PROBLEMS PREVENTING AIR COMPANIES FROM EFFICIENT INVESTMENT ACTIVITIES

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Abstract. The article deals with the problems of investment development of air companies. The author examines the aspects of modelling of investment solutions under conditions of developing aviation business, giving methods of modelling of demand, including those based on dynamics of macroeconomic indicators. The article contains the problems relating to assessment of macroeconomic risks, using models of assessment of discount rates. Variants of assessment of currency risks in the process of evaluation of efficiency of international investment solutions are analyzed as well. This article also deals with some problems relating to project financing. The aspect on necessity to take into account correlation between man's potentiality and equipment capacity in the process of development of investment activities of air companies is discussed as well.

Keywords: investment activity, risk, modelling, discounting, conversion, financing, possibilities, efficiency.

1. Introduction

Development of air companies is closely connected with the processes of transformation so typical for the world economy nowadays. Air companies promote development of the globalization processes of the world economy. Their progress and functioning create conditions for a more efficient internationalization of economic life and international differentiation of labour.

Air companies are to some extent an image of countries of the universal community. Their development certifies of potential of the country, possibilities of its qualitative progress, stability of macroeconomic system. At the same time, the complex of risks, macroeconomic risks being the most serious ones, influences development of air companies. The problems

of revealing, systematization and assessment of macroeconomic risks relating to functioning of air companies become the issue of the day. This article contains analysis of separate aspects of the said problem.

Financing of investment activities of air companies, especially in the situation of existence of considerable risk factors, requires consolidated efforts of the state governments, financial intermediaries and their associations as well as air companies themselves. At the same time, investment activity should be expedient, based on the state and capacities of a man in whose favour it is carried out, in fact.

2. Forecasts of economic development of air business

The most preferable form of development of companies nowadays is their qualitative dynamics. The latter is finally revealed as a growing ability of companies to offer services needed by the society, most rationally and efficiently using all kinds of resources, including finances.

Investment activity is a pre-condition for qualitative dynamics of companies. At the same time, investment activity should be first, expedient, second, efficient. Taking into account current problems of global aviation, air company's investments should facilitate implementation of the below aspects:
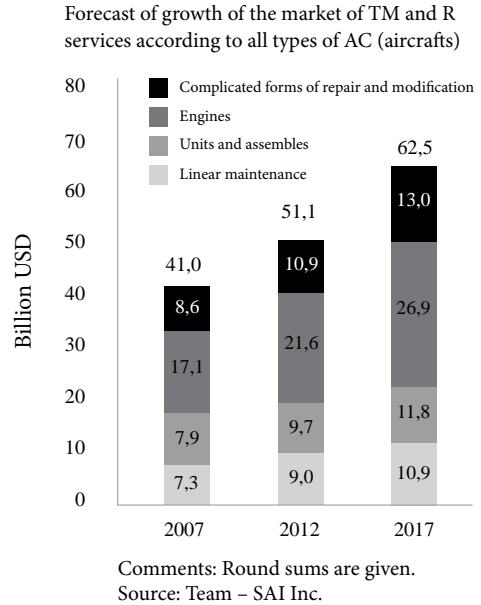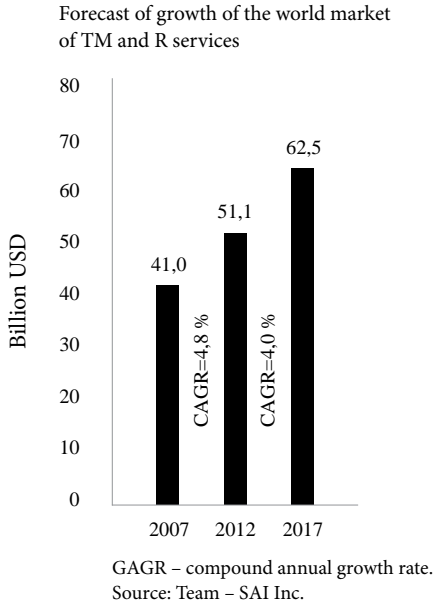
- to raise efficiency of using air companies' assets;
- to reach higher level of effectiveness of used resources, first of all, aviation fuel;
- to settle the problems relating to ecologic aspects of aviation business;
- to lessen the problems relating to cyclical changes in activities of air companies;
- to solve the problems relating to systems "man-machine", "man-man" due to stricter requirements to the "human factor";
- to ensure compliance of all aspects of activities of air companies with the international standards and requirements relating thereto.

