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APPLICATION OF TOTAL PRODUCTIVITY MODEL WITHIN CROATIA AIRLINES

ABSTRACT

By defining and selecting adequate factors of the total productivity model and by assigning specific relevance of each factor, the initial preconditions for the analysis and monitoring of the model application efficiency within the Croatia Airlines business policy have been established. Since the majority of the analyzed factors have realized a more intensive growth than planned, the business year 2004 can be assessed as the most successful one in the Croatia Airlines history. Consequently, the difference related to the productivity indicators of the Association of European Airlines has been reduced, particularly the aircraft productivity with remnant of 5 to 10 percent, and the productivity of the employees with a remnant of 15 to 20 percent, and the productivity of fuel expressed as quantity at AEA level, and expressed as value below that level. Finally, although there is no expressed correlation between the quantitative productivity indicators and business profitability, the highest realized net profit since the foundation of Croatia Airlines fully supplements the solid level of the comparison indicators, confirming its complete readiness and maturity to join the Star Alliance.

KEY WORDS

total productivity model, productivity indicators, growth rate, business profitability, productivity factors

1. INTRODUCTION

Since the model of total productivity, the so-called TFP (Total Factor Productivity), apart from basic productivity indicators of aircraft, employees, and fuel, encompasses a much wider range of influencing factors, in setting up the model it is necessary to select those that have the highest specific relevance appropriate for the representativeness of the model.

For quite some time now, Croatia Airlines has been paying due attention also to the indicators of high-quality transport effect, and not only to direct quantity productivity factors. The economical, as well as indirect inter-influencing factors also find their suitable position in the model of future development until the year 2014.

Since the model has been set for the period 2002 – 2014, its feasibility in the business year 2004 needs to be analyzed in detail.

At the same time, the correlation of the selected quantitative and economical indicators needs to provide an answer to the concrete realizations of Croatia Airlines in the period from 1991 to 2004, how strong is the correlation between the selected categories.

2. DEFINING OF THE MODEL FACTORS

Regarding the processed and presented total productivity factors, as well as growth trends of all the relevant indicators of traffic effects in the world and in Europe, it is possible to quantify more precisely the inter-relationship and the specific relevance of single elements using the growth matrix i. e. its direct and indirect growth rates.

The direct growth rates cannot represent well enough which of the applied model factors is developing faster in the absolute and in the relative sense. Since these are significantly different productivity expressions, which means different measuring units, their reduction to a common measure is carried out by the approach of relative assessment of the achieved level of each single factor in relation to the average factors of the European airlines. The reason why the European comparison prevailed is the basic knowl-

Table 1 – Total productivity elements of the Croatian air transport 2002 – 2014 in relation to the average of the European airlines

