N E W S
OF THE NATIONAL ACADEMY OF SCIENCES OF THE REPUBLIC OF KAZAKHSTAN
SERIES OF SOCIAL AND HUMAN SCIENCES
ISSN 2224-5294 **https://doi.org/10.32014/2019.2224-5294.132**
Volume 4, Number 326 (2019), 25 – 32

UDC 657.1(075.8)

B.Markhayeva[1], Y.Cherenyova[2]

[1,2]Almaty Management University, Almaty, Kazakhstan
markhaeva@mail.ru, julia_chereneva@mail.ru

STRUCTURAL ANALYSIS OF THE LOW-COST AIRLINE OPERATING COSTS: LESSONS FOR KAZAKHSTAN

Abstract. Air Astana airline is the largest national carrier in Kazakhstan and performs about half of all air transportations on the market. On the one hand, the company launches the first low-cost airline FlyArystan in the first half of 2019. The low-cost airline will operate according to the classic low-cost model, following the example of such successful low-cost airlines like EasyJet, Indigo, Cebu Pacific and Air Asia. Like Air Astana, the new company will operate on a self-financing basis. However, on the other hand, difficult climatic conditions, low passenger traffic, and long distances, as well as high airport charges, along with a decrease in the purchasing power of the population due to devaluation processes, do not contribute to the emergence of the first low-cost airline in Kazakhstan.This contradiction has generated a need for the analysis of the financial statements of both international and domestic airlines in terms of operating costs and the recommendations developing on the basic rate calculating of the air ticket in terms of dynamic (flexible) pricing. In addition, the low-cost airline model as a low-cost model implies a focus on the study of this particular component of the company's performance efficiency. Furthermore, the companies reporting was used, which is available in the publicity.

Keywords: low-cost airline, financial statement, operating costs, basic rate, dynamicpricing.

Introduction

Today, Kazakhstan is a major player in the global aviation market, on whose territory there are 20 airlines, providing commercial air transportation services/flights, where seven of which are performing scheduled passenger flights. 7.4 million passengers were transported in Kazakhstan in 2017, which is 23% more than in 2016. This is the highest growth rate in all the years of independence, in part due to the successful arrangement of the EXPO-2017.

Air Astana airline is the largest carrier in Kazakhstan, having served 4.2 million passengers in 2017. SCAT reportedly carried 1.7 million passengers in 2017 compared to 1.3 million in 2016.

According to IATA, privately owned Bek Air is the third-largest airline in Kazakhstan, having carried slightly fewer than 1 million passengers in 2017, and Qazaq Air is the fourth-largest, with slightly more than 250,000 passengers (Table 1).

Table 1 – The international and domestic market share of the main passenger carriers in Kazakhstan

Domestic market share, %		International market share, %	
Air Astana	51	Air Astana	49
SCAT	24	Aeroflot	13
Bek Air	19	SCAT	6
Qazaq Air	6	Others	30
Note: compiled by the authors on the basis of Air Astana's Annual Report 2017 [1]			

Kazakhstan is pursuing a liberal policy in the aviation market, which has enabled foreign airlines to expand. This policy also poses no barriers to new entrants to Kazakhstan's aviation market. In 2017,

Kazakhstan's market was served by 27 foreign airlines, including Aeroflot, Fly Dubai, Turkish Airlines and others. New entrants to the market in 2017 included Air China, Finnair, LOT, and Wizz Air.

Air Astana will launch the first low-cost airline FlyArystan in 2019.

Our goal is to investigate operating costs of some chosen airlines in order to learn their lessons and justify the basic rate for needs of dynamic pricing in the new airline.

Methods

During this research such methods of scientific knowledge as analysis and synthesis, classification, generalization and analogy are widely used.

The choice of airlines is conditioned by the following reasons:

- structural analysis of EasyJet operating expenses is of special interest, since the company shows the classic model of an international low-cost airline;
- the pricing procedure for FlyArystan tickets will mostly identical to the pricing in the first Russian low-cost airlinePobedain the Aeroflot Group due to the historical proximity of the two neighboring countries;
- the structure of the operating expenses will mostly repeat the behavior of the Air Astana as a parent company, and, therefore, a thorough reporting analysis of this national airline is also necessary;
- FlyArystan will initially carry out domestic flights, therefore, the financial statements of Qazaq Air are of interest, which provides the same regional flights.

