The highest gap stands for *the in-flight entertainment facilities and programs* (-0.85 gap). There are no in-flight entertainment facilities and programs, except the on-board magazines-menu in the *Low Cost Airline1*.

The second factor is the *responsiveness* (0.16 gap). Passengers are satisfied with the dimensions evaluated. The lowest gap is *the crew's speed handling request* (gap 0.03). The highest gap for satisfaction is *an appearance of crew* and *a handling of delay* (gap equal of 0.28).

The third and fourth places are *the reliability and assurance*, and *the empathy* (gap 0.22). The customers are unsatisfied for *the safety* dimension from *the reliability and assurance* (-0.05 gap) and *the crew's behaviour to delayed passenger* (-0.04 gap) from the factor of *empathy*. This is compensated by *the consistent ground/in-flight services* (0.59 gap) and *the understanding of passenger's specific needs* (0.66 gap).

The highest satisfaction rate according the gap between the expectations and perception is *a flight pattern* (0.37 gap). The gap varies from *the flight problems* (0.32 gap) and *the frequency of the flight* (0.43 gap).

The *mean gap* is 0.17. The passengers' of *Low Cost Airline1* are satisfied with the service quality provided by the airline.

Table 8. The weight of service items of Low Cost Airline1.

Dimension	Fuzzy weight	Defuzzied
Tangibles	**(1.92; 3.08; 3.93)**	**3.03**
Comfort and cleanness of seat	(1.75; 4.17; 4.77)	3.76
Quality of food and bevarage	(2.25; 3.20; 4.10)	3.19
In-flight newspaper, magazines and books	(1.52; 2.50; 3.47)	2.50
In-flight washroom facility	(2.85; 3.72; 4.47)	3.70
In-flight entertaimant facilities and programs	(1.84; 2.82; 3.76)	2.81
Availability of waiting lounges	(1.47; 2.46; 3.21)	2.42
Size of airplane	(1.74; 2.72; 3.76)	2.73
Responsiveness	**(3.12; 3.98; 4.69)**	**3.96**
Courtesy of crew	(3.25; 4.09; 4.77)	4.06
Handling of delay	(3.21; 4.05; 4.70)	4.02
Efficient check-in/ baggage handling services	(3.40; 4.20; 4.81)	4.17
Crew's speed handling request	(2.84; 3.76; 4.61)	3.75
Quality of the reservation services	(3.12; 3.98; 4.70)	3.96
Crew's approach against unexpected situations	(3.37; 4.20; 4.86)	4.17
Crew's willingness to help	(3.37; 4.18; 4.80)	4.15
Appearance of crew	(2.39; 3.36; 4.29)	3.35
Reliability and assurance	**(3.45; 4.23; 4.78)**	**4.19**
Safety	(3.97; 4.63; 4.94)	4.57
On-time departure and arrival	(3.64; 4.41; 4.94)	4.37
Consistent ground/ in-flight services	(2.74; 3.65; 4.47)	3.64
Empathy	**(2.85; 3.72; 4.48)**	**3.70**
Crew's behaviour to delayed passenger	(2.69; 3.59; 4.40)	3.58
Individual attention to passenger	(2.72; 3.64; 4.50)	3.63

Table 8. Continued.

Understanding of passenger's specific needs	(3.03; 3.89; 4.61)	3.87
Extent travel services	(2.01; 2.97; 3.87)	2.96
Convenient ticketing process	(3.49; 4.26; 4.80)	4.22
Customer complaint handling	(3.14; 3.99; 4.69)	3.97
Flight pattern	**(3.50; 4.28; 4.83)**	**4.24**
Flight problems	(3.55; 4.32; 4.86)	4.28
Convenient flight schedules	(3.55; 4.32; 4.86)	4.28
Frequancy of flight	(3.26; 4.10; 4.78)	4.07
Non-stop flight	(3.65; 4.39; 4.86)	4.35

All fuzzy weights of all service items and the representation of fuzzy numbers are obtained as shown in Table 8.

From formulas (4) and (12) we get the average importance weight from all the passengers under the service item 1.

Comfort and cleanness of seat:

MA_{w1}= (1.75; 4.17; 4.77).

Since we have the fuzzy weight for each dimension, using the equation (1), we obtain the representation of fuzzy number MA_{w1}= 3.76.

The first important dimension, based on the results in table 7, is *the flight pattern* (the average score 4.24), in terms of the important weight of service dimensions. The second is *the reliability and assurance* (the average score 4.19). The third is *the responsiveness* (the average score 3.96). The fourth is *the empathy* (the average score 3.70). The fifth is *tangibles* (the average score 3.03).

According to the method used to find the scores for expectations and perceptions of *Low Cost Airline1*, the same calculation is used for getting the results for *Low Cost Airline2* (see table 9).

Table 9. The scores of expectations and perceptions of Low Cost Airline2.

