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PROPOSAL OF THE FUNCTIONAL SYSTEM FOR THE AIRLINE COMPANIES FINANCIAL SITUATION ASSESSMENT

This paper presents the draft methodology to be applied for evaluating the financial health of airlines. In the introductory part, specific attributes, regarding the individual types of airlines, are described. Subsequent parts of the manuscript outline advantages and disadvantages to measure airlines performance when implementing financial indicators, as well as a general procedure to evaluate the financial situation of a company operating in the aviation industry. The most important part of the paper includes the proposal of the specific functional system to evaluate the economic performance of airlines. Financial evaluation itself (evaluation of financial indicators of the enterprise's economic performance) is performed through a particular case study when comparing several existing airlines.

Keywords: financial assessment, airlines, financial analysis, financial situation, economic performance

1. Introduction

Airline companies face many different challenges, some of which may affect their performance and others that might result in their closure [1]. Worldwide public and private agencies take action to improve air transportation operations. Those changes seek to address challenges posed by increasing air traffic, increasing diversity of air traffic, aging infrastructure and ongoing efforts to make air transportation safer and more efficient [2]. In recent years, the European aviation sector has gone through a drastic change on both the supply and the demand side [3]. In contrast to many other industries, the driving forces governing those changes do not depend mainly on technological factors, but on developments in the legal, institutional and cultural domains of the aviation market [3]. Numerous studies have shown that air transportation makes a significant contribution to a country's economic and social development and represents an important engine of economic growth for nations [4]. Airlines core activities include:
- Air passenger transport,
  - regular,
  - charter,
- Air transport of freight, mail, consignments.

Regular air passenger transport –t refers to scheduled transportation of passengers. Free seats are publicly offered on websites or in air carriers´ branches. Operators of such flights operate a network of lines depending on the market size and the operator´s financial strength.

Charter air passenger transport – refers to unscheduled, irregular air transport services of passengers. Air carriers operate air transport at request. Mostly these are "holiday" flights or flights offered by travel agencies acting as customers. Flight price is then established based on the agreement between the air carrier and the travel agency (customer).

Air transportation of freight, mail, consignment – air carriers specializing in freight transport mostly operate long-distance flights. They are typically subsidiaries of passenger carriers. Consignment transportation is ensured by mail carriers, who operate connecting flights collecting or dispatching consignments from / to hubs (major nodes – airports) and then transporting them to final destinations.

A business is said to have significant market power when it can profitably raise and maintain process above the level that would prevail in a competitive market [5]. The assessment of market power is therefore an assessment of consumers to changes in price or quality [5]. For the cost-efficient operation of airlines and efficient functioning of airlines and efficient operation of all the main and additional services, continuous performance measurement is necessary.

Measuring airline performance using financial indicators helps the company to act in accordance with its financial capabilities and tackle the problems identified by means of such metrics. It can be the first indicators of defects and deficiencies in operation or other corporate functions.

2. Advantages and disadvantages of measuring airline performance using financial indicators

Systems of measuring company's performance, based on exact financial indicators, retain the features of basic financial analysis indicators including the deficiencies [6]. Their major drawbacks are their orientation to the past and past phenomena, their simplicity and the related inability of a complete description of a company in its complexity and their necessary interpretation, which is always dependent on the evaluator and is therefore subjective [7].

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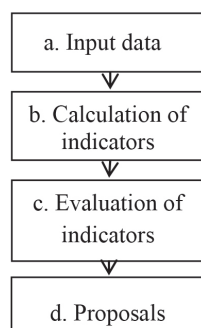 E-mail: stopka@mail.vstecb.cz

Figure 1 Process of airline financial evaluation

Figure 2 Proposed airlines financial evaluation procedure

On the other hand, it should be noted that using the financial indicators brings several advantages. The most important ones include easy data collection and their processing [8], as well as the possibility to compare the indicators of one or more companies over time, which reflects the fact that the structure of such indicators is based on accounting standards.

3. Data and methods

The fundamental method of assessing the airline economic performance is to carry out financial analysis (see Figure 1) [9]. It also shows the performance of the company in the past as well as the strengths and weaknesses of the company´s economic performance.

