Verification of Hypotheses to the Selected Indicators from the Annual Report of the Prague Public Transit Company and Ostrava Transport Company

Michal Krajňák

***Abstract*—**The paper deals with testing of hypotheses and development of selected indicators from the annual reports of two companies in the Czech Republic - the Prague Public Transit Company and Ostrava Transport Company. The annual report is an important document presenting the summary of the profit or loss of an accounting unit during the reference period. In case of the Prague Public Transit Company it holds that the number of passengers is increasing slightly, the similar case is with the time accuracy of transport. It is, on the contrary, higher in Ostrava, but here there is a decline in the number of transported passengers. In both analyzed cities is increased the accuracy of urban public transport and the speed of circulation of vehicles. As indicated, for passenger it is also important the price of ticket, which in Ostrava Transport Company in comparison with the Prague Public Transit Company increases more frequently and on a larger amount. This fact has subsequently influence on reducing the number of passengers in Ostrava.

***Keywords*—**annual report, hypotheses testing, urban public transport

I. Introduction

URBAN public transport is a necessity for each big modern city. Its advantages are especially high availability, environmental friendliness or the lower expenses in comparison with the individual car transport. The aim of this paper is to accept or reject the selected hypotheses related to the operation of urban public transport in Prague and Ostrava by using one-sample and two-sample parametric tests. Another aim of this paper is to carry out the evaluation of the development of selected indicators over time.

The question of performance assessment of operating and financial results of transport company are discussed in [26]. According to conclusion of the study [20], it is important to deal with the speed of urban public transport, the goal is optimizing time of each passenger. It is valid, as mentioned study [29], not only in urban, but also in regional public transit. According to [19] during the operation of public transport it is necessary to create optimal schedule. A key factor for public transport is price [6]. Cost minimization is targeted not only from the perspective of passengers, but also from the perspective of the transport company. More about minimizing costs see [25].

Urban public transport in Prague consists of subway trains, trams and buses. The urban transport networks also includes the funicular transport and ferry. In Ostrava, the foundation of public transport are three tractions - bus, tram and trolleybus. Public transport is one of the most important means of daily travel for purposes such as commuting, shopping and education especially in large cities where the costs of travelling by private vehicles are high due to the lack of space [12].

The primary source for formation of hypotheses and their testing are annual reports of the Prague Public Transit Company and Ostrava Transport Company.

The importance of the financial statements and the annual report is characterized in the second part of the article. The next part is focussed on description of mathematical-statistics methods which are used. The testing of hypotheses formulated on the basis of the processed data from the annual reports of Ostrava Transport Company and Prague Public Transit Company forms the main part of article. Last part summarizes the results.

II. Financial Statements and Annual Report

An annual report informs in an efficient, balanced and complete way about performance, activities and economic status of the accounting entity. Financial statements create a component of the annual report. This brings to users a reasonable level of understanding when reading an annual report [5]. Users may be seeking more detailed explanation, therefore the financial statements and annual report are widely demanded documents. A part of the financial statements is created by the balance sheet, the objective of which is to provide information about the financial position [14]. Income statement show profit for the year [13]. A cash-flow table is not always the compulsory part to the financial statement.

This work was supported by the VSB-Technical Univerzity of Ostrava under a research project "The Impact of the Implementation of a Common Consolidated Corporate Tax Base (CCCTB) on Selected Economic Entities in the Czech Republic" under the registration number SP2016/42.

M. Krajňák is with the VSB – Technical University Ostrava, Faculty of Economics, Department of Accounting, Sokolská třída 33, 702 00 Ostrava, CZECH REPUBLIC, (phone: 00420-597-322222; fax: 0042-596-110026, e-mail: michal.krajnak@vsb.cz)

Preparation of the cash-flow table makes sense, since the information about profits or losses are based on accrual accounting [23]. An attachment (a comment) contains more detailed explanation of the information contained in the financial statements.

The annual report also contains a report of the board of directors on the accounting entity's business, a report of the board of directors between the controlled and controlling person or an audit report. The Accounting Act states that the annual report are compulsorily made out by such entities that must have the financial statements verified by an auditor. The annual report is also subject to an auditor's verification [7].