DIMENSION	Fuzzy expectation	Fuzzy perceptions	Fuzzy gap	Expectations	Perceptions	Gap
Tangibles	**(1.87; 2.99; 3.79)**	**(2.40; 2.89; 3.37)**	**(-1.39; -0.10; 1.50)**	**2.94**	**2.89**	**-0.05**
Comfort and cleanness of seat	(1.85; 4.27; 4.67)	(3.42; 3.87; 4.00)	(-1.25; -0.40; 2.15)	3.93	3.82	-0.12
Quality of food and bevarage	(2.35; 3.10; 4.00)	(3.07; 3.27; 3.65)	(-0.93; 0.17; 1.30)	3.13	3.30	0.18
In-flight newspaper, magazines and books	(1.45; 2.30; 3.27)	(2.46; 3.06; 3.24)	(-0.81; -0.76; 1.79)	2.32	2.99	-0.34
In-flight washroom facility	(2.67; 3.65; 4.34)	(3.00; 3.14; 4.00)	(-1.34; -0.51; 1.33)	3.60	3.26	-0.34
In-flight entertaimant facilities and programs	(1.48; 2.56; 3.27)	(1.51; 2.07; 2.46)	(-1.76; -0.49; 0.98)	2.50	2.04	-0.46
Availability of waiting lounges	(1.45; 2.14; 3.16)	(1.30; 1.96; 2.77)	(-1.86; -0.18; 1.32)	2.20	1.99	-0.21
Size of airplane	(1.87; 2.84; 3.82)	(2.05; 2.87; 3.49)	(-1.77; -0.03; 1.62)	2.84	2.84	-0.05
Responsiveness	**(3.18; 3.98; 4.61)**	**(3.49; 4.14; 4.57)**	**(-1.12; 0.16; 1.39)**	**3.95**	**4.10**	**0.15**
Courtesy of crew	(3.34; 4.16; 4.67)	(3.45; 4.14; 4.24)	(-1.22; -0.02; 0.90)	4.11	4.04	-0.07
Handling of delay	(3.31; 3.95; 4.68)	(3.95; 4.17; 4.76)	(-0.73; -0.22; 1.45)	3.97	4.23	-0.03
Efficient check-in/ baggage handling services	(3.34; 4.18; 4.55)	(3.57; 4.36; 4.56)	(-0.98; -0.18; 1.22)	4.10	4.26	-0.08
Crew's speed handling request	(2.84; 3.56; 4.66)	(3.12; 3.77; 4.46)	(-1.54; 0.21; 1.62)	3.62	3.78	0.15
Quality of the reservation services	(3.20; 3.87; 4.64)	(3.66; 4.31 4.48)	(-0.98; 0.44; 1.28)	3.89	4.23	0.34
Crew's approach against unexpected situations	(3.27; 4.30; 4.56)	(3.48; 4.36; 4.92)	(-1.08; 0.06; 1;65)	4.17	4.31	0.14
Crew's willingness to help	(3.84; 4.26; 4.79)	(3.51; 4.43; 4.83)	(-1.28; 0.17; 0.99)	4.28	4.34	0.07
Appearance of crew	(2.29; 3.45; 4.36)	(3.14; 3.57; 4.32)	(-1.22; 0.12; 2.03)	3.41	3.62	0.22

Table 9. Continued.

Reliability and assurance	**(3.50; 4.20; 4.70)**	**(3.77; 4.46; 4.89)**	**(-0.93; 0.26; 1.39)**	**4.17**	**4.42**	**0.25**
Safety	(3.84; 4.75; 4.93)	(4.07; 4.56; 4.94)	(-0.86; -0.19; 1.10)	4.63	4.54	-0.09
On-time departure and arrival	(3.74; 4.31; 4.92)	(4.11; 4.38; 4.94)	(-0.81; 0.07; 1.20)	4.32	4.43	0.11
Consistent ground/ in-flight services	(2.93; 3.56; 4.24)	(3.14; 4.43; 4.80)	(-1.10; 0.87; 1.87)	3.57	4.28	0.71
Empathy	**(2.95; 3.67; 4.41)**	**(3.10; 3.93; 4.54)**	**(-1.31; 0.26; 1.59)**	**3.67**	**3.89**	**0.22**
Crew's behaviour to delayed passenger	(2.85; 3.46; 4.57)	(2.91; 3.56; 4.14)	(-1.66; 0.10; 1.29)	3.54	3.55	0.01
Individual attention to passenger	(2.81; 3.64; 4.46)	(2.47; 3.74; 4.80)	(-1.99; 0.10; 1.99)	3.64	3.71	0.07
Understanding of passenger's specific needs	(3.14; 3.87; 4.50)	(3.00; 3.40; 4.79)	(-1.50; -0.47; 1.65)	3.85	3.57	-0.29
Extent travel services	(2.24; 2.94; 3.46)	(2.70; 3.61; 3.85)	(-0.76; 0.67; 1.61)	2.91	3.50	0.59
Convenient ticketing process	(3.52; 4.21; 4.82)	(3.66; 4.75; 4.93)	(-1.16; 0.54; 1.41)	4.20	4.60	0.40
Customer complaint handling	(3.16; 3.89; 4.67)	(3.86; 4.55; 4.72)	(-0.81; 0.66; 1.56)	3.90	4.46	0.57
Flight pattern	**(3.48; 4.26; 4.84)**	**(3.85; 4.76; 4.89)**	**(-0.99; 0.50; 1.41)**	**4.24**	**4.63**	**0.40**
Flight problems	(3.46; 4.36; 4.87)	(3.76; 4.76; 4.84)	(-1.11; 0.40; 1.38)	4.30	4.61	0.31
Convenient flight schedules	(3.48; 4.30; 4.88)	(3.87; 4.74; 4.84)	(-0.61; 0.44; 1.36)	4.26	4.61	0.42
Frequancy of flight	(3.30; 4.06; 4.77)	(3.80; 4.66; 4.93)	(-0.97; 0.60; 1.63)	4.05	4.56	0.51
Non-stop flight	(3.66; 4.30; 4.84)	(3.98; 4.88; 4.96)	(-0.86; 0.58; 1.30)	4.28	4.74	0.46
Mean	**(3.00; 3.82; 4.47)**	**(3.32; 4.04; 4.45)**	**(-1.15; 0.26; 1.46)**	**3.79**	**3.99**	**0.23**

The statistical gathered data confirms the passengers' satisfaction of the service provided by the *Low Cost Airline2* (see the table 9).

There is only one factor with the gap of minus symbol, which means that the passengers are not satisfied with *the tangibles* (-0.05 gap). The same factor is unsatisfied for the *Low Cost Airline1*. The gap is 0.09 lower comparing the result with the *Low Cost Airline1's* gap for *the tangibles*. There is the same dimension of *in-flight newspapers, magazines and book*s (-0.46 gap).

The second factor is *the responsiveness* (0.15 gap), which is lower by 0.01 than for *Low Cost Airline1*. The respondents are unsatisfied with the efficient check-in/baggage handling services (-0.08 gap). This is compensated by the quality of the reservation services (0.34 gap).