Moreover, it evaluates the expected development in the future and analyzes the consequences of individual optimizing measures, choosing the most suitable one. Airline performance is closely related to the financial soundness of the company [10].

The basic input data necessary for evaluating the airline economic performance include [10-11]:
- Number of employees
- Number of passengers transported
- Assets
- Current assets
- Fixed assets
- Stock (less relevant in the case of airlines)
- Liabilities
- Current liabilities
- Borrowed capital
- Long-term liabilities
- Equity
- Sales
- Profit
- Personnel costs.
  Calculating indicators of financial analysis includes [12-13]:
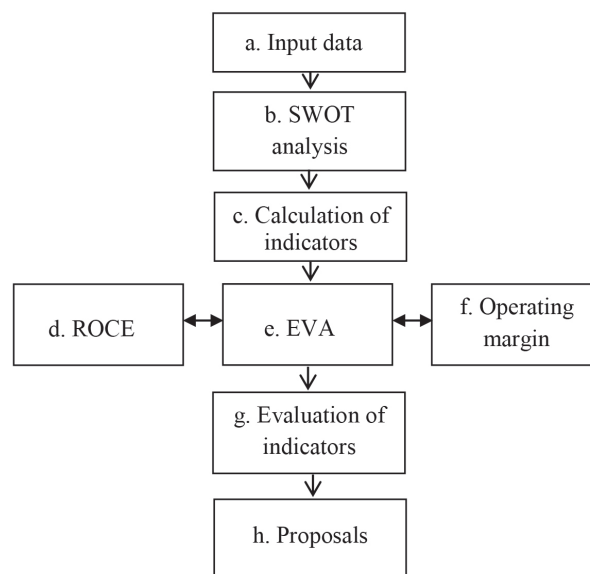- Liquidity indicators
- Activity indicators
- Productivity indicators
- Profitability indicators.

4. Results and discussion

The main task of an airlines economic evaluation system is to gain the maximum relevant information from the statements and other available information resources, to analyse and assess the financial soundness of the companies and to prepare the groundwork for necessary management decisions within the recommended optimization measures. In the process of financial analysis, the above-mentioned procedure (see Figure 1) must be followed. A modified procedure (see Figure 2) of airlines financial evaluation, as well as the proposed indicators, will be described in the following parts of the paper.

4.1 The SWOT analysis of airline financial health

The SWOT analysis [14-15] suggests external and internal elements, opportunities and threats that might influence the functional airline financial evaluation system (see an example of SWOT analysis below).

Strengths:
- High competitiveness of the company
- Using experience with the existing evaluation systems
- Complex services offer
- Cost minimization
- High profitability;
  Weaknesses:
- Untested system
- Ambiguous system identification
- Problematic promotion
- No history
- Service prices higher than those offered by competitors;
  Opportunities:
- Wide targeting
- New markets

- Business clientele
- Promotion through less used communication channels
- Individual approach to customers;
  Threats:
- Rejection from customers
- Competition
- Similar companies entering the market
- Low return on investment
- Zero reaction to promotion.

4.2 Calculation of airlines financial analysis indicators

For more detailed financial performance evaluation of airlines, other financial analysis indicators should be completed [13]. Changes proposal, in the context of financial analysis, consists primarily in of calculating the indicators of [16]:
- liquidity
- activity
- productivity
- profitability – return on capital employed (ROCE)
- economic value added (EVA),
- operating margin.

a) Liquidity indicator (Quick Asset Ratio)

Quick Asset ratio (see Equation (1)) is calculated as a proportion of current liabilities in current assets, while the stock is not included in the calculation (for aviation industry companies, stock is of minimum importance). It is an indicator essential for maintaining the operation of the company and indicator which is often not readily converted into cash. In the case of companies offering services, quick asset ratio is almost equal to current asset ratio. The recommended current asset ratio value is in the range between 1 and 1.5 [8].

$$Quick\ Asset\ Ratio = \frac{Current\ assets - stock}{current\ liabilities}\ [-]. \qquad (1)$$

b) Activity indicator (Return on total assets)