Ord. No.	description of productivity elements	growth rate 93-02 CTN	2002			2008			2014			growth rate 02/08		growth rate 08/14		growth rate 02/14	
			CTN	Europe	relation (calculated CTN/EU %)	CTN	Europe	relation (estimated CTN/EU %)	increase decrease relation 2008-2004	CTN	Europe	relation (estimated CTN/EU %)	increase decrease relation 2014-2002	CTN	Europe	CTN	Europe	CTN	Europe
1	WLF%	2.36	48.2	57.0	85	54.0	60.0	90	5	58.0	62.0	94	8.99	1.92	0.86	1.35	0.54	1.55	0.72
2	PLF%	1.87	56.5	64.0	88	62.0	66.0	94	6	66.0	68.0	97	8.78	1.56	0.51	1.04	0.50	1.30	0.51
3	BH/a/c	1.00	2,709.0	2,915.0	93	2,860.0	3,000.0	95	2	3,000.0	3,100.0	97	3.84	0.92	0.57	0.80	0.54	0.87	0.56
4	Tkm/Empl.(000)	3.68	87.5	125.0	70	110.0	143.0	77	7	130.0	156.6	83	13.01	3.90	2.27	2.83	1.53	3.35	1.90
5	ATkm/Empl.(000)	0.22	181.4	255.0	71	225.0	292.2	77	6	265.0	323.2	82	10.86	3.65	2.30	2.77	1.69	3.21	1.99
6	Pkm/Empl.(000)	3.33	940.0	1,350.0	70	1,190.0	1,530.0	78	8	1,450.0	1,730.0	84	14.19	4.01	2.10	3.35	2.07	3.67	2.09
7	Askm/Empl.(000)	1.43	1,670.0	2,300.0	73	1,900.0	2,450.0	78	5	2,100.0	2,600.0	81	8.16	2.18	1.05	1.68	1.00	1.92	1.03
8	Tkm/t fuel	5.11	1.7	1.8	90	1.8	1.9	90	0	1.8	2.0	90	-0.02	0.89	0.89	0.84	0.84	0.87	0.87
9	BDP/capital	8.90	5,056.0	14,875.0	34	6,400.0	17,000.0	38	4	7,640.0	18,800.0	41	6.65	4.02	2.25	3.00	1.70	3.50	1.97
10	Yield Usc/tkm	-3.05	155.2	140.0	111	137.0	127.0	108	-3	128.0	122.0	105	-5.94	-2.05	-1.61	-1.13	-0.67	-1.60	-1.14
11	Regularity dep.%	-0.79	79.2	81.2	98	83.0	83.0	100	2	86.0	84.5	102	4.24	0.79	0.37	0.59	0.30	0.69	0.34
12	Lost luggage	0.00	9.8	11.8	120	8.0	9.2	115	115	6.5	7.3	112	-8.10	-3.32	-4.06	-3.40	-3.78	-3.36	-3.93

edge about the dominant character of Croatia Airlines operations, which does not operate long-haul transport but rather offers one of the European airports as the final travelling destination.

Considering everything mentioned previously, the following 12 elements are determined as factors of total Croatian air transport productivity:

1. weight load factor (WLF),
2. passenger load factor (PLF),
3. annual utilization of aircraft (BH),
4. ton kilometre per employee,
5. available ton kilometre per employee,
6. passenger kilometre per employee,
7. available seat kilometre per employee,
8. ton kilometre per ton of fuel,
9. gross domestic product per inhabitant,
10. total yield (USC/tkm),
11. departure regularity (within 15 min.),
12. lost luggage per 100,000 passengers.

The structure of the selected elements is as follows:

direct quantitative productivity factors 8 of 12 or 66.67%;
economical factors 2 of 12 or 16.67%;
indirect inter-influencing factors 2 of 12 or 16.66%.

The structure of direct quantitative productivity factors:

aircraft productivity 3 of 8 37.5%
employee productivity 4 of 8 50.0%
fuel productivity 1 of 8 12.5%.

3. SETTING OF A MODEL

The time guideline of setting the model is determined in two phases:

- 1st phase from 2002 to 2008,
- 2nd phase from 2008 to 2014.

The reason for defining the time period of the first phase is the assumed year of Croatia joining the European Union, which will logically have significant reflection on the market and economic status of the Croatian airline. For several reasons and rules of the game dictated by the European Union, the achieved level of its productivity must come close to the realization level of the European airlines (Table 1).

Although it has been proven earlier that the success of the accession process to Europe does not automatically bring operating profitability, the increase of productivity is an imperative and a necessary precondition without which such objective cannot be realized.

The second phase of the time dynamics of the model scope ends in 2014, the year by which the ele-

ments of the expected growth dynamics can be actually estimated[1].

By setting the model of total productivity by evaluating its elements and the growth dynamics in relation to the European competitors, the synergy effects of model factors inter-influence are obtained as well as clear vision of the future directions of their growth dynamics.

It is assumed that the model of total air transport productivity consists of 12 inter-related elements. The symbols y_{it} and $y_{i,\,t-1}$ designate the value of productivity elements (such as e. g. input, parameter, etc.) of the i-th productivity element (i=1, ..., n) in the period t and t_{-1}.