The empathy factor results are the same as for the *Low Cost Airline1* (0.22 gap).

The reliability and assurance factor (0.25 gap) is higher by 0.03 for the *Low Cost Airline2* comparing it with the *Low Cost Airline1*. According the data, passengers are unsatisfied with the safety dimension (-0.09 gap). This dimension's gap is negative for the Low Cost Airline2 too. The statistical results are unexpected, as both airlines have the fleet with the average year from 3 to 6 years. This is a very young fleet for the airline. There are no major accidents and incidents published. EASA (European Aviation Safety Agency) keeps this kind of information reachable for the public. There are the black listed airlines, which are seen as unsafe airlines; most of the airlines are from the region of Africa.

The highest satisfaction factor is *the flight pattern* (0.40 gap). The same factor is the highest for the *Low Cost Airline1*. The *Low Cost Ailine2's* gap is higher by 0.03.

According to the strategic report of one of the *Low Cost Airlines* operating in Lithuanian market, the competition is high between the low cost airlines. The competitors offer not only the discounted fares but the more attractive schedules too.

These results were received from the SERVQUAL questionnaire. The results confirm the importance of the flight pattern dimension for the customers. The high satisfaction rate shows the high competition between the low cost airlines.

The *Low Cost Airline* believes that, in tough market, lowest cost ultimately wins and the necessary cost discipline is something to which we they are committed, day in, day out.

Table 10. The result's comparison of *Low Cost Airline1* and *Low Cost Airline2* gaps and ranks.

Dimension	**Gap** ***Low Cost 1***	**Rank**	**Gap** ***Low Cost 2***	**Rank**
Tangibles	**-0.14**	**1**	**-0.05**	**1**
Comfort and cleanness of seat	-0.01	**6**	-0.12	**6**
Quality of food and bevarage	0.02	**7**	0.18	18
In-flight newspapers, magazines and books	0.57	35	-0.34	**2/3**
In-flight washroom facility	-0.43	**3**	-0.34	**2/3**
In-flight entertaimant facilities and programs	-0.85	**1**	-0.46	**1**
Availability of waiting lounges	-0.47	**2**	-0.21	**5**
Size of airplane	0.12	11	-0.05	**10**
Responsiveness	**0.16**	**2**	**0.15**	**2**
Courtesy of crew	0.15	12/13	-0.07	**9**
Handling of delay	0.28	17/18	-0.03	11
Efficient check-in/ baggage handling services	0.09	**9**	-0.08	**8**
Crew's speed handling request	0.03	**8**	0.15	17
Quality of the reservation services	0.25	16	0.34	21
Crew's approach against unexpected situations	0.23	15	0.14	16
Crew's willingness to help	0.16	14	0.07	13/14
Appearance of crew	0.28	17/18	0.22	19
Reliability and assurance	**0.22**	**3/4**	**0.25**	**4**
Safety	-0.05	**4**	-0.09	7
On-time departure and arrival	0.11	**10**	0.11	15
Consistent ground/ in-flight services	0.59	37	0.71	28
Empathy	**0.22**	**3/4**	**0.22**	**3**
Crew's behaviour to delayed passenger	-0.04	**5**	0.01	12

Table 10. Continued.

Individual attention to passenger	0.15	12/13	0.07	13/14
Understanding of passenger's specific needs	0.66	38	-0.29	**4**
Extent travel services	0.58	36	0.59	27
Convenient ticketing process	0.33	30/31	0.40	22
Customer complaint handling	0.51	34	0.57	26
Flight pattern	**0.37**	**5**	**0.40**	**5**
Flight problems	0.32	29	0.31	20
Convenient flight schedules	0.37	32	0.42	23
Frequancy of flight	0.43	33	0.51	25
Non-stop flight	0.33	30/31	0.46	24

Analysing the calculations and data from table 7, table 8, table 9 and table 10, we compare the results for *Low Cost Airline1* and *Low Cost Airline2*. There is a small difference in the passengers' expectations and perceptions, either for the *Low Cost Airline1*and *Low Cost Airline2*.

Firstly, in terms of service quality dimensions of passengers' expectations for the Low Cost Airline1 in the first place is a flight pattern (the average score is 4.24), the second is reliability and assurance (the average score is 4.19), which is an unexpected finding. According the airlines' vision, mission and strategies, safety always stands in the first place and after that service quality, etc. The third is responsiveness (3.96 average score). The fourth place is an empathy (3.70 average score). The last one is for the tangibles (the average score is 3.03).

Secondly, in terms of the dimensions of service perception, the priority stays the same as for the service expectations. The first place is the flight pattern (4.61 average score), the second is the reliability and assurance (the average score 4.41), the third is responsiveness (4.12 average score), the fourth is the empathy (average score of 3.92), the last in the order is tangibles (2.89 average score).

In conclusion on the *Low Cost Airline1*, only the one dimension of service perception is lower than the expectations of service quality by passengers, this is the tangibles by 0.14. The mean average of all five dimensions for the expectation is 3.83 and for the perception is 3.99. Generally, the score for the service quality is between fair and good. As at the beginning of the

research we set the linguistic variables for the expectation and perception. The *fair* was acknowledged as (2.0; 3.0; 4.0) and the *good* as (3.0; 4.0; 5.0).

Analysis of service quality of *Low Cost Airline2* based on the results from the tables mentioned before. In terms of the dimensions of service expectations the first is the flight pattern (the average score 4.24), the second is reliability and assurance (4.17 average score), the third is responsiveness (the average score 3.95), the fourth is the empathy (3.67 average score), the fifth one is the tangibles (2.94 average score).

In terms of service dimensions based on the perception of passengers, the order of importance is the same as for the expectations. The first is the flight pattern (the average score is 4.63), the second is the reliability and assurance (4.42 average score), the third is responsiveness (4.10 average score), the fourth is the empathy (the average score 3.89), the fifth is tangibles (the average score is 2.89).