Results

A structural analysis of the operating costs of the mentioned above airlines presented below.

EasyJet operates in the European short-haul aviation market. Fuel is one of the biggest costs that airlines face and one of the most volatile. Fuel represented 22% of EasyJet's cost base for the 2018 financial year (Table 2).

Table 2 - Headline costs in EasyJet, percent of total headline costs including fuel

Operating costs	30 September 2018	30 September 2017	Average two years
Airports and ground handling	31,00	31,58	31,27
Crew	14,17	13,90	14,05
Navigation	7,52	8,21	7,84
Maintenance	5,88	5,78	5,83
Selling and marketing	2,69	2,63	2,66
Other costs	9,34	8,00	8,72
Aircraft dry leasing	2,86	2,37	2,63
Depreciation	3,74	3,90	3,82
Amortization	0,28	0,30	0,29
Fuel	22,26	22,89	22,55
Total headline costs including fuel	100,00	100,00	100,00
Note: compiled by the authors on the basis of EasyJet's Annual Report and Accounts 2018 [2]			

Aeroflot Group has adopted a multi-brand structure that allows each subsidiary company to operate in its own market segment. It includes Russian Airlines, Rossiya, Aurora and Pobeda. Pobeda was launched as the low-cost carrier in 2014.

In 2017,scheduled flight yields decreased by 4.9% including yields on international destinations (by 7.7%) and yields on domestic destinations (by 1.1%). Yields were mainly influenced by the competitive environment in the market and the development of Pobeda airline which, being a low-cost carrier, provides air transportation with lower yields (Table 3).

Table 3 - Operating costs in Aeroflot, percent of total operating costs including fuel

Operating costs	31 December 2017	31 December 2016	Averagetwo years
Operating lease expenses	14,85	13,15	14,07
Aircraft servicing	14,55	16,48	15,44
Aircraft maintenance	7,45	7,23	7,35
Staff costs	14,28	16,67	15,37
Passenger services expenses	4,13	4,10	4,12
Administration and general expenses	3,37	3,33	3,35
Communication expenses	2,53	2,98	2,74
Food cost for in-flight catering	1,96	2,13	2,04
Sales and marketing expenses	1,86	3,24	2,49
Others	2,32	2,39	2,35
Aircraft fuel	30,73	24,78	28,00
Depreciation and amortization	2,23	2,87	2,52
Total operating costs	100,00	100,00	100,00
Note: compiled by the authors on the basis of Aeroflot Group's Annual Report 2017 [3]			

Air Astana was established in 2001 and its shareholders are JSC National Welfare Fund Samruk-Kazyna (on behalf of the Government of the Republic of Kazakhstan) and BAE Systems (Kazakhstan) Limited, which own 51% and 49% of the shares, respectively.

Table 4 - Operating costsin Air Astana, percent of total operating costs including fuel

Operating costs	31 December 2017	31 December 2016	Average two years
Handling, landing fees and route charges	14,6	15,4	15,0
Passenger service	12,3	12,0	12,1
Employee costs	10,1	11,1	10,6
Engineering and maintenance	9,8	10,4	10,1
Aircraft operating lease costs	8,7	10,0	9,3
Fuel	26,1	22,4	24,4
Selling costs	5,7	5,2	5,5
Aircraft crew costs	4,3	4,8	4,5
Depreciation and amortization	3,8	4,9	4,3
Property lease cost	0,7	0,7	0,7
Others	3,7	3,2	3,4
Total operating costs including fuel	100,0	100,0	100,0
Note: compiled by the authors on the basis of Air Astana's Annual Report 2017 [1]			

Operating expenses of Air Astana increased by 20.8% in 2017 compared to 2016. Fuel is the key operating expense for any airline. As a result, fuel price volatility has a direct and significant impact on the profitability of all airlines across the globe. The Air Astana fuel expenses grew by 40% in 2017 compared to 2016. Other significant items in the airline's operating expenses include ground handling, landing fees, navigation charges, passenger service, engineering and maintenance, employee costs, aircraft operating lease costs and aircraft crew costs. These costs increased by 13.6% in 2017 compared to 2016, largely due to the increase in both flight frequency and passenger numbers (Table 4).