Return on total assets, or the number of assets turns (see Equation (2)) is the most complex indicator in this group. The indicator, also referred to as productivity of the capital invested, measures the efficient use of all the assets of a company. It indicates the appreciation of fixed and current assets in airline activities regardless of financial resources to cover such assets [13].

$$Return\ on\ total\ assets = \frac{total\ sales}{total\ assets}\ [-]. \qquad (2)$$

c) Productivity indicator

Labour productivity (also referred to as effective using of resources) expresses the relation between the economic benefits (economic outputs) and the resources invested (inputs) (see Equation (3)) [7].

$$Labor\ productivity = \frac{total\ annual\ sales}{H}\ [\text{€/h}], \qquad (3)$$

where: H – number of hours worked by all the employees per year [h/year].

d) Profitability indicator – Return on Capital Employed (ROCE)

This financial analysis indicator (see Equation (4)) [16]. Return on capital employed indicates how much the company obtained from 1 € invested by shareholders.

Capital employed is the total amount of capital that a company has utilized in order to generate profits. It is the sum of shareholders' equity and debt liabilities. In addition, it can be simplified as total assets minus current liabilities [13].

$$ROCE = \frac{EBIT}{Capital\ emloyed}\ [-], \qquad (4)$$

where: EBIT - Earnings before Interest and Taxes [€].

e) Economic value added (EVA)

The EVA is a measure of company's performance created in order to motivate managers to focus on the company's value growth. The economic value-added model is based on the economic profit, which cannot be confused with accounting profit. Economic profit refers to the yields surplus after paying for the services of production factors, including both equity and borrowed capital [12].

The EVA thus measures the value created by a company by means of its business activities in comparison to another (the second best) investment opportunity with the same business risk. If the EVA values are positive (see Equation (5)) [13, 17], that indicates that the company creates the value for its owners; if the EVA values are negative, the value for the owners is being destroyed.

$$EVA_{rel.} = \frac{EVA}{personal\ \cos ts + WACC * NOA} =$$
$$= \frac{EBIT * (1 - t) - C * WACC}{personal\ \cos ts + \left(R_d * (1 - t) * \frac{D}{C} + R_e * \frac{E}{C} \right) * NOA}, \qquad (5)$$

where:
EVA$_{rel.}$ – EVA indicator (relative value) [-];
WACC – Weighted Average Cost of Capital [€];
NOA – Net Operating Assets [€];
t – corporate tax rate [-];
R$_d$ – cost of debt [€];
D – Debts (market value of the firm's debt) [€];
R$_e$ – cost of equity [€];
E – Equity (market value of the firm's equity) [€];
C – invested capital – capital tied up in assets intended for operation activities (equity and debts) [€].

f) Operating margin

Operating margin describes the ratio measuring the pricing strategy and operational efficiency of the company in question (see Equation (6)) [13]. Operating margin describes the sales share in the company after all the variable costs of services provided (e.g. wages, fuel, energy, repairs and maintenance of airplanes, outsourcing, etc.) are covered. A good operating margin is essential for the company to cover variable costs, such as interest on loans [8].

$$Operating\ mar\ gin = \frac{operating\ profit}{Total\ sales}\ [-], \qquad (6)$$

Table 1 Criteria values for individual solution options (in 2017)

Criterion (C_i)/airline company (A_i)		A_1	A_2	A_3	A_4
C_1	Quick Asset Ratio [-]	1.16	0.72	0.53	0.86
C_2	Return on total assets [-]	1.92	0.40	2.37	0.90
C_3	Labour productivity per hour [€/h]	181.25	0.07	0.69	12.11
C_4	Return on capital employed [-]	0.59	0.14	0.21	0.43
C_5	$EVA_{rel.}$ [-]	1.03	-6.53	-2.27	3.74
C_6	Operating margin [-]	5.82	4.87	3.69	6.04

Table 2 Determining the weighing of criteria (criteria paired comparison)

	C_1	C_2	C_3	C_4	C_5	C_6	Coefficient + 1	Sum	Weight
C_1	-	1	0	0	0	0	1	2	0.10
C_2	0	-	0	0	0	0	1	1	0.05
C_3	1	1	-	0	0	1	1	4	0.20
C_4	1	1	1	-	0	1	1	5	0.25
C_5	1	1	1	1	-	1	1	6	0.30
C_6	0	1	0	0	0	-	1	2	0.10
Σ	-	-	-	-	-	-	-	20	1