Comparing the service dimensions for the expectations and perception of *Low Cost Airline2*, the tangibles have the lowest perception of all the dimensions analysed. The mean of all service dimensions for the expectations is 3.79 and for the perception is 3.99. The same as for the *Low Cost Airline1*, the score is between *fair* and *good*. The same linguistic variables were used to assess the service dimensions for the *Low Cost Airline2* and *Low Cost Airline1*.

Table. 11. The research data comparison of two airlines.

	Low Cost Airline1		**Low Cost Airline2**	
Dimensions	Expectations	Perception	Expectations	Perception
Flight pattern	4.24	4.61	4.24	**4.63**
Reliability and assurance	**4.19**	4.41	3.95	**4.42**
Responsiveness	**3.96**	**4.12**	3.95	4.10
Empathy	**3.70**	**3.92**	3.67	3.89
Tangibles	**3.70**	**3.92**	2.94	2.89
Mean	**3.83**	3.99	3.79	3.99

The research data analysis shows that there isn't a big gap between the *Low Cost Airline1* and *Low Cost Airline*2 service quality provided (see table 11).

The total of 400 respondents questioned about the monthly gross salary during the research. There are 48 % of respondents, who earn less than 500 Euros up to 1000 Euros gross salary monthly. The 48 percentage consists of 17 percent, who earns up to 500 Euros gross per month; and 31 percent, who earns from 501 to 1000 Euros gross salary per month. This segment of population is the biggest part of all 400 respondents (see chart 3).

According to the Official State portal, the average monthly gross earning was 677.4 Euros in 2014 and 714.1 Euros in 2015. This is exactly the greatest segment of respondents we had questioned.

Furthermore, there were 2,942,670 passengers carried in one of the Lithuanian International Airports (the airport name is not mentioned due to the confidential agreement) in 2014 and 3,336,084 passengers carried in 2015 (see table 3).

Nevertheless, there were only 1,329 million people employed in the year 2014 (see the table 1). There were 647,100 men and 671,900 women employed from the 1,329 million. Likewise, we questioned 92.7 percent respondents at the age less than 20 years and up to 50 years old (see chart 1).

The data denies the **hypothesis** that the service quality has the direct impact on the airline's demand. We cannot find the impact on the passengers' loyalty and on the market of the airline's comparing only the service quality. This is a more complex matrix.

In accordance with the data analysed, especially, the comparison of passengers' expectations and perception of two airlines; the gap between the dimensions expectations and perception; the respondents monthly gross salary; the average Lithuanian gross earning, the greatest impact on the customer has the price.

3.2. The findings of in-depth interview with Small Planet Airline's head of marketing department using a qualitative method

During the face-to-face interview the questions relating to the service quality and service standards were asked. Head of marketing department was asked about the company's mission, vision and aims of the company are they well known inside the company. Furthermore, there was a question about the core values and beliefs, which are important in the company. The interviewee was asked about the service standards, how the employees keep the company's prescribed standards, how does the company measure the service provided to the customers and passengers by the employees. As there was a question about the ceremonies and the rituals, does the company encourages the employees to maintain the high standards of the service provided. What are the criteria for hiring people? The interview was concluded with the question about the main obstacles the company has to overcome when it comes to doing business in Lithuania.

According to the interviewee, the company is doing business in the different approach to customers. The company asks the main question 'Why not?'. From this the four company values emerge: Brave Explorers, Sane Operators, Fun Lovin' Team Players and Self Movers. The company encourages employees to be self-movers, to be brave in exploring new goals, keep open and friendly working environment, be a team-players, and spread this to the customers through the service provided.

The company mainly provides charter flight services for tour operators, ad-hoc flights, ACMI (an aircraft, complete crew, maintenance, and insurance) services for the other airlines.

The company has service standards. There is no separate department for the service quality. There is a department of quality, which is fulfilling aviation sector specific flight safety quality. Separate departments are involved in maintaining the service quality. As there is no separate department for the service quality only, there is no service quality program introduced in the company.

Currently, specific company employees are doing service audits on random flights. This is a main way, how company is doing service quality checks. Every audit comes with corrective actions to increase service level or to maintain service standards better. After the performed audits, each responsible department receives data, which are mainly in-flight department, cabin crew department and ground handling department, sometimes other departments. The responsible department takes action.

There are no routine checks on daily flights. The audits are performed constantly. Surveys are conducted for the passengers. Every week data about service level is being received.

More reaction is given to a negative feedback, which is the main source in developing customer service standard or following how the customer service standard is implemented. A positive feedback is used to praise employees and to increase motivation and morale of employees.

The general company's vision in a long term is to grow in size to 1 billion Euros revenues by 2020.

Interviewee listed several rituals and ceremonies which are present in the company. One of the rituals to emphasize the company's uniqueness – the cabin crew finishes a safety demonstration before the flight with the bow – it shows, that in normal circumstances, crew finished the active safety duties for now and are ready to perform the service duties. There are more internal rituals.

Many things have changed recently during the last few years of operation. The company moved to new office in Vilnius Old Town to increase satisfaction of employees to their working place. Company invested in putting more effort in improving physical working conditions for employees, creating working and break places in the office.

Regarding the service, the interviewee determined an experience in service sectors as a mandatory key aspect in hiring people. In order to improve service standards, employees must be involved in developing service standards. Besides that, the employees must be passionate about delivering customer service, it is essential.

Concluding the interview findings, in terms of the service standards, the company has it, but the part about the service quality program is missing. The company mainly performs the audits during the flights, to check the service standards. The quality program should not stand only for the service provided on board the aircraft. It should take into account pre and after flight services. Moreover, not only the inflight crew members, but the office managers should be evaluated in the service standards. Where is always a Swiss cheese chain of gap in performance. The company could implement the service quality program, to increase the service standards, which is a key player in charter companies. There are no big competitors in Lithuanian charter market, but as the company does business not only in Lithuania, but also in Poland, Germany and Thailand - this could be an advantage.