The input value increment of the i-th element of the model is:

$$\Delta y_{it} = y_{it} - y_{it-1} \tag{1}$$

Indirect growth rate of the i-th element of productivity in relation to the j-th element is defined as the relation of the input increment of the i-th element of productivity, Δy_{it}, and the input value of the j-th element of productivity in the interval t, i. e.:

$$r_{ijt} = \Delta y_{it} / y_{it} \quad i, j = 1, \ldots, \text{n.}\ \ Y_{it-1} \neq 0 \tag{2}$$

Indirect growth rates can be expressed in the form of the model elements growth matrix of the total Croatian air transport productivity, i. e.:

$$R_t = \begin{bmatrix} r_{11} & r_{12} & \cdots & r_{1nt} \\ r_{21} & r_{22} & \cdots & r_{2nt} \\ \vdots & \vdots & \ddots & \vdots \\ r_{n1t} & r_{n2t} & \cdots & r_{nnt} \end{bmatrix} \quad t = 1, \ldots, T \tag{3}$$

where elements along the main vertical designate the direct (i=j) growth rates and the others ($i \neq j$) designate indirect growth rates. The elements in the i-th row designate the input growth in the i-th element of the productivity model in relation to the inputs in other elements. The elements in the i-th column designate the growth of the input values in all elements of the model in relation to the input of the i-th element in period t.

This leads to the conclusion that every element in the growth matrix is represented by one row and one column, with the elements that express indirect or relative growth relations. Thus for example, the input growth of the first element of the productivity model has been expressed in the first row with relation to other elements, and the growth of other elements has been expressed in the first column, in relation to the input of the first element. Second rows and columns correspond to second elements of the productivity model.

Indirect growth rates can be defined also with relation to the inputs of the j-th element of the model in the period t-1, that is:

$$r'_{ijt} = \Delta y_{ij} / y_{j,t-1} \quad i, j = 1, \ldots, n. \tag{4}$$

The relation between the indirect growth rate (20) and (22) can be established by means of the following inter-relations:

$$r_{ijt} = r'_{ijt} / 1 + r'_{j,jt} \quad \text{and} \quad r'_{ijt} = r_{ijt} / 1 - r'_{j,jt} \qquad i, j = 1, \ldots, n \tag{5}$$

The growth matrix can be determined also through the external vector of the model element. This method of determination is useful for the practical calculation of the growth matrix. The growth vector of the productivity model elements:

$$\Delta y_{it} = (\Delta y_{it}, \ldots, \Delta y_{m,t}) \tag{6}$$

and the vector of reciprocal values of the productivity model elements:

$$(1 / y_t) = (1 / y_{1t}, \ldots, 1 / y_{nt}) \quad i, j = 1, \ldots, n.\ Y_{i,\,t-1} \neq 0 \tag{7}$$

The external growth vector of the productivity model elements coefficients and the vector of reciprocal values define the growth matrix of the productivity model.

$$R_{pt} = \Delta y'_t (1 / y_t) = \begin{bmatrix} \Delta y_{1t} \\ \Delta y_{mt} \end{bmatrix} (1 / y_t, \ldots, 1 / \Delta y_{nt}) \tag{8}$$

$$R_{pt} = \begin{bmatrix} \Delta y_{1t} / y_{1t} & \cdots & \Delta y_{1t} / y_{nt} \\ \vdots & \ddots & \vdots \\ \Delta y_{mt} / y_{1t} & \cdots & \Delta y_{mt} / y_{nt} \end{bmatrix} = \begin{bmatrix} r_{11t} & \cdots & r_{1nt} \\ \vdots & \ddots & \vdots \\ r_{m1t} & \cdots & r_{mnt} \end{bmatrix} \tag{9}$$

When only direct growth rates are considered, then the growth of one element is expressed independently of the growth of the others. However, when the indirect growth rates are defined, i. e. the growth of the i-th element in relation to the j-th element (i, j=1, ... n), it is possible to determine the structure of the elements growth and to express all the relations through the growth matrix in the overall system. By simultaneously expressing direct and indirect rates, it is possible to monitor both the changes in the elements growth intensity and their structural relations.