In 2017 Qazaq Air's passenger flow growth exceeded 53%, which increased revenue by 54%. These results were achieved amid the fleet use optimizing with the redistribution of the route network to provide passengers with convenient flights from the cities of Astana and Atyrau to the regional airports. This year the carrier signed an agreement with Bombardier.Inc. for the acquisition of ownership of two new aircraft model - Q400 NextGen. Airline obligations grew by 66% and 95% of obligations are provided with a loan from the parent company.

Major operating expenses are represented by aircrafts operating leasing costs (34%), aviation fuel costs (13%), personnel costs (13%), engineering and maintenance services of the fleet (12%). The company's loss for 2017 decreased by 13% compared with 2016 (Table 5).

Table 5 - Operating costsin Qazaq Air, percent of total operating costs including fuel

Operating costs	31 December 2017	31 December 2016	Average two years
Aircraftsoperatingleasingcosts	34,19	65,71	50,02
Fuel	12,59	8,56	10,57
Staff costs	12,28	9,28	10,77
Engineering and maintenance	11,81	0,19	5,97
Aircraft crew costs	8,52	2,49	5,49
Ground services costs, take-off/landing charges and route charges	5,38	4,51	4,95
Passenger service	3,02	1,78	2,40
Education	1,67	0,42	1,04
Rental costs	1,54	0.96	1,25
Insurance	1,53	0,67	1,10
Information technology	1,40	1,01	1,20
Transport costs, living expenses and daily subsistence costs	1,37	1,82	1,60
Consultation, legal and professional services	1,00	0,41	0,70
Implementation costs	0,90	0,64	0,77
Depreciation and amortization	0,29	0,20	0,25
Aircraft operating licenses	0,16	0,17	0,16
Others	2,35	1,18	1,77
Total operating costs	100,00	100,00	100,00
Note: compiled by the authors on the basis of Qazaq Air's Annual Report 2017 2017 [4]			

Now we will combine all chosen four airlines in a comparative table in the context of the main similar cost items (Table 6).

Table 6 - The shares of the main items of the operating costs, percent of total operating costs including fuel

	EasyJet	Aeroflot	Air Astana	Qazaq Air
Crew	14,1	15,4	15,1	16,3
Maintenance	5,8	7,4	10,1	6,0
Passenger services	0,0	4,1	12,2	2,4
Aircraft leasing	2,6	14,1	9,3	50,0
Depreciation and amortization	4,1	2,5	4,3	0,3
Fuel	22,6	28,0	24,4	10,6
Note: compiled by the authors on the basis of data of Tables 2, 3, 4, 5				

From this comparative table, the main lessons for Kazakhstan in order to create an effective model of the first national low-cost airlineteach us that it is necessary to explore ways to reduce such costs item asthe aircraft leasing.

Discussion

The most preferred airline with the highest confidence rate is one which operates based on a low-cost model and allows passengers to choose additional services for additional charges. The passenger expectations that have the highest impact on the preference when selecting an airline are ticket prices, punctuality and booking convenience [5].

Maltsev and Matveeva noted that the steady increase in air passenger traffic and turnover is largely stimulated by the development of low-cost airlines and emphasized the reasons behind the growth in passenger traffic on domestic and international flights from Russia. They found that favorable environmental factors and the introduction of a flexible business model improved the performance indicators of air carriers [6].

Frankeargued that aside from basic cost cutting, innovation may become the decisive driver of progress, comprising advanced business models, customer segmentation, and technologies. Legacy network carriers had to take on the challenge of low-cost carriers, and regain competitiveness in short- and mid-haul business through considerable cost cutting and more flexible pricing models and are now

profitable. But airlines claim that they are still squeezed between their neighbors in the aviation value chain that leverage local monopolies (such as airports) or oligopolies (such as aircraft equipment manufacturers) [7].