Table 3 Paired comparison of individual alternatives for all criteria

	A_1	A_2	A_3	A_4
C_1	0.40	0.20	0.10	0.30
C_2	0.30	0.10	0.40	0.20
C_3	0.40	0.10	0.20	0.30
C_4	0.40	0.10	0.20	0.30
C_5	0.30	0.10	0.20	0.40
C_6	0.30	0.20	0.10	0.40

Table 4 Decision matrix and determining alternatives for airlines

	Weighing of criteria	Alpha – A_1	Beta – A_2	Gamma – A_3	Delta – A_4	Σ
C_1	0.10	0.40	0.20	0.10	0.30	-
C_2	0.05	0.30	0.10	0.40	0.20	-
C_3	0.20	0.40	0.10	0.20	0.30	-
C_4	0.25	0.40	0.10	0.20	0.30	-
C_5	0.30	0.30	0.10	0.20	0.40	-
C_6	0.10	0.30	0.20	0.10	0.40	-
Weighted sum	-	0.30	0.20	0.10	0.40	1
Order of alternatives	-	2	3	4	1	-

4.3 Evaluation of airlines financial performance indicators – a case study

As a model example of financial situation final evaluation, the following maximization criteria (see Table 1), based on the recommended financial analysis ratios in the context of creating the particular functional system of airlines economic evaluation, are used:
- Quick Asset Ratio – C_1 [-],
- Return on Total Assets – C_2 [-],
- Labour productivity per hour – C_3 [€/h],
- Return on Capital Employed (ROCE) – C_4 [-],

- Relative Economic Value Added ($EVA_{rel.}$) – C_5 [-],
- Operating margin – C_6 [-].

For the purpose of evaluating the individual alternatives of financial performance solutions, four fictitious airlines and their values for the given criteria (Table 1) were chosen:
- Airline Alpha – A_1,
- Airline Beta – A_2,
- Airline Gamma – A_3,
- Airline Delta – A_4.

Values for the criteria were quantified based on the input data in the context of financial analysis for each airline.

Subsequently, weighing of the individual criteria were determined ($C_1 - C_6$) based on the paired comparison method, (see Table 2). This method consists in comparing each criteria pair. To ensure that the criteria with the resulting value of 0 are not excluded from evaluation, coefficient 1 was added to all the values [18-19].

By analogy (based on the paired comparison method), comparison of individual alternatives (airlines) is carried out subsequently for all determined criteria ($C_1 - C_6$). This way the individual alternatives weighing for all the criteria will be obtained.

The results of paired comparison for all the criteria are shown in the Table 3.

For quantification of results in order to determine the order of alternatives for airlines (in descending order) and identification of a company with objectively best economic (financial) health, the multi-criteria analysis method is applied. More particularly, the FDMM – Forces Decision Matrix Method (see Table 4) is used.

According to results of the multi-criteria analysis for FDMM (Forces Decision Matrix Method) and based on the set criteria (selected financial analysis indicators), the airline with the best financial health seems to be Airline Delta.

5. Conclusions

Within this research, a methodology (functional system) for evaluating financial performance (evaluating the financial situation) of airlines was created. This methodology includes analysis of the external, internal and competitive environment, financial analysis and creating models (functional system) for quantification of financial analysis results.

Parts of the methodology concerning analysis of external, internal and competitive environments (SWOT analysis as a part of the proposed functional evaluation system) follow development of the air transport in the world. Analyses are focused mainly on the future development of the air transport.

Parts of the methodology, regarding the financial analyses of individual companies (calculation and subsequent evaluation of airlines financial analysis indicators), provide information on performance of the evaluated airlines (financial health). To compare the results of airlines financial analysis, a system for financial analysis results quantification was created.

Using this system, it is possible to identify the differences in successful performance of the individual companies.

The advantage of the created airline economic performance evaluation system is mainly the possibility to compare the performance of freely chosen airlines based on the freely chosen financial analysis indicators and multi-criteria analysis method for final evaluation.

Acknowledgement

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