Results of activities of air companies are constantly growing. IATA expects an increase in passenger traffic flow worldwide from 2,1 billion passengers in 2006 to 2,6 billion in 2010, noting that within 20 years park capacities will be doubled (Fiorino 2008).

Specialists in the sphere of freight services note that development of business activity in the world economy leads to higher demand for air carriages, reaching the new level. Indicators of intensity of freight traffic are in direct ratio to the indicators of gross domestic product (GDP), currently increasing by 6 % per annum. According to Boeing and Airbus estimations, such indicator will grow in a longer term.

At the same time, it is stated that sea and road transport competitors become more and more severe, since they work up some market share, offering more attractive price policy (Ott 2007).

The world market of technical maintenance and repair services grows intensively. According to expert's opinion, such market turnover will reach 51,1 billion USD in 2012 and 62,5 billion USD in 2017. Total profit of companies functioning in the market of repair and maintenance services was not less than 2,5 billion USD in 2007. Company Team-SAI Inc. expects the tendency of increase in profit of companies in the aforesaid market within next 10 years.

Forecast of growth of the world market of TM and R services

GAGR – compound annual growth rate.
Source: Team – SAI Inc.

Forecast of growth of the market of TM and R services according to all types of AC (aircrafts)

Comments: Round sums are given.
Source: Team – SAI Inc.

Forecast of growth of the market of TM and R according to all types of aircrafts and dynamics of growth of the world park of aircrafts according to categories are given on Figure 1 (Philips 2007).

Increased tempo of business activities in any sphere is traditionally related to the growing investment activities in the same sphere. Air companies are not an exception. International aspect of activities of companies always requires special attention. Therefore, improvement of assessment of investment activities of companies is the matter of current importance.

3. Modelling of demand

Efficiency of investment projects should be assessed on a qualitative information basis. The primary aspect for an air company is provision of services. In fact, the matter in question is modelling of demand under the
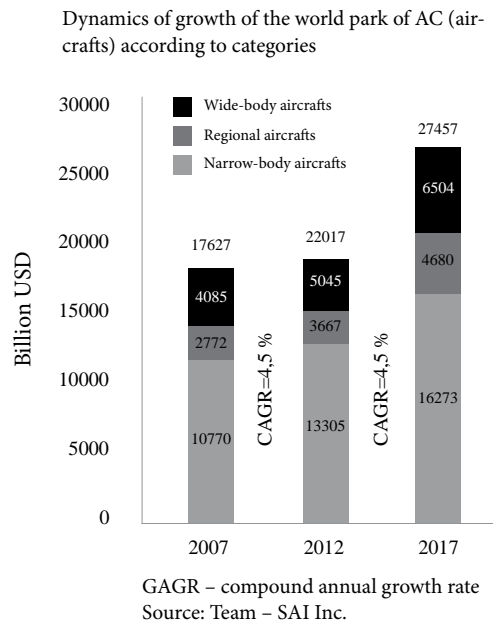
Dynamics of growth of the world park of AC (aircrafts) according to categories

GAGR – compound annual growth rate
Source: Team – SAI Inc.

Fig. 1. Forecast of the market of TM and RS growth

Table 1. Stated demand for civil aircraft

Type of AC	2008		2009		2010		2011		2012		Total	
	Domestic order	Export	Domestic order	Export	Domestic order	Export	Domestic order	Export	Domestic order	Export	Domestic order	Export
IL-96	1	3	0	4	3	5	3	4	2	2	9	18
TU-204	11	5	30	6	34	6	28	3	22	4	125	24
TU-334	21	0	21	0	25	8	24	14	23	5	114	27
AN-148	9	4	22	15	26	16	14	21	12	10	83	66
Superjet-100	6	0	30	0	76	14	34	59	0	70	146	143
Total	48	12	103	25	164	49	103	101	59	91	477	278