CONCLUSIONS AND RECOMMENDATIONS

In order to examine the influence of airline service quality on passenger satisfaction and loyalty the following tasks were solved:

1. Analysis of scientific literature shows that service quality of airlines can be regarded as a composite of various attributes. It consists not only of tangible attributes, but also intangible/subjective attributes such as safety, comfort, which are difficult to measure accurately. Different individual usually has wide range of perceptions toward quality service, depending on their preference structures and roles in process (service providers/receivers).

2. According to IATA's statistics, in the year 2015, the world's airlines safely transported 3.5 billion people and 51 million metric tons of cargo. They accomplished this with a workforce of nearly 10 million people managing a fleet of 26,000 aircraft averaging 100,000 flights a day over a global network of 51,000 routes. For the first time in history, airlines made a normal level of profitability. In real terms, a $35.3 billion net profit on revenues of $718 billion. The fall in the oil price is a major driver of improved profitability; fuel is a major expense for airlines and accounted for, on average, 27% of an airline's costs in 2015. The profitability has been reinforced by airline efforts that have raised load factors to all-times highs, increased ancillary revenues, and improved aircraft utilization. As stated in annual review 2016, the sharp decline in jet fuel prices which occurred in late 2014 and continued in 2015, such that the average price of barrel of jet fuel in 2015 was 42% lower than in 2014. Jet fuel prices fell further in the final months of 2015 and ended the year at around $48 a barrel – the lowest level in more than 11 years. The lower jet fuel prices were not felt equally across airlines and regions globally. Due to the different hedging practices within the aviation industry. There is a possible delay to feel the lower unit costs benefitting from translation of lower oil prices. There was the other factor, which had an influence on the fuel prices - the drop in the value of many currencies against the US dollar in 2015. This was strongly felt in Brazil and Russia.

3. In thesis the review was done of the main methods of qualitative and quantitative research suitable for airlines service quality. The general objective of this work was to examine the influence of airline service quality on passenger satisfaction and loyalty. To achieve this, the research was guided by specific objectives to which data collection was effected mainly by interview method using fully structured questionnaires. The analysis, in this work, was based on the SERVQUAL method for evaluating airline service quality. This research adapted the SERVQUAL scale to the specific context of aviation by generating additional quality related measures. The

measurement items and the dimensions were changed to develop a more appropriate scale for measuring airline service quality. The fuzzy set theory is chosen to evaluate the data collected from the questionnaires for the quantitative research method. To develop airline service quality measures, the surveys were held in one of International Lithuanian airports. The passengers, who travel with the airlines: *Legacy Carrier1*, *Legacy Carrier2*, *Low Cost Ai*rline1, *Low Cost Airline2* and *Charter Company* (the real airlines are known for the researcher, the names are changed due to the airport's media representative request), were interviewed. An in-depth interview was conducted to gather the primary qualitative data in one of Lithuanian aviation charter company – *Small Planet Airlines*. This technique is used to provide context to other data in order to get a more complete picture of the issue and its reasons.

4. The research was guided by specific objectives to which data collection was carried out mainly by survey and interview method using fully structured questionnaires. Findings indicated that the quality of pre-flight, in-flight and post-flight services had a statistically significant effect on passenger satisfaction. In addition to that, passenger satisfaction as a mediating variable also had a significant effect on passenger loyalty. It was noted that passenger satisfaction differed from person to person as some were more interested in off board facilities, others on board, others in the quality of food while others wanted more extra luggage. In conclusion on of the *Low Cost Airline1*, only the one dimension of service perception is lower than the expectations of service quality by passengers, this is the tangibles by 0.14. The mean average of all five dimensions for the expectation is 3.83 and for the perception is 3.99. Generally, the score for the service quality is between fair and good. As at the beginning of the research we set the linguistic variables for the expectation and perception. The *fair* was acknowledged as (2.0; 3.0; 4.0) and the *good* as (3.0; 4.0; 5.0). Comparing the service dimensions for the expectations and perception of Low Cost Airline2, the tangibles have the lower perception from all the dimensions analysed. The mean of all service dimensions for the expectations is 3.79 and for the perception is 3.99. The same as for the *Low Cost Airline1*, the score is between *fair* and *good*. The same linguistic variables were used to assess the service dimensions for the *Low Cost Airline2* and *Low Cost Airline1*. The scores of all five dimensions are spread between 2.94 and 4.63.

5. The total of 400 respondents questioned about the monthly gross salary during the research. There are 48 % of respondents, who earn less than 500 Euros up to 1000 Euros gross salary monthly. The 48 percentage consists of 17 percent, who earn up to 500 Euros gross per month; and 31 percent, who earn from 501 to 1000 Euros gross salary per month. This segment of population makes up the greatest part of all 400 respondents. According to the Official State portal,

the average gross earning monthly was 677.4 Euros in 2014 and 714.1 Euros in 2015. This is exactly the greatest segment of respondents we had questioned. Nevertheless, there were only 1,329 million people employed in the year 2014 (see the table 1). There were 647,100 men and 671,900 women employed from the 1,329 million. Likewise, we questioned 92.7 percent respondents at the age less than 20 years and up to 50 years old.

6. The data denies the **hypothesis** that the service quality has a direct impact on the airline's demand. We cannot find the impact on the passengers' loyalty and on the market of the airline's comparing only the service quality. This is a more complex matrix.

7. In accordance with the data analysed, especially, the comparison of passengers' expectations and perception of two airlines; the gap between the dimensions expectations and perception; the respondents monthly gross salary; the average Lithuanian gross earning, the price has the greatest impact on the customers.