Publication of relevant, accurate, understandable information in the annual report is necessary. According to [9] it is also suggested that disclosure regulation may be motivated by the need to protect the welfare of unsophisticated investor. Besides the financial statements prepared in accordance with national legislation it is often a duty to prepare the financial statements complying with the system of accounting standards recognized by the world stock exchanges – i.e. in accordance with IFRS or US GAAP. To learn more on the harmonization of accounting see [1], [11] or [8].

III. Methodology

To test the hypotheses, one can choose either parametric or nonparametric tests. Since only some basic parameters of the selected set are tested, the parametric tests will be applied. In case of the mentioned tests, there are considered either two or one independent choice.

For the test of a significance of the difference of two sample variances, the F-test is used. A test criterion that has Fisher-Schnedecor distribution takes the form (1).

$$F = \frac{n_1 (n_2-1)S_1^2}{n_2 (n_1-1)S_2^2}, \quad (1)$$

where n_1 and n_2 are the sample sizes, S_1^2 and $S_2^2$are sample variances. To learn more about the F-test, see [18]

The range of random samples n is <30, for the test of the significance of difference of two sample mean values, a two-sample t-test is used. The test criterion T value (in case of equality of variances confirmed by F-test) takes the form (2),

$$T = \frac{(\overline{X_1}-\overline{X_2})-d_0}{\sqrt{n_1 s_{x1}^2+n_2 s_{x2}^2}} \cdot \sqrt{\frac{n_1.n_2.(n_1+n_2-2)}{n_1+n_2}}, \quad (2)$$

where $\overline{X_1}$ and $\overline{X_2}$are average values, the interpretation of the remaining variables are the same as in (1). To learn more about a t-test, see [3] and [16].

The one-sample t-test is used for verifying the hypothesis in case of an unknown variance. The form of test criterion T that has a Student distribution $t_{(n-1)}$ is determined by the relation (3).

$$T = \frac{\bar{X}-\mu_0}{S} \cdot \sqrt{n-1}, \quad (3)$$

where $\bar{x}$ is the mean value, S is a standard deviation with a n range of random samples.

To determine the dependency between the two characters, it is possible to use Spearman's rank correlation coefficient r_s that takes the form (4). Spearman's rank correlation coefficient is dealt with by [21] or [30].

$$r_s = 1 - \frac{6.\sum_{i=1}^{n} d_i^2}{n\,(n^2-1)}, \quad (4)$$

where d are the differences in the order $i_x - i_y$ of values x_i and y_i, n is the number of pairs x_i and y_i. In the event that the value of r_s takes 1, we are talking about a complete dependence of the order of the characters x and y.

Values from annual reports were identified during the selected period of time. The crucial objective of a time series analysis is to determine its trend, i.e. searching for a function that will best express the dependence of the values of monitored indicators on the time. In such case the simple regression methods are used, and the function might take following form (5). To learn more about a regression analysis, see [2].

$$TR = c_1 + c_2 x. \quad (5)$$

For evaluation of the development of selected indicators over time, the average growth rate k (6) is used:

$$k = \sqrt[n-1]{\frac{y_n}{y_1}}, \quad (6)$$

where y_n is the value in the last monitored period, and y_1 is the value in the first monitored period.

IV. Hypotheses Testing

Formulated hypotheses are as follows,

H_1: Time accuracy of urban public transport is the same in both cities,

H_2: Public transport in Ostrava meets the quality standards of time accuracy of the transport

H_3: Circulation speed of vehicles in Ostrava is higher,

H_4: Time accuracy of the urban public transport and the number of passengers are two independent variables,

A significance level is set to be at 5 %. It is a commonly used significance level [17].

With the aid of a time-series analysis, the following arguments will be verified,

H_5: The number of people using public transport has a downward trend in both cities,

H_6: The 24-hours ticket's price increased more in Ostrava than in Prague.