Lun,Yang, Lialso indicated that uncertainties in demand in airline companies were figured out, various forms of dynamic pricing methods were used to increase revenue. The advance sale of tickets was considered as the airline tickets sale operator who held a European option, which starting at $t=t(j)$ with a payout of omega at $t=t(j+1)$, it could be exercised only at time $t=t(j+1)$. The firm had the option of selling or holding the tickets. The model produced minimally acceptable prices and inventory release quantities (number of tickets available for sale at a given price) [8].

Mang, Post and Spann empirically analyzed consumer purchase behavior for flexible products based on a large field study of a low-cost airline. At this low-cost airline, consumers can select the level of flexibility of the flexible product. Finally, they identified the drivers of purchase behavior by analyzing the impact of consumers' flexibility and search behavior and the price discount of the flexible ticket and also estimated the revenue and profit effects of flexible products [9].

Using publicly available datasets, Sibdari, Mohammadian and Pykeexplored three capacity decisions (flight frequency, aircraft size, and load factor) of seven major airlines and address their relationship with the level and fluctuations of three exogenous factors (fuel cost, total passenger demand, and unemployment rate). They found that increased passenger demand is associated with smaller aircraft and more frequent flights, while higher fuel costs are associated with larger aircraft and less frequent flights. Overall, it is indicated that airlines adjust both flight frequency and aircraft sizes to manage capacity and maintain load factors in response to fluctuations in passenger demand and fuel cost [10].

By estimating the impact of leasing on profitability from 73 airlines operating worldwide over the period 1996-2011, Bourjade, Huc and Muller-Vibes showed that the impact of leasing on an airline's operating profit is stronger for Low Cost Carriers (LCC) than for Full Cost Carriers: deviating from the optimal level of leasing might be more harmful for a LCC than for a legacy carrier [11].

Chen and Bell examined an airline as an example of perishable products that face demand uncertainty with fixed capacity and limited product options, and where customers have distinct preferences in product selection. Under some circumstances, the airline offering the flexible ticket to attract price-sensitive, flexible customers will enhance revenues. Also, they investigated the optimal number of seats to reserve from the flights for the various fare classes and the fare for the flexible ticket [12].

Based on15 airline companies, which had continuous financial data during the 2004-2015 period, Kiraciand Aydinfound that low-cost airlines generally operate based on the trade-off theory while borrowing in the short-term and based on the pecking order theory while borrowing in the long-term[13].

According to Carrier, the rapid expansion of low-cost airlines and the development of online distribution of tickets have put pressure on the pricing and revenue management strategy of network airlines and have substantially modified the airline passenger choice environment, especially in short-haul markets. Estimation results show that outbound passengers tend to prefer early morning and late afternoon flight departures that allow them to conduct their business activities either before or after their trips. In addition, a significant proportion of passengers traveling during the week tends to prefer higher-priced fully flexible fare products to cheaper nonflexible options; this preference shows the revenue potential of a multiproduct pricing strategy in markets affected by the presence of low-cost competition [14].

The increasingly dynamic nature of business-to-business electronic commerce has produced a recent shift away from fixed pricing and toward flexible pricing. Flexible pricing includes both differential pricing, in which different buyers may receive different prices based on expected valuations, and dynamic-pricing mechanisms, such as auctions, where prices and conditions are based on bids by market participants [15].

Similarly, econometric concept is based on creation of dynamic model of bank with an application of economic-mathematical modeling. In such models financial performance is analyzed in dynamics and flexed indicators [16].

In our opinion, above mentioned structural analysis of the operating costsfromthe financial statements of EasyJet, Aeroflot, Air Astana and Qazaq Air can serve as justification in order to calculatethe reasonable basic rate, which participates in the dynamic pricing formula, offered by Zagaynova and described below[17].

The airline profit is closely related to revenue, since most part of the flight costs are fixed costs, and the marginal costs, associated with the number of passengers in the cabin, are close to zero. It follows, that profit maximization entirely depends on the revenue function maximization:

$$R = \sum_{i=1}^{T} p_i q_i, \quad (1)$$

where$R$ is the company's revenue; $p_i$is ticket price for a flight on the date i; q_i is the number of seats, booked in the cabin, on the date i; T is a number of days between the first day of flight booking and the aircraft departure.