The initial values of the model, which are based on the realized growth (decline) rates in the reference period 1993-2002 are reduced to the lowest common denominator by comparing the relative relation with the achieved averages of the European airlines and the future dynamics of their growth from the aspect of Croatia Airlines and the European competitors.

The table clearly shows that the biggest remnant, a part of which certainly influences the airline operations, is the level of the gross domestic product per capita, which is hardly 34 percent of the European average.[2]

The aircraft productivity elements are poorer in 2002 by 7-15 percent in relation to the average of the European airlines, the productivity elements of the employee by about 30 percent, and the elements of

fuel productivity are relatively poorer by about 10 percent.

Regarding individual elements of the model (yield, lost luggage) for Croatia Airlines, the initial 2002 was better than the average, and the forecast says that until the end of 2014 it will continue to maintain a better position, but the difference will be reduced and therefore the growth rates are negative.

According to the presented table the growth vector of total productivity of the Croatian air transport amounts to[3]:

$$\Delta y'_{2014} = \begin{bmatrix} 9 \\ 9 \\ 4 \\ 13 \\ 11 \\ 14 \\ 8 \\ 0 \\ 7 \\ -6 \\ 4 \\ -8 \end{bmatrix}$$

It follows that the vector of reciprocal values of the total productivity model of the Croatian air transport amounts to:

$$\frac{1}{y_{2014}} = \left(\frac{1}{94}, \frac{1}{97}, \frac{1}{97}, \frac{1}{83}, \frac{1}{82}, \frac{1}{84}, \frac{1}{81}, \frac{1}{90}, \frac{1}{41}, \frac{1}{105}, \frac{1}{102}, \frac{1}{112}\right)$$

The product of the external vector Δyi_{2014} and $1/y_{2014}$ determines the growth matrix of the productivity model elements in relation to the current values.

By assigning the values of specific relevance of each of the mentioned elements it is possible to additionally estimate and assess their relations and contributions of the productivity optimization process in the future.

Specific relevance of the productivity model elements can be divided into four categories:

first category of values
2x16% (WLF, Tkm/empl.)
second category of values
4x11% (PLF, Pkm/empl., BDP, yield)
third category of values
3x5% (BH/a/c, Atkm/empl., ASkm/empl.)
fourth category of values
3x3% (fuel, regularity, luggage)
Total 100%

In this way the distribution of the specific weight of each of the mentioned factors (Table 2) is obtained. It should be emphasized that the specific relevance of

Table 2 – Matrix of direct and indirect significance indicators of single factors of total productivity model of the Croatian air traffic