A. Time accuracy of transport

The transport service is considered to be accurate in terms of time when it arrives exactly or within a permitted deviation with a maximum delay of 179 seconds. The data in Table 1 express percentage of service meeting this criterion. **The first null hypothesis** is based on the argument that the accuracy of urban traffic is same during the reference period in both cities, an alternative hypothesis claims the opposite. The data on how many percents of services meet the criterion of accuracy are shown in Table 1.

Table 1 Time accuracy [in %] of public transport Ostrava vs Prague

City	2010	2011	2012	2013
Ostrava	84.93	87.76	87.97	92.24
Prague	89.72	90.99	86.80	90.70

Source: own processing according to the annual reports

Time accuracy of public transport in Ostrava is improving, mainly by reason of increasing the number of intersections with the preference of public transport. The lower level of time accuracy of public transport operation in Prague in 2012 was caused by floods during this period. Service reliability is one of the most important level-of-service determinants for public transport users [22].

Results of two-sample F-test are shown in Table 2 and Fig. 1. The value of test criterion *F* specified by relation (1) takes the amount of 2.48, while the critical domain W = (0, 0.23) ∪ (9.27; ∞).

Since the value of the test criterion does not lie in the domain of critical values, the null hypothesis based on the equality of variances of the two sets (H_0: $\sigma_1^2 = \sigma_2^2$) is accepted at the 5% of significance level.

Table 2 Two-sample F-test for a variance

	Group 1	*Group 2*
Mean value	88.225	89.5525
Variance	9.086167	3.662492
F	2.48087	
P(F<=f) (1)	0.23757	
F crit (1)	9.276628	

Source: own calculation

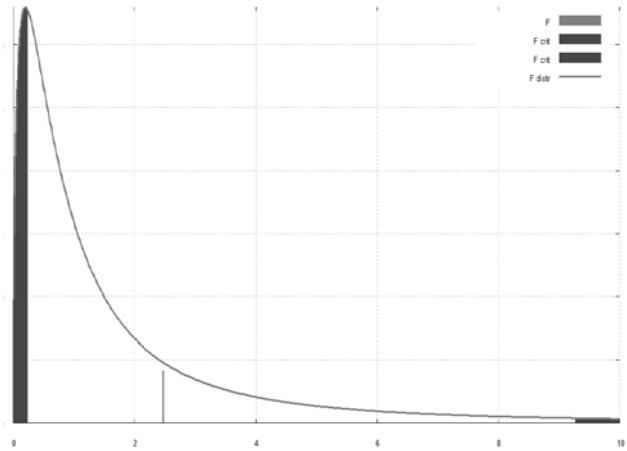

Fig. 1 F-test, Source: own calculation by using Maxima

For verification of the compliance of mean values of both sets, t-test is applied. The null hypothesis is based on the equality of mean values (H_0: $\mu_1 = \mu_2$), an alternative hypothesis is based on the argument that the mean values are different (H_1: $\mu_1 \neq \mu_2$). With the aid of (2) a value of test criterion *T* is calculated. In conclusion, the Table 3 and Fig. 2 show that the time accuracy of the public transport is the same at the 5% of significance level.

Table 3 Two-sample t-test

	Group 1	*Group 2*
Mean value	88.225	89.5525
Variance	9.086167	3.662492
T stat	-0.74359	
t crit (2)	2.446912	

Source: own calculation

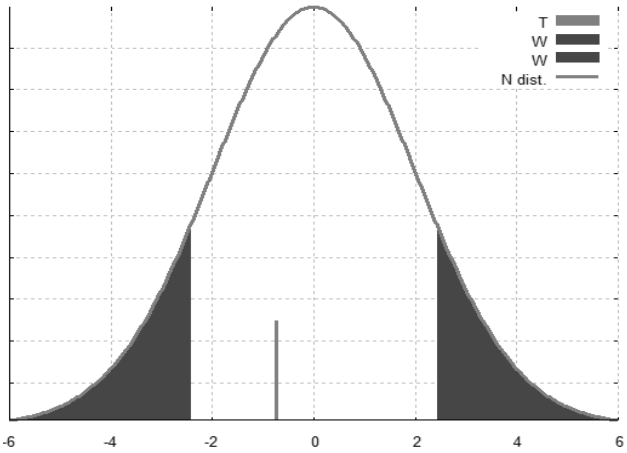

Fig. 2 T-test, Source: own calculation by using Maxima

The value of the test criterion *T* is – 0.74359, while the critical domain lies in the interval (-∞; -2.44) ∪ (2.44 ∞). At the 5% of significance level, the hypothesis H_0 is accepted.