8. According to the results of research, it is recommended that airline management should consider developing various strategies for improving service quality based on demographic characteristics of the customers such as occupation, age, gender and education level. The company has to establish the system for the passengers' satisfaction evaluation. There should be the direct access to the results of passengers' questionnaires in order to improve the service quality provided. The service quality should be improved periodically. The processes should be overviewed and improved. The employees should be involved to create the link between the customers and the service providers. From the in-depth interview, we found out that the charter airline, *Small Planet Airlines*, has no separate service quality department and service quality program in the company. The company could adopt the SERVQUAL questionnaire used in the master thesis for the passengers' expectations and perceptions measurement. Another suggestion is to reduce the costs to have a higher profit and use the money for the service quality improvement. One of the cost saving strategies is a newer fleet. New, fuel efficient aircraft provide a natural hedge against the most unpredictable of cost drivers and at the same time provide a better passenger experience and enhance the Green credentials of the airline.

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APPENDEXES

A. The SERVQUAL questionnaire dimensions for airline services

TANGIBLES:				
Comfort and cleanness of seat				
Very Poor (Very Low)	Poor (Low)	Fair	Good (High)	Very Good (Very High)
Quality of food and beverage				
Very Poor (Very Low)	Poor (Low)	Fair	Good (High)	Very Good (Very High)
In-flight newspapers, magazines and books				
Very Poor (Very Low)	Poor (Low)	Fair	Good (High)	Very Good (Very High)
In-flight washroom facility				
Very Poor (Very Low)	Poor (Low)	Fair	Good (High)	Very Good (Very High)
In-flight entertainment facilities and programs				
Very Poor (Very Low)	Poor (Low)	Fair	Good (High)	Very Good (Very High)
Availability of waiting lounges				
Very Poor (Very Low)	Poor (Low)	Fair	Good (High)	Very Good (Very High)
Size of airplane				
Very Poor (Very Low)	Poor (Low)	Fair	Good (High)	Very Good (Very High)
RESPONSIVENESS:				
Courtesy of crew				
Very Poor (Very Low)	Poor (Low)	Fair	Good (High)	Very Good (Very High)
Handling of delay				

Very Poor (Very Low)	Poor (Low)	Fair	Good (High)	Very Good (Very High)
Efficient check-in/ baggage handling services				
Very Poor (Very Low)	Poor (Low)	Fair	Good (High)	Very Good (Very High)
Crew‘s speed handling request				
Very Poor (Very Low)	Poor (Low)	Fair	Good (High)	Very Good (Very High)
Quality of the reservation services				
Very Poor (Very Low)	Poor (Low)	Fair	Good (High)	Very Good (Very High)
Crew‘s approach against unexpected situations				
Very Poor (Very Low)	Poor (Low)	Fair	Good (High)	Very Good (Very High)
Crew‘s willingness to help				
Very Poor (Very Low)	Poor (Low)	Fair	Good (High)	Very Good (Very High)
Appearance of crew				
Very Poor (Very Low)	Poor (Low)	Fair	Good (High)	Very Good (Very High)
RELIABILITY AND ASSURANCE:				
Safety				
Very Poor (Very Low)	Poor (Low)	Fair	Good (High)	Very Good (Very High)
On-time departure and arrival				
Very Poor (Very Low)	Poor (Low)	Fair	Good (High)	Very Good (Very High)
Consistent ground/ in-flight services				
Very Poor (Very Low)	Poor (Low)	Fair	Good (High)	Very Good (Very High)
EMPATHY:				
Crew‘s behaviour to delayed passenger				

Very Poor (Very Low)	Poor (Low)	Fair	Good (High)	Very Good (Very High)
Individual attention to passenger				
Very Poor (Very Low)	Poor (Low)	Fair	Good (High)	Very Good (Very High)
Understanding of passenger‘s specific needs				
Very Poor (Very Low)	Poor (Low)	Fair	Good (High)	Very Good (Very High)
Extent travel services				
Very Poor (Very Low)	Poor (Low)	Fair	Good (High)	Very Good (Very High)
Convenient ticketing process				
Very Poor (Very Low)	Poor (Low)	Fair	Good (High)	Very Good (Very High)
Customer complaint handling				
Very Poor (Very Low)	Poor (Low)	Fair	Good (High)	Very Good (Very High)
FLIGHT PATTERN:				
Flight problems and Convenient flight schedules				
Very Poor (Very Low)	Poor (Low)	Fair	Good (High)	Very Good (Very High)
Frequency of flight				
Very Poor (Very Low)	Poor (Low)	Fair	Good (High)	Very Good (Very High)
Non-stop flight				
Very Poor (Very Low)	Poor (Low)	Fair	Good (High)	Very Good (Very High)

B. The arithmetic operations on fuzzy numbers

Suppose $A_1 = (c_1, a_1, b_1)$ and $A_2 = (c_2, a_2, b_2)$ are triangular fuzzy numbers.

An additional operation on A_1 and A_2:

$$A_1 \oplus A_2 = (c_1 + c_2, a_1 + a_2, b_1 + b_2)\ ; \qquad (7)$$

$c_1, c_2, a_1, a_2, b_1, b_2$ are real numbers.

In the research the above operation are used to evaluate the service quality of an airline.

The subtraction operation on A_1 and A_2:

$$A_1 \Theta A_2 = (c_1 + c_2, a_1 + a_2, b_1 + b_2). \qquad (8)$$

The division operation on A and any real number *r*:

$$\frac{A}{r} = (\frac{c}{r}, \frac{a}{r}, \frac{b}{r}) \qquad (9)$$

where *r* is a real number.

C.-C. Chou *et. al*. (2011) proposed the Inverse Function Arithmetic Representation Method. Suppose A_1=(c_1, a_1, b_1, d_1) is a trapezoidal fuzzy number. $L_A^{-1}(h)$ and $R_A^{-1}(h)$ are the inverse functions of the function $L_{A1}(x)$ and the function $R_{A1}(x)$ of A_1 at *h*-level.