Factor	1	K1	K2	Description	WLF%	PLF%	BH/a/c	Tkm/Empl. (000)	ATkm/Empl.(000)	Pkm/Empl. (000)	Askm/Empl.(000)	Tkm/t fuel	BDP/capital	Yield Usc/tkm	Regularity dep.%	Lost luggage
	Coefficient	$\Delta y_{1,2004}$	CTN : EU 2014													
1	16	8,9870	93,55	WLF%	1,537	1,481	1,486	1,732	1,754	1,716	1,780	1,594	3,538	1,371	1,413	1,280
2	11	8,7776	97,06	PLF%	1,032	0,995	0,998	1,163	1,178	1,152	1,195	1,070	2,376	0,920	0,949	0,860
3	5	3,8411	96,77	BH/a/c	0,205	0,198	0,198	0,231	0,234	0,229	0,238	0,213	0,473	0,183	0,189	0,171
4	16	13,0140	83,01	Tkm/Empl.(000)	2,226	2,145	2,152	2,508	2,540	2,484	2,578	2,309	5,124	1,985	2,046	1,854
5	5	10,8553	81,99	ATkm/Empl.(000)	0,580	0,559	0,561	0,654	0,662	0,648	0,672	0,602	1,336	0,517	0,533	0,483
6	11	14,1854	83,82	Pkm/Empl.(000)	1,668	1,608	1,612	1,880	1,903	1,862	1,932	1,730	3,840	1,487	1,533	1,389
7	5	8,1605	80,77	Askm/Empl.(000)	0,436	0,420	0,422	0,492	0,498	0,487	0,505	0,452	1,004	0,389	0,401	0,363
8	3	0,0213	90,20	Tkm/t fuel	0,001	0,001	0,001	0,001	0,001	0,001	0,001	0,001	0,002	0,001	0,001	0,001
9	11	6,6484	40,64	BDP/capital	0,782	0,753	0,756	0,881	0,892	0,873	0,905	0,811	1,800	0,697	0,719	0,651
10	11	5,9391	104,92	Yield Usc/tkm	0,698	0,673	0,675	0,787	0,797	0,779	0,809	0,724	1,608	0,623	0,642	0,582
11	3	4,2382	101,78	Regularity dep.%	0,136	0,131	0,131	0,153	0,155	0,152	0,157	0,141	0,313	0,121	0,125	0,113
12	3	8,1005	112,31	Lost luggage	0,260	0,250	0,251	0,293	0,296	0,290	0,301	0,269	0,598	0,232	0,239	0,216

the elements is a variable category, and a different categorization of the mentioned four groups is possible. This is a subjective estimate, but in no way determined outside the technical and scientific research.

The optimization of the productivity model factors is represented by direct quantitative indicators, especially tkm per employee, pkm per employee, and gross domestic product per capita. These are followed by the so-called productivity factors of the capacity marketing, available ton kilometres and available seat kilometres. These in turn are followed by the aircraft productivity indicators, i. e. weight and passenger load factor (WLF, PLF), whereas the remaining factors grow less intensely, and the indicators of yield and lost luggage have negative signs, although at the end of the observed time period in the year 2014 they should still be better than the average of the European airlines.

The obtained results of the presented assigned values of specific relevance in Table 2 indicate for instance that the relevance of the WLF productivity growth indicators is much greater for the optimization of the future projected productivity growth than the indicators of departure regularity. It is also obvious that the elements of the realized traffic effects (tkm, pkm) per employee have greater specific relevance than the available capacities per employee, which is also logical, since the increase of the offer on the market does not automatically mean increase in productivity.