To solve the problem of the revenue maximization within a given cabin capacity limitation, it is used the Lagrange function:

$$L = \sum_{i=1}^{T} p_i q_i + \mu(Q - \sum_{i=1}^{T} q_i) \quad (2)$$

where μ is the Lagrange multiplier, Q is the total number of seats in the cabin.

Usingdifferentiation the function L by p_i and simplifying formula, it is obtained the following formula for determining the optimal price p_i:

$$q_i + (p_i - \mu)\frac{\partial q_i}{\partial p_i} = 0 \quad (3)$$

where $i \in [1;T]$[16].

In 2005 year Anjos, Cheng and Currie offered a demand function, which negatively depends on the price (in our case, ticket price/flight rate) and the interval between the dates of purchase and departure. The authors concluded, that many airlines (especially those organizations, operating under the low-cost system) use this function to determine demand [18]. In general, this function can be written as follows:

$$q_i = \mathrm{A}e^{-\alpha(p_i/\mathrm{P}_{basic})i} \quad (4)$$

where A and α are constants; p_i/P_{basic} is ticket`s mark-up/extra charge at time i compared to the base rate(P_{basic}); i is the number of days, remaining until departure (the number of days between the ticket booking date and departure date).

Substituting formula (4) into (3) it is obtained the formula of the optimal price:

$$p_i = \mu + \frac{\mathrm{P}_{basic}}{\alpha i|x-\beta|} \quad (5)$$

which indicates the relationship between the price $p_i$and the parameters μ, α,x, β, P_{basic} and i. In this case, μ is the parameter, responsible for the mark-up to the price, which increases as the seats in the cabin fill up; α is a parameter, that links the ticket`s price with the number of days, remaining before departure (the smaller parameter $\alpha$, the higher the ticket`s price).

Thus, by empirical calculation of the parameters μ, α, β the airline can determine the optimal ticket`s price at time i. The coefficients μ, α, β should be calculated empirically, based on such conditions as, for example, the intensity of bookings, the frequency of the airline's website visits, etc. (in the framework of the company's revenue maximization).

Conclusion

Summarizing, it is proposed the following pricing algorithm in a low-cost airline that contributes to the creation of an effective low-cost model:

- structure analyzing of the operating costs of several international and local airlinesand an identification of the effective cost structure of an air carriage;
- determining the basic rate due to the results and lessons of a comparative structural analysis of the operating costs;
- calculating the most acceptable flight ticket price in the dynamic pricing system using the basic rate.

Lessons of the Russian three previous low-cost air carriers require special attention. Now only Pobeda Airline is represented in the segment of domestic low-cost airlines, the previous three airlines were not

survived.According to the analytical reviews, there were a number of factors that made these airlines unable to secure a foothold in the market: high cost of the aircrafts ownership, high maintenance costs, lack of subsidies from local authorities and airports, and other factors.

To form a segment of low-cost air market in Kazakhstan, it should take into account the lessons of successful and unsuccessful projects, as well as pay close attention to pricing issues. A dynamic pricing system can provide high e-commerce benefits.All the conditions necessary for the effective use of this pricing strategy are fulfilled on the civil aviation: clients' growth, market segmentation, restriction to arbitration, etc.Therefore, the proposed above model allows to determine the optimal ticket`s price at the current time, depending on three main parameters: the number of days, left before departure; load factor of the cabin; the flight ticket purchase time by a client, and also takes into account the basic rate.

Since the beginning of 2018, Kazakhstan's airports have decided to increase rates for the airport services in connection with the airports state prices deregulation from the second half of 2017.Astana airport of Kazakhstan has increased payment for boarding-landing of the international flights by 30%, providing security by 100%, aircraft base landing by 157%, and excess parking of the aircraft by 188%. As a result, some foreign airlines (British Airways, Air Baltic, Czech Airlines and Pobeda Airline) were forced to stop their activities in Kazakhstan by economic reasons, including due to non-transparent prices and the sale of the airports fuel at the excessively high prices.