The membership function of A_1 is:

$$f_{A1}(x)\begin{cases}\dfrac{(x-c_1)}{(a_1-c_1)}\\ 1,\\ \dfrac{(x-d_1)}{(b_1-d_1)}\\ 0,\end{cases}, c_1 \le x \le a_1, a_1 \le x \le b_1, b_1 \le x \le d_1, \text{ otherwise.}$$

Since,

$$L_{A1}(x) = \frac{(x-c_1)}{(a_1-c_1)}, c_1 \le x \le a_1,$$

$$R_{A1}(x) = \frac{(x-d_1)}{(b_1-d_1)}, b_1 \le x \le d_1,$$

And,

$$L_{A1}^{-1}(h) = c_1 + (a_1-c_1)h, 0 \le h \le 1,$$

$$R_{A1}^{-1}(h) = d_1 + (b_1-d_1)h, 0 \le h \le 1.$$

Similarly, the membership function of $A_2=(c_2, a_2, b_2, d_2)$

$$f_{A2}(x)\begin{cases}\dfrac{(x-c_2)}{(a_1-c_2)}\\ 1,\\ \dfrac{(x-d_2)}{(b_2-d_2)}\\ 0,\end{cases}, c_2 \le x \le a_2, a_2 \le x \le b_2, b_2 \le x \le d_2, \text{ otherwise}$$

Since

$$L_{A2}(x) = \frac{(x-c_2)}{(a_2-c_2)}, c_2 \le x \le a_2,$$

$$R_{A2}(x) = \frac{(x-d_2)}{(b_2-d_2)}, b_2 \le x \le d_2,$$

And,

$$L_{A2}^{-1}(h) = c_2 + (a_2-c_2)h, 0 \le h \le 1$$

$$R_{A2}^{-1}(h) = d_2 + (b_2-d_2)h, 0 \le h \le 1.$$

The Inverse Function Arithmetic Representation Method:

Definition. Let $P(A_1 \oplus A_2)$ be the representation of $A_1 \oplus A_2$.

$$P(A_1 \oplus A_2) = \frac{\int_0^1 \int_0^1 \frac{1}{4}\{[h_{A1}L_{A1}^{-1}(h)\times h_{A2}L_{A2}^{-1}(h)]+[h_{A1}L_{A1}^{-1}(h)\times h_{A2}R_{A2}^{-1}(h)]+[h_{A1}R_{A1}^{-1}(h)\times h_{A2}L_{A2}^{-1}(h)]+[h_{A1}R_{A1}^{-1}(h)\times h_{A2}R_{A2}^{-1}(h)]\}dh_{A1}dh_{A2}}{(\int_0^1 h_{A1}dh_{A1}\times\int_0^1 h_{A2}dh_{A2})} =$$

$$\frac{\int_0^1 \int_0^1 \frac{1}{4}\{[h_{A1}[c_1+(a_1-c_1)h_{A1}]\times h_{A2}[c_2+(a_2-c_2)h_{A2}]+h_{A1}[c_1+(a_1-c_1)h_{A1}]\times h_{A2}[d_2+(b_2-d_2)h_{A2}]+h_{A1}[d_1+(b_1-d_1)h_{A1}]\times h_{A2}[c_2+(a_2-c_2)h_{A2}]+h_{A1}[d_1+(b_1-d_1)h_{A1}]\times h_{A2}[d_2+(b_2-d_2)h_{A2}]|dh_{A2}}{(\int_0^1 h_{A1}dh_{A1}\times\int_0^1 h_{A2}dh_{A2})} =$$

$$\frac{\int_0^1 \begin{matrix}\frac{1}{4}\left[\frac{1}{2}h^2{}_{A1}c_1+\frac{1}{3}h^3{}_{A1}(a_1-c_1)\right]\times h_{A2}[c_2+(a_2-c_2)h_{A2}]+\left[\frac{1}{2}h_{A1}^2c_1+\frac{1}{3}h_{A1}^3(a_1-c_1)\right]\times h_{A2}[d_2+(b_2-d_2)h_{A2}]\\ +[\frac{1}{2}h^2{}_{A1}d_1+\frac{1}{3}h^3{}_{A1}(b_1-d_1)]\times h_{A2}[c_2+(a_2-c_2)h_{A2}]+[\frac{1}{2}h^2{}_{A1}d_1+\frac{1}{3}h^3{}_{A1}(b_1-d_1)]\times h_{A2}[d_2+(b_2-d_2)h_{A2}]\}|dh_{A2}\end{matrix}}{(\frac{1}{2}h_{A1}^2|\times\int_0^1 h_{A2}dh_{A2})} =$$

$$\frac{\int_0^1 \frac{1}{4}\left\{\begin{matrix}[\frac{1}{2}c_1+\frac{1}{3}(a_1-c_1)]\times h_{A2}[c_2+(a_2-c_2)h_{A2}]+[\frac{1}{2}c_1+\frac{1}{3}(a_1-c_1)]\times h_{A2}[d_2+(b_2-d_2)h_{A2}]+[\frac{1}{2}d_1+\frac{1}{3}(b_1-d_1)]\\ \times h_{A2}[c_2+(a_2-c_2)h_{A2}]+\left[\frac{1}{2}d_1+\frac{1}{3}(b_1-d_1)\right]\times h_{A2}[d_2+(b_2-d_2)h_{A2}]\end{matrix}\right\}dh_{A2}}{(\frac{1}{2}\times\int_0^1 h_{A2}dh_{A2})}$$

=

$$\frac{\frac{1}{4}\left\{\begin{matrix}\left[\frac{1}{2}c_1+\frac{1}{3}(a_1-c_1)\right]\times\left[\frac{1}{2}h_{A2}^2c_2+\frac{1}{3}h_{A2}^3(a_2-c_2)\right]+\left[\frac{1}{2}c_1+\frac{1}{3}(a_1-c_1)\right]\times\left[\frac{1}{2}h_{A2}^2d_2+\frac{1}{3}h_{A2}^3(b_2-d_2)\right]+\left[\frac{1}{2}d_1+\frac{1}{3}(b_1-d_1)\right]\\ \times\left[\frac{1}{2}h_{A2}^2c_2+\frac{1}{3}h_{A2}^3(a_2-c_2)\right]+\left[\frac{1}{2}d_1+\frac{1}{3}(b_1-d_1)\right]\times\left[\frac{1}{2}h_{A2}^2c_2+\frac{1}{3}h_{A2}^3(b_2-d_2)\right]|\end{matrix}\right\}}{\left(\frac{1}{2}\times\frac{1}{2}h_{A2}^2\right)}$$