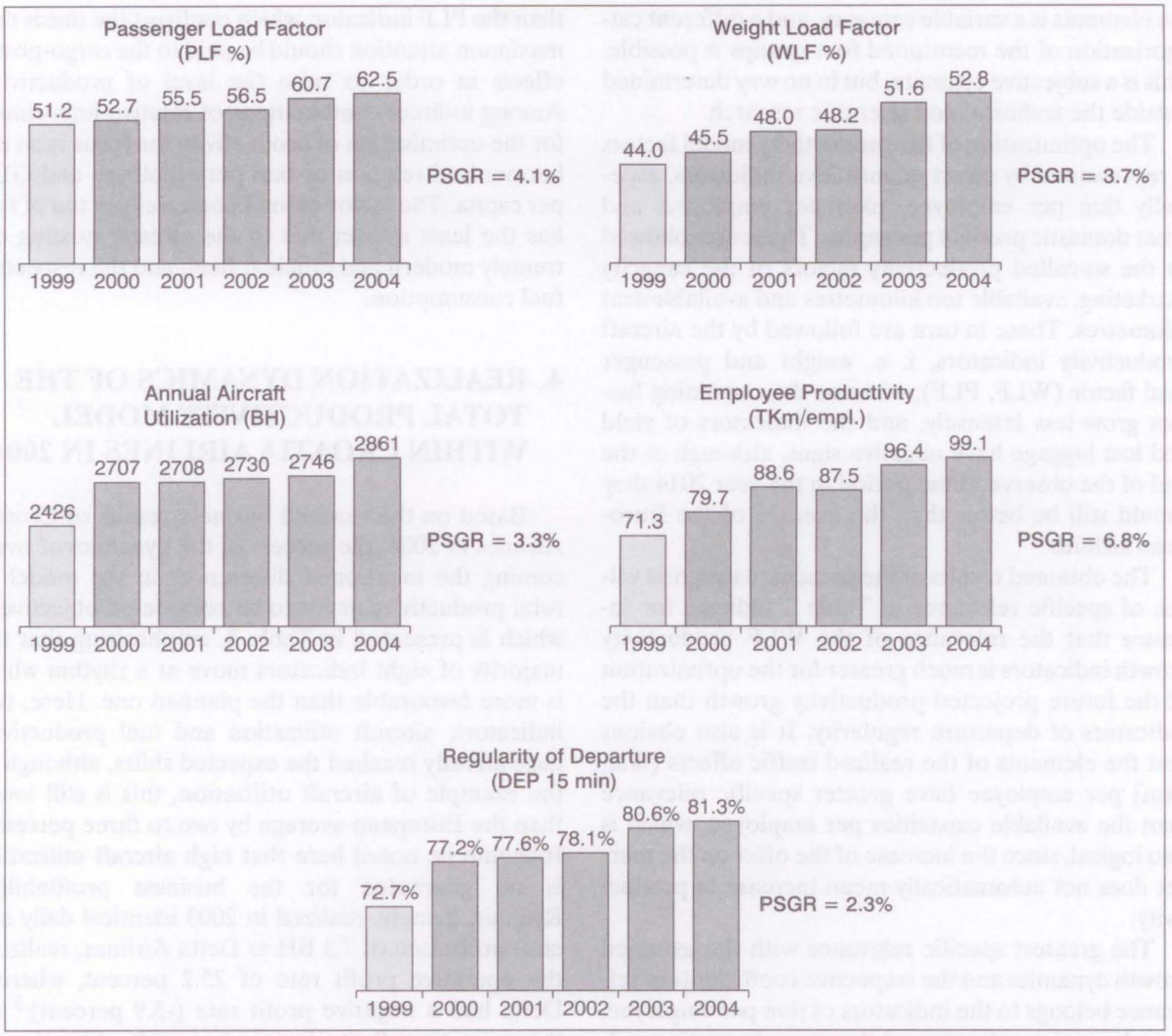
The greatest specific relevance with the assumed growth dynamics and the respective coefficients of relevance belongs to the indicators of tkm per employee, i. e. pkm per employee, and the gross domestic product per capita. The WLF indicator is of greater value than the PLF indicator, which confirms the thesis that maximum attention should be paid to the cargo-postal effects in order to raise the level of productivity. Among indirect combinations of relative importance for the optimisation of productivity the focus is on the harmonized relation of tkm per employee and GDP per capita. The factor of ton kilometres per ton of fuel has the least impact due to the already existing extremely modern and efficient fleet, and the respective fuel consumption.

4. REALIZATION DYNAMICS OF THE TOTAL PRODUCTIVITY MODEL WITHIN CROATIA AIRLINES IN 2004

Based on the realized business results of Croatia Airlines in 2004, the success of the dynamics of overcoming the mentioned differences in the model of total productivity needs to be considered objectively, which is presented in Table 3, emphasizing that the majority of eight indicators move at a rhythm which is more favourable than the planned one. Here, two indicators, aircraft utilization and fuel productivity have already reached the expected shifts, although in the example of aircraft utilization, this is still lower than the European average by two to three percent.[4] It should be noted here that high aircraft utilization is no guarantee for the business profitability. Ryanair, namely, realized in 2003 identical daily aircraft utilization of 7.3 BH as Delta Airlines, realizing the operative profit rate of 25.2 percent, whereas Delta had a negative profit rate (-5.9 percent).[5] At the same time Swiss featured aircraft utilization of 12.1 BH daily, but also operative loss per passenger