Table 2. Forecast of demand of Russian air companies and foreign customers in aircraft produced in Russia in 2008–2012

Type of AC	Basic order according to groups of probability of signing firm contract					Corrected forecast of demand according to years, taking into account probability of contracts					
	Group 1	Group 2	Group 3	Group 4	Total	2008	2009	2010	2011	2012	Total
IL-96	8	6	13	0	27	3	3	5	4	5	20
TU-204	25	58	49	21	153	12	23	25	23	18	101
TU-334	5	6	66	64	141	8	8	8	15	12	51
AN-148	22	12	63	52	149	8	16	24	17	10	75
Superjet-100	139	83	47	20	289	6	30	43	61	65	205
Total	199	165	238	157	759	37	80	105	120	110	452

circumstances of uncertainty of functioning the market, with methods of modelling being of variable nature. One of them is formation of strategic investment programs on the basis of comparison of subjective "opinion" of customers and contract orders.

Please find below an example of modelling of the "product line" of civil aircrafts for 2008–2012 developed by the United Aircraft Corporation in Russia (Piadushkin 2007).

To define domestic demand for the new airliners, UAC conducted negotiations with 32 Russian air carriers. According to the UAC, the results of questioning can be considered to be representative, since the companies, participated in the negotiations, are providers of 90 % of services offered by the civil aviation of Russia.

The participants were offered to define their needs in the aircraft produced or developed by the industry of Russia and ready for shipment within 2008–2012. The following payment provisions were offered: payment on installment contract basis within 15 years with prepayment equal to 5 % of the aircraft value; an efficient monthly lease rate is 0,85–0,90 % of the aircraft value.

In addition to assessment of domestic demand, the United Aircraft Corporation gathered information on export orders, both contract-based and planned for the same period, by leasing company *Ilyushin Finance Co* and directly by manufacturers and developers.

Orders were classified according to 4 groups on the basis of probability of signing firm contracts. All orders were relevantly corrected through the reduction factors resulting in the forecast of demand for Russian aircraft reduced from 755 to 452 machines.

In such case, we do not comment results of questioning. The method allowing to refer desires of air companies to the real level of orders for aviation equipment is of interest.

4. Macroeconomic indicators as model variables

Mathematical models allowing to assess efficiency of investment solutions of air companies contain a number of macroeconomic indicators as variables. For example, gross domestic product is a model variable used in world practice, when planning volumes of air carriages (Kostromina 2007).

Form of the basic model:

$$Y = a * X^b * Z^c,$$ (1)

where:

Y – passenger-kilometers performed (PKP);

X – gross domestic product in real terms (GDP);

Z – income from passenger traffic per passenger-kilometer in real terms (PYIELD);

a – constant factor got through the method of statistical appraisal;

b, c – factors of price elasticity of demand with regard to relevant GDP and PYIELD.

Using logarithm instruments:

$$\ln Y = a + b * \ln X + c * \ln Z.$$ (2)

Air companies planning their results normally use the following model:

$$\ln PKP = 1.14 + 2.11 * \ln GDP - 0.62 * \ln PYIELD .\tag{3}$$

Company Boeing uses the following models:

$$\ln PKP = 3.21 + 1.88 * \ln GDP .\tag{4}$$

After volumes of air carriages are planned for the country in general, air company's share in such carriages is defined on the basis of assessment of micro and mesoeconomic indicators.

Thus, risk of dynamics of business activity in macro system is taken into account when assessing efficiency of projects at the stage of forecasting of air company volume the work.

To assess the efficiency of international investment projects, proper assessment of inflation and currency risks is required practically in all cases.

The time factor is traditionally included in estimations through the mechanism of discounting. In particular, within the framework of use of Net Present Value method, being one of standard methods for assessment of investments efficiency, we should do the following. Investment expenditures should be compared with the total amount of corrected future cash receipts, generated by the same within the planned period. With the desired discount rate (factor fixed independently by the analyst on the basis of desired or possible annual interest on the capital invested by him), it is possible to define the present value of all cash outflows and inflows within economic life of the project as well as to compare the same. The result of such comparison will be a positive or a negative value (net present value), showing whether the assumed discount rate satisfies or not (Shapkin 2004).