Such an increase in the operating costs may lead to the fact, that the first flight of the first Kazakhstan low-cost airline will not be realized due to the high cost of services.

ӘОЖ 657.1(075.8)

Б.Мархаева[1], Ю.Черенева[2]

[1,2] Алматы Менеджмент Университеті, Алматы, Казақстан

ҚОЛЖЕТІМДІ ӘУЕ КОМПАНИЯСЫ ОПЕРАЦИЯЛЫҚ ШЫҒЫНДАРЫНЫҢ ҚҰРЫЛЫМДЫҚ ТАЛДАУЫ: ҚАЗАҚСТАН ҮШІН САБАҚ АЛУ

Аннотация. Эйр Астана әуе компаниясы Қазақстан нарығында әуе тасымалдарының жартысынан көбірек үлесін атқарады. Біржағынан, ол 2019 жылда FlyArystan атты бірінші қолжетімді әуекомпаниясын іске қосуды жоспарлап отыр. Easyjet, Indigo, CebuPacific және AirAsia табысты тасымалдаушылар сияқты, жаңа қолжетімді әуе компаниясы классикалық «lowcost» моделі бойынша жұмыс істейді.Бірақ, басқа жақтан, күрделі климат жағдайлары, төмен жолаушылар легімен тасымалдау қашықтықтың алыстығы, сондай-ақ әуежай алымдарының жоғарылығы және халықтың сатып алу қабілетінің төмендігі Қазақстандағы бірінші лоукостердің пайда болуына жағдай тудырмайды. Бұл қайшылық халықаралық және отандық әуе компанияларының операциялық шығындарына қатысты олардың қаржылық есептілігін талдау қажеттілігін және икемді (динамикалық)баға белгілеу жағдайында әуе билетінің базалық тарифін есептеу бойынша ұсыныстар жасауды талап етті. Қаржылық есептілігі қолжетімді болған әуе компаниялары ғана зерттелді.

Түйін сөздер: қолжетімді әуе компаниясы, қаржылық есептілік, операциялық шығындар, базалық тариф, динамикалық баға белгілеу.

УДК 657.1(075.8)

Б.Мархаева[1], Ю.Черенева[2]

[1,2] Алматы Менеджмент Университет, Алматы, Казахстан

СТРУКТУРНЫЙ АНАЛИЗ ОПЕРАЦИОННЫХ РАСХОДОВ БЮДЖЕТНОЙ АВИАКОМПАНИИ: УРОКИ ДЛЯ КАЗАХСТАНА

Аннотация. Авикомпания Эйр Астана выполняет около половины всех воздушных перевозок на рынке Казахстана. С одной стороны, компания запускает первую бюджетную авиакомпанию FlyArystan в 2019 году. Бюджетная авиакомпания будет функционировать по классической лоукост-модели, следуя примеру таких успешных лоукостеров, как Easyjet, Indigo, CebuPacific и AirAsia. Однако, с другой стороны, сложные климатические условия, низкий пассажиропоток и большие расстояния, а также высокие аэропортовые сборы нарядусо снижением покупательской способности населения из-за девальвационных процессов не

способствуют появлению первого лоукостера в Казахстане. Данное противоречие вызвало необходимость анализа финансовой отчетности как международных, так и отечественных авиакомпаний в части операционных затрат и разработки рекомендаций по формированию базового тарифа на авиабилет в условиях гибкого (динамического) ценообразования. Кроме того, модель лоукостера как модель низких издержек предполагает акцент на исследовании именно этой составляющей эффективности деятельности компании. При этом использована отчетность компаний, которая имеется в открытом доступе.

Ключевые слова: бюджетная авикомпания, финансовая отчетность, операционные затраты, базовый тариф, динамическое ценообразование

Information about authors:

Markhayeva Bayanslu is a professor of Finance, Accounting and Audit Department of Almaty Management University, Almaty, Kazakhstan, doctor of economic sciences, markhaeva@mail.ru, https://orcid.org/0000-0002-7354-7125;

Cherenyova Yulia is an undergraduate student of Almaty Management University, Almaty, Kazakhstan, julia_chereneva@mail.ru, https://orcid.org/0000-0001-7971-5284

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