=

$$\frac{\frac{1}{4}\left\{\begin{matrix}\left[\frac{1}{2}c_1+\frac{1}{3}(a_1-c_1)\right]\times\left[\frac{1}{2}c_2+\frac{1}{3}(a_2-c_2)\right]+\left[\frac{1}{2}c_1+\frac{1}{3}(a_1-c_1)\right]\times\left[\frac{1}{2}d_2+\frac{1}{3}(b_2-d_2)\right]+\left[\frac{1}{2}d_1+\frac{1}{3}(b_1-d_1)\right]\\ \times\left[\frac{1}{2}c_2+\frac{1}{3}(a_2-c_2)\right]+\left[\frac{1}{2}d_1+\frac{1}{3}(b_1-d_1)\right]\times\left[\frac{1}{2}d_2+\frac{1}{3}h_{A2}^3(b_2-d_2)\right]\end{matrix}\right\}}{\left(\frac{1}{2}\times\frac{1}{2}\right)}$$

$$=\frac{1}{6}(c_1+2a_1+2b_1+d_1)\times\frac{1}{6}(c_2+2a_2+2b_2+d_2)$$

It gives us:

$$\mathrm{P}(A_1 \oplus A_2) = \frac{1}{6}(c_1+2a_1+2b_1+d_1)\times\frac{1}{6}(c_2+2a_2+2b_2+d_2)$$

Triangular fuzzy numbers Y_1=(c_1, a_1, b_1, d_1) and Y_2=(c_2, a_2, b_2, d_2) are special cases of generalized trapezoidal fuzzy numbers. The representation of multiplication operation on two triangular fuzzy numbers becomes:

$$\mathrm{P}(Y_1 \oplus Y_2) = \frac{1}{6}(c_1+4a_1+b_1)\times\frac{1}{6}(c_2+4a_2+b_2) \qquad (10)$$

C. Questionnaire for in-depth interview

1. **What is Your position in the company?**
   Head of Marketing
2. **How long have You been working in the company?**
   2 years
3. **How many employees work in the company?**
   500 to 800, depends on the season.
4. **What are the mission, vision and aims of the company? Are they well known inside the company?**
   Company values are 4: Brave Explorers, Sane Operators, Fun Lovin' Team Players and Self Movers.
   Company's mission is to recharge people by connecting them to holidays in the exciting value. Company's vision is to grow in size to 1bn EUR revenues by 2020.
5. **The company You work in, is in aviation sector. What are the main services the company provide?**
   Company mainly provides charter services for tour operators, ad-hoc flights, ACMI services for other airlines.
6. **As the company provides services, does it have the service standards?**
   Yes, company has service standards.
7. **Does the company have a service quality department in the company?**
   Company has mandatory quality department, fulfilling aviation sector specific flight safety quality. But, I believe, this questions is more about service quality – company does not have separate service quality department, quality is being supervised by specific departments.
8. **If yes, how many employees work in this department?**
   No separate department.
9. **Does the company have a service quality program?**
   No.
10. **How does the company measure the service quality?**
    Specific company employees are doing service audits on random flights. This is a main way, how company is doing service quality checks. Every audit comes with corrective actions to increase service level or to better maintain service standards.

11. **How does the department collect the data about the service provided?**

    As there is no separate service quality department, each responsible department receives data after audit performed – mainly it is in-flight department, cabin crew department and ground handling department, sometimes other departments too. Responsible departments take actions if it needs to.

12. **How often does a passenger experience is evaluated? How this evaluation is taken?**

    It is evaluated constantly on every X flight audits and surveys are conducted. Every week data about service level is being received.

13. **How does the company react to the passengers' and customers' negative and positive feedback?**

    More reaction are given to negative feedback – it is a main source in developing customer service standard or following how customer service standard is implemented. Positive feedback is used to praise employees and to increase motivation and morale of employees.

14. **What are the core values and beliefs, which are important in the company?**

    It is written in company's mission – to recharge people by connecting them to holidays in an exciting way. Exciting is important world in service level manifesto – company wants holiday to start already on-board the aircraft.

15. **Rituals and ceremonies are described as elements of organizational culture. Do You have any rituals in the company?**

    Yes, there is. One of the rituals is – our cabin crew finish safety demonstration before the flight with the bow – it shows, that in normal circumstances, crew finished active safety duties for now, and now are ready to perform service duties. There are more internal rituals too.

16. **How does the company encourages employees to maintain high service standards?**

    Service employees are getting additional bonus for maintaining high service level. Administration employees, who are working on creating and implementing standards, have these goals included in their performance goals.

17. **What is Your opinion about the rituals and ceremonies in the company, does it have the influence on the employees' performance?**

Strong values and mission is key for long living companies. Many things in business can change – but values gives opportunity to have stable background both for individual employees and form company.

18. **Does the company involve employees in the improving standards?**

    Yes, even service employees are involved in developing service standards. We believe, employees efforts are main thing for delivering service and with think, employees needs to be passion about customer service. When you are involved – it is easier to have passion in what you do.

19. **What is the criterion of hiring people, part from their academic qualifications?**

    For service employees, service experience is mandatory in hiring.

20. **How much time and resources are dedicated in improving the physical working conditions in the organization?**

    Company moved to new office last year in Vilnius Old Town to increase satisfaction of employees to their working place. Company invested quite a lot in putting more efforts in improving physical working conditions for employees, creating working and break-places in the office.

21. **What are the main obstacles You believe Your company has to overcome when it comes to doing business in Lithuania (in terms of competition between service providing companies)?**

    There are no big competitors in Lithuanian market to be benchmarked with. I believe lack of skilled people will become a problem more and more in near future. Also, company understands working in completely international environment and hiring people worldwide.