Thus, within the framework of a given variant, discount rate is defined by the analyst independently on the basis of own preferences.

According to economic literature, discount rate is defined as maximum returns in alternative forms of capital investments. Our practice shows that method of selection of discount rate on the basis of the aforesaid provisions is most often preferred by entrepreneurs. In such case, they are attracted by the fact that there is no need to use indicators of meso-, macro- and mega-economic dynamics for assessments.

However, there are also other recommendations on how to assess risk factors and inflation for entrepreneurial activities. In particular, we can do the same through assessment of corrected discount factor (Fathutdinov 1998):

$$K_d = 1 + d_i = \frac{1 + \dfrac{r}{100}}{1 + \dfrac{i}{100}} ,\tag{5}$$

where

d_i – discount rate;

r – refinance rate set by the Central Bank of the country, %;

i – inflation tempo for relevant year as stated by the Government of the country, %.

However, when using the said formula, we face some paradox. Discount factor will be more than 1 in case when $r > i$. In this context, the known thesis than todays monetary unit is more expensive than tomorrow monetary unit proves to be true. However, if $r < i$, then $K_d < 1$, and in such case tomorrow monetary unit becomes more expensive that todays monetary

unit. With regard to discounted values, it turns out that the present value of generated cash flow is higher than its future value. This brings the question on appropriateness of using the formula or incorrect interpretation thereof.

At the same time, we consider that it would be appropriate to assess discount rate on the basis of certain combination of inflation tempo and refinance rate. Taking into account such variables in the discount rate, an entrepreneur actually takes into account the state of currency circulation in the country, where relevant project is implemented and returns on the government securities in such country.

It should be noted that some authors suggest that discount rate should be assessed taking into account activity risk level (Fathutdinov 1998). In such case, it is suggested that analyst should take into account a correction factor (p), which level varies depending on goal of relevant project. In such case:

$$d = d_i + \frac{P}{100},\qquad(6)$$

where

P – correction factor to take into account activity risk.

Thus, in fact we come to the idea of necessity to use cumulative method of assessing of discount rate, taking into account risk factor. Such method is widely used in developed economic systems, notably when implementing venture projects.

Specialists in such sphere consider that the problem of assessing the inflation risk recedes into the background in well-developed countries with low inflation tempo. The main problems in less developed countries are as follows:

- to define inflation risk premium;
- market risk premium;
- impact of quotations in the stock market on capital value;
- impact of relation between own capital and borrowed capital;
- possibility to rely on published factors;
- to correctly define risk-free rate;
- to calculate capital value in real and nominal terms (Rosh 2008).

Anyway, it should be taken into account that the farther we look into the future, the higher is the project risk. However, more complicated assessment methods do not necessarily raise efficiency of business appraisal.

Analysis of cash flow models is a task akin to scientific research. Dynamic models of such kind is a complicated object of analysis. They admit experimenting and "playing" various situations. They are a tool in the analyst's hands which use requires systematic (scientific) approach, knowledge and skills (Sholomitsky 2005).

5. Assessment of currency risk in the process of investment

Companies involved in the process of international investment use, as a rule, various currencies. This brings up a question, when and how to take into account the process of currency

exchange. According to the international practice, there are minimum two methods of how to take into account currency exchange in the process of assessing net present value of the project (Braly, Mayers 1997).

Let's examine such methods by the example of implementation of investment project of Latvian company in the territory of Russia, within which framework translation of currency: lat and rouble has taken place.

First method:

1st phase. We assess future value of generated cash flow in roubles.

2nd phase. We convert future value of generated cash flow into lats (according to expected exchange rate).

3rd phase. We calculate the discounted value (using lat discount rate).

Second method:

1st phase. We assess future value of generated cash flow in roubles.

2nd phase. We calculate the discounted value (using rouble discount rate).

3rd phase. We convert the discounted value into lats (using current exchange rate).

The theory again offers to an expert some variants – two methods consisting of similar number of phases and different in sequence thereof.