Table 3 – Realization of "TFP" factors of Croatia Airlines in 2004

TFP element	2002	2003	2004	objective 2008	necessary annual increment %	realization assessment
1. WLF % ord.	48.2	50.8	52.2	54.0	0.85	overfulfilment
2. PLF % ord.	56.5	59.6	61.4	62.0	0.24	overfulfilment
3. BH/a/c	2709	2741	2861	2860	–	overfulfilment
4. Tkm/empl.	87.5	96.4	99.3	110	2.64	overfulfilment
5. ATkm/empl.	181.4	186.8	187.6	225	4.65	within plan
6. Pkm/empl.	940.0	1036.8	1071.5	1190	2.65	overfulfilment
7. ASkm/empl.	1670.0	1707.6	1715.0	1900	2.60	overfulfilment
8. Tkm/t (fuel)	1.7	1.8	1.81	1.8	–	overfulfilment
9. BDP/capita €	5458	5742	6150	6800	1.87	overfulfilment
10. Yield USc/tkm	155.2	150.0	145.0	137.0	-1.40	within plan
11. Regularity (DEP 15min)	79.2	80.8	81.3	83.0	0.52	within plan
12. Lost luggage	9.8	11.4	11.2	10.0	-7.44	underfulfilment



Scheme 1 - Evolutionary process of the selected factors of total productivity of Croatia Airlines 1999-2004

of -25.8 SDR, as well as Alitalia 10.6 BH, i. e. -24.6 SDR, i. e. Malev 9.1 BH, and -8.2 SDR per passenger.[6]

The realization of three more indicators is estimated within the framework of the planned achievements until 2008 and for the moment only the indicator of lost baggage is below the expected planned proportions since it is increasing, rather than decreasing. It should be emphasized that in spite of that, with the realized 11.2 items of lost luggage per 100,000 carried passengers during 2004 Croatia Airlines realized a better result than the average of the AEA members (13.9 items), and that it occupies fourteenth place out of thirty AEA members.[7] Regarding the regularity of flight schedule realization with the efficiency of 81.3 percent Croatia Airlines is poorer than the AEA average for 2004 (82.7 percent) and it occupies the eighteenth place on the ranking list.[8]

Further in the text the selected indicators of the total productivity model of Croatia Airlines are presented over a longer mid-term period

5. CORRELATION ANALYSIS OF THE SELECTED QUANTITATIVE AND ECONOMICAL PRODUCTIVITY INDICATORS OF CROATIA AIRLINES 1991 – 2004

Regression model is used to express the relation between the mentioned TFP factors expressed by the values of the selected numeric variables out of which two are the uantitative expression of productivity, and the remaining three are the basic indicators of the success of travelling. The intention is to determine the level of intensity and the connection between the mentioned variables over a longer period of time for the obtained results to be sufficiently statistically representative.

The results of covariance r for different combinations indicate a relatively high level of correlation in the combinations of ualitative indicators (1 and 2) in relation to the realized revenues (column 3) slightly

less expressed correlation in combinations 1 and 2 in relation to the operative result, and absence of the correlation between the most recognized indicators of productivity and business profitability, which means that high airline productivity does not guarantee the business profitability as well.

Year	WLF %	Tkm/empl. (1000)	Revenues (mill. USD)	Oper. result (mill. USD)	Profit (mill.USD)
	1	2	3	4	5
1991	27.3	58.8	7.7	-5.6	-2.8
1992	38.4	51.3	26.8	0.7	-2.9
1993	39.1	68.7	58.4	4.0	-2.1
1994	43.7	81.6	84.0	9.6	1.4
1995	42.8	69.0	95.4	4.7	-3.4
1996	48.9	81.5	114.0	13.0	4.1
1997	42.5	64.9	109.3	-5.9	-21.5
1998	42.5	69.9	121.2	3.2	-1.0
1999	44.0	71.3	115.8	-2.8	-15.7
2000	45.5	79.7	124.2	1.0	-24.8
2001	48.0	88.6	141.8	8.6	-11.6
2002	48.2	87.5	158.9	16.3	-3.0
2003*	51.6	96.4	176.6	17.1	2.0
2004*	52.8	99.1	179.7	13.8	5.0