An expert faces a dilemma – how to act? What to do first: conversion or discounting? In fact, this question sounds this way: what should be assessed first: inflation or currency risk? Theory does not give unambiguous answer to such question. It is clear that an expert can assess net present value of the project using two methods and according to variation level can judge on the level of insurance risk, on the fact to which extent rate of currencies used in the project reflects real economic situation in relevant countries.

In most cases, an entrepreneur prefers the second method so as not to work with forecasted exchange rates.

Economic theory contains the research of various concepts, on which basis it is possible to forecast currency rates. They comprise:

- Theory of Purchasing Power Parity – PPP;
- Theory of Interest Rate Parity – IPR;
- Fisher Effect;
- International Fisher Effect;
- Theory of Unbiased Forward Rate.

The aforesaid concepts are used to reveal interrelation between main indicators of the international currency market and on such a base to find most optimal ways for capital investments.

Under present conditions, Theory of Unbiased Forward Rate, according to which nobody will give more precise forecast relating to exchange rate than the exchange market itself, is supported by more and more experts. Thus, forward rate converted by banks or future rate – by currency exchange is the best forecast on expected exchange rate (Pivovarov 2005).

Specialists in the sphere of practical currency management note that international investment solutions of companies should not depend on opinion of managers of such companies on how correctly currency value is defined by the market. Owners and managers of companies

should not be governed by their own forecasts on exchange rate; they should substantiate their investment solutions by agreed forecasts of international currency markets (Braly, Mayers 1997). It is practically always stressed that to implement international investment project, qualitative, efficient currency management is required.

Thus, both theory and practice admit the fact that forecasted currency rates often differ from those proven by real practice further on. There are various methods to forecast dynamics of exchange rates in modern theory: fundamental analysis, technical analysis, contingent valuation method, etc. Combination of such methods is often used. However, to define future exchange rate is the most complicated task requiring much efforts. Scientific researches of many scientists are devoted to such aspect (Pivovarov 2005).

6. Project financing

The world practice shows that air projects are financed with active participation of the state government. Air companies need the state support to purchase aircraft, to develop overland infrastructure, to form their staff, etc. Lacking the same, they have to assume considerable liabilities, paying high lease payments. Such situation results in enlarged expenses and worsened competitiveness of air companies. Due to insufficient resources, "old" aircraft are replaced by the same "old" models with more economical indicators what does not ensure safe flights and development of air business. Modernization of aircraft (for example, installation of new
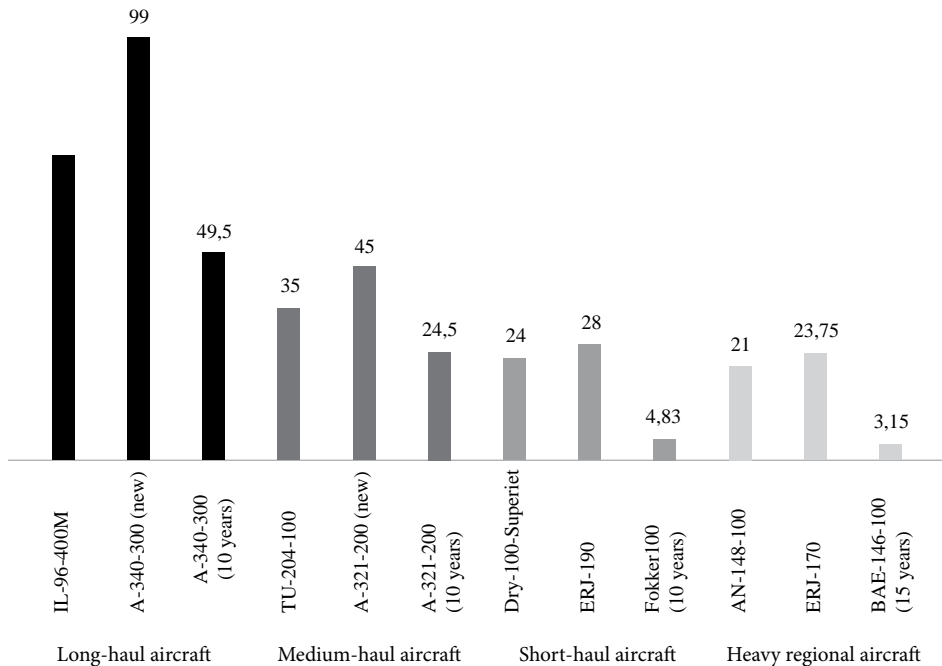

Fig. 2. Cost of Aircraft in the World Market, millions USD (Aralov 2007)

Existing structure of air lease-financing   *Offered structure of air lease-financing*
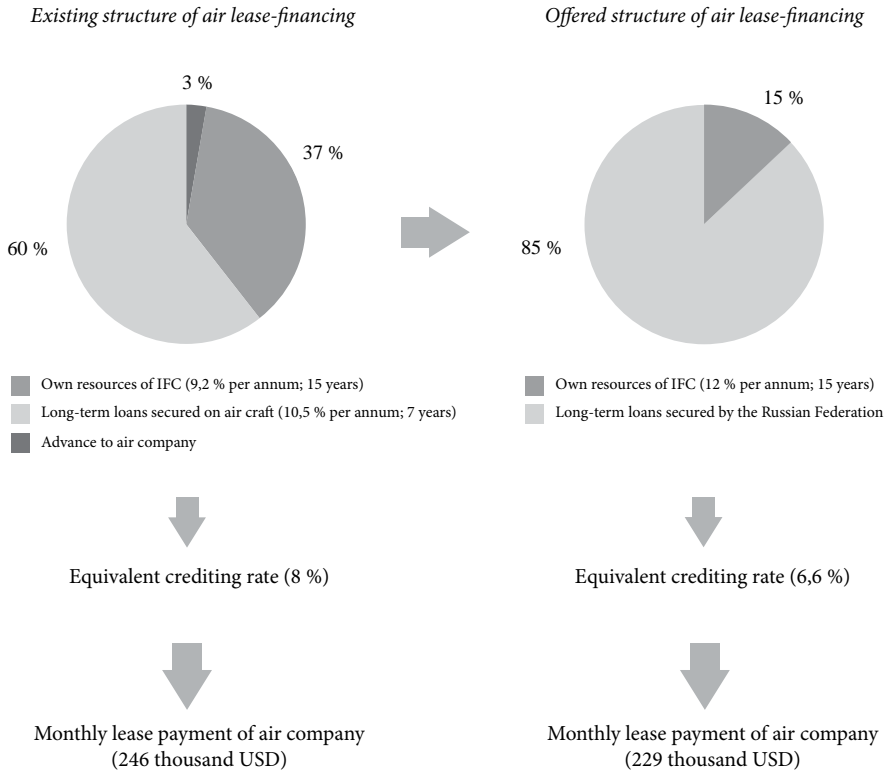

Fig. 3. Events to reduce cost of financing aircraft (Estimate for aircraft TY-204 of value 25 million USD net of VAT)(Aralov 2007)

engines) is a partial problem solution, at the same time requiring serious investments. Banks are not always ready to cooperate with air companies due to specifics of air business.

Optimization of lease payments is a serious problem of air companies. Economic literature contains methods of assessment of leasing efficiency for both borrower and lender. Efficiency of lease payments payable by air companies is modelled using various economic and mathematical models. Variables of such models include macroeconomic indicators. Such models have the same drawbacks we have written above.

Leasing companies are involved in optimization of lease payments as well. For example, Russian leasing company Iliushin Finance Co (IFC) offered the scheme for reduced costs of aircraft supply, attracting long-term loans secured by the Government of the RF. Such scheme is necessary to reduce annual interest rate on loans, which air companies can presently obtain from the bank maximum for 7 years with 10,5 % annual interest rate. Implementation of the scheme results in reduction of equivalent crediting rate by one third, reaching 6,6 %, which more or less complies with the worldwide norms (Aralov 2007).