*Note: the expressed economic values for 2003 and 2004 are in mln Euro

The results of covariance r for different combinations:

WLF-TKm/empl.	(1:2)	0.84927
WLF-revenues	(1:3)	0.92128
WLF-operative result	(1:4)	0.75836
WLF-profit	(1:5)	0.11555
TKm/empl. -revenues	(2:3)	0.87530
TKm/empl. -operative res.	(2:4)	0.82073
TKm/empl. -profit	(2:5)	0.24647

It is obvious that the business profitability is a specific category which is also influenced by numerous economic and financial factors such as e. g. exchange rate differentials in relation to the structure of revenues and costs, level of burden by interests in relation to the airline development cycle, etc.

6. CONCLUSION

By defining and selecting adequate factors of the total productivity model, and by assigning specific relevance of each of them, the initial preconditions have been created for the analysis and monitoring of the success of model implementation in the business practice of Croatia Airlines.

Since the majority of analyzed factors has realized a growth greater than planned, the business year 2004 may be assessed as the most successful in the history of Croatia Airlines.

In this way, the difference in relation to the productivity indicators of the European association of airlines has been reduced, which is the aircraft productivity with remnant of 5 to 10 percent, employee productivity with remnant of 15 to 20 percent, and fuel productivity quantitatively at the AEA level, and economically below that level.

Finally, although there is no expressed correlation between the quantitative indicators of productivity and business profitability, the highest realized net revenue since the foundation of Croatia Airlines entirely supplements the solid level of the comparison indicator, confirming its full readiness and maturity to join STAR ALLIANCE.

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SAŽETAK

PRIMJENA MODELA UKUPNE PRODUKTIVNOSTI U CROATIA AIRLINESU

Definiranjem i selekcijom odgovarajućih čimbenika modela ukupne produktivnosti, te pridruživanjem specifične važnosti svakog od njih, stvoreni su početni preduvjeti za analizu i praćenje uspješnosti primjene modela u poslovnoj praksi Croatia Airlines. Kako je većina analiziranih čimbenika ostvarila intenzivniji rast od planiranog, poslovna 2004. godina može se ocijeniti kao najuspješnija u povijesti Croatia Airlinesa. Na taj način smanjena je razlika u odnosu na indikatore produktivnosti europske porodice zrakoplovnih tvrtki i to produktivnost zrakoplova sa zaostatkom od 5 do 10 posto, produktivnost zaposlenih sa zaostatkom od 15 do 20 posto, te produktivnost goriva količinski na razini AEA, a vrijednosno ispod te razine. Na kraju, iako ne postoji izražena korelativna veza između količinskih pokazatelja produktivnosti i profitabilnosti poslovanja, najveća ostvarena neto dobit od osnutka Croatia Airlines u cijelosti upotpunjuje solidnu razinu indikatora usporedbe, potvrđujući njegovu punu spremnost i zrelost pridruživanja članstvu STAR ALIJANSE.

KLJUČNE RIJEČI

model ukupne produktivnosti, indikatori produktivnosti, stopa rasta, profitabilnost poslovanja, čimbenici modela produktivnosti

REFERENCES

1. Cfr. **Nikolić, G.**: *Multimodalni transport*, Section 7, Rijeka 2004
2. Cfr. **Dowling, M.**: *Interactive Table of World Nations*, http://www.mrdowling.com/800nations.html, 2002

3. rounded figures
4. Cfr. AEA *kolekcija STAR*, Bruxelles, 2004
5. TRL: *Airline Performance Indicators 2004*, Wokingham, 2004, pp.77, 81
6. Ibidem, pag. 77, 85
7. Cfr. AEA: *Consumer Report*, December 2004, Bruxelles 2005
8. Ibidem