Permanent search of new forms of project financing is typical for the present-day air business. So, European companies prefer state financing programs, involving European credit agencies. The system of European credit agencies is a form of security that the state government interested in export of its products provides to banks to enter into this or that transaction. For example, Airbus cooperates with three European agencies: Coface (France), Euler Hermes (Germany) and ECGD (Great Britain). Such scheme makes it possible for air companies to obtain long-term financing (to 12 years) equal to up to 85 % of the aircraft cost. 13 % of 434 aircrafts Airbus supplied to customers in 2006 were purchased through European credit agencies. Other forms of transaction financing included: own or borrowed resources (50 %), leasing schemes (25 %), redemption leasing (13 %) (Nedbaylo 2007).

One of the efficient instruments for attraction of resources for development of the company is approaching the financial market – placing shares on the stock exchange. Effect of such activity is defined by the image of the company in financial circles – its investment image. It is a result of long-time efforts aimed at creation of investment history in the eyes of investment society. Investment image of the company depends on the image of the country. It is negatively influenced by such moments as uncertain attitude of the government towards private air companies; contradictory tendencies in the industry relating to liberalization / centralization; inadequate currency potential of the state, etc. (Manakov 2007). Level of macroeconomic risks in such situation defines possibilities of fund financing of air companies.

7. Man – equipment: interaction problems

Technical and technological growth reached in the process of investment activities is certainly needed. At the same time, a serious question arises: which is the correlation between equipment capacities and man's potentiality? Such problem is topical nowadays. There is a basis to state that in the course of technical development it will become more and more severe. Professionals ask a question: aren't we on the phase when technical and technological opportunities start contradicting man's capacities? The world aviation community invests considerable financial resources into researches in the sphere relating to the "human factor": the problem cannot be considered to be solved, since the reason for each three out of four aircraft accidents is mistakes or violations made by the crew members, with namely crew members among all aviation professionals being most interested in successful flight (Vasilyev 2007).

In 2007, specialists actively discussed the position of China in the aspect of control over economic growth of air companies. Volume of air carriages in China for the first 6 months of 2007 increased by almost 19,5 %; according to the forecasts, 4000 aircrafts will be operated in the country by 2020 as against 1039 aircraft operated nowadays. Peculiarity of the Chinese approach to the aspect of economic development is that in 2007 the Ministry of CA of China imposed restrictions on tempo of economic growth and defined the safety level as a constant, making other requirements even stricter – for example, training of flight personnel (Fiorino 2008).

Anyway, flight safety should be a priority task of innovative solutions of air companies. Investment projects can be considered to be expedient, when they at least do not worsen the existing conditions of a man's life, including in the sphere of aviation practice. In this

connection, modern investment projects should defend a man and improve conditions of his life. Any man has right to make a mistake, but the system of air carriages should be developed so that a man would be unable to exercise such right (Kozlov 2007).

8. Conclusions

The problem of investment development of air companies can be classified as the most topical nowadays. Relevant risks relating to business processes should be taken into account when developing investment solutions. The more we assess risks, the lesser level of profitability of the project we have at the stage of relevant assessments. However, finally business structures are ready to deal with risky situations in practice and do not lose their stability in extreme circumstances.

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AVIAKOMPANIJŲ INVESTICINĖS VEIKLOS EFEKTYVUMO PROBLEMŲ PREVENCIJA

I. Arljukova

Santrauka

Straipsnyje nagrinėjamos aviakompanijų investicijų plėtros problemos. Autorė tyrinėja investicinių sprendimų modeliavimo aspektus aviacijos verslo plėtros sąlygomis. Pateikiami paklausos modeliavimo metodai, tarp kurių yra nagrinėjančių makroekonomikos rodiklių dinamiką. Straipsnyje aptariamos makroekonominės rizikos įvertinimo problemos taikant modelius, įvertinančius diskonto normą. Taip pat nagrinėjami valiutos rizikos variantai tarptautinių investicinių sprendimų efektyvumo įvertinimo proceso kontekste. Šiame straipsnyje taip pat gvildenamos kai kurios projekto finansavimo problemos. Diskutuojama, ar aviakompanijų investicijų plėtros procese būtina įvertinti tarpusavio ryšį tarp apsirūpinimo žmogiškaisiais ištekliais ir įranginiais.

Reikšminiai žodžiai: investavimas, rizika, modeliavimas, diskontavimas, konversija, finansavimas, galimybės, efektyvumas.

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