The second null hypothesis H_2 dealing with the time accuracy of public transport is as follows: public transport in Ostrava meets the quality standards of time accuracy of the service (i.e. at least 85 % services arrive on time). Data concerning the percentage of the time-accurate services during the years 2005 - 2013 are shown in Table 4. Since 2010, there is an improvement in time accuracy of urban public transport. Using (3), the test criterion for one-sample t-test is calculated. An alternative hypothesis is left-sided and it says that during the reference period, on average the quality standards of time accuracy of the service (i.e. less than 85 % of the services arrived on time, μ <85) were not met.

Table 4 Time accuracy (TA) of public transport in Ostrava in years 2005 – 2013 [in %]

Year	2005	2006	2007	2008	2009
% of TA	85.13	85.23	83.69	82.84	81.78
Year	2010	2011	2012	2013	
% of TA	84.93	87.76	87.97	92.24	

Source: annual reports of Ostrava Transport Company

Since it is a left-sided hypothesis, the critical value takes an amount of $t_{2p}(n-1)$, i.e. $t_{0,01}(8) = 1.85$. Critical domain is $(-\infty; -1.85)$. The value of the test criterion is $T = 0.649$. The hypothesis H_0 is accepted, for the value of the test criterion, as stated in Fig. 3, does not lie in the critical domain. At the 5% of significance level, it is clear that urban public transport arrivals were time-accurate during the reference period.

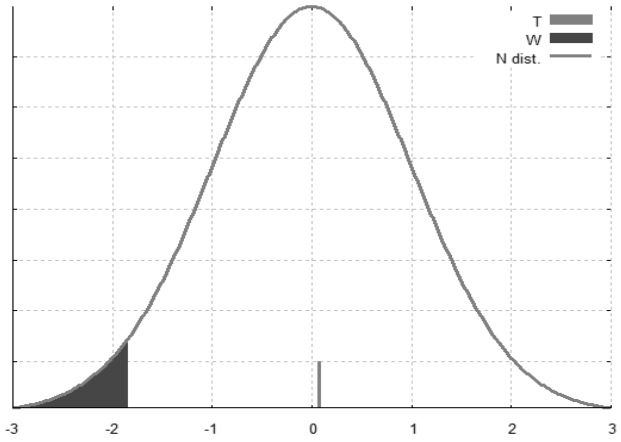

Fig. 3 One-sample t-test. Source: own calculation using Maxima

B. Circulation speed of vehicles

For testing the circulation speed of vehicles there were chosen the trams and buses from the public transport in Ostrava and in Prague there was excluded the subway traction from the circulation speed. The reason for excluding circulation speed of the subway and trolley buses is the fact that in the latter of mentioned cities, there is no such traction in operation. Considering the traffic density in individual cities, the third null hypothesis is based on the argument that the circulation speed of vehicles in Ostrava is higher than in Prague. Table 5 shows the circulation speed of vehicles in the reference period.

Table 5 Circulation speed of vehicles [in km per hour]

Year	2005	2006	2007	2008	2009
Ostrava	17.64	18.30	18.23	18.11	17.83
Prague	15.45	15.45	15.55	15.60	15.00
Year	2010	2011	2012	2013	
Ostrava	17.81	17.82	17.62	17.67	
Prague	13.90	15.00	14.95	15.60	

Source: annual reports of Ostrava Transport Company and Prague Public Transit Company

F-test is used to test the null hypothesis for the significance of differences between the two sample variances. The test results are shown in Table 6 and Fig. 4.

Table 6 F-test

	Group 1	*Group 2*
Mean value	17.89222	15.16667
Variance	0.068501	0.29875
F	0.229291	
P(F<=f) (1)	0.02619	
F crit (1)	0.290858	

Source: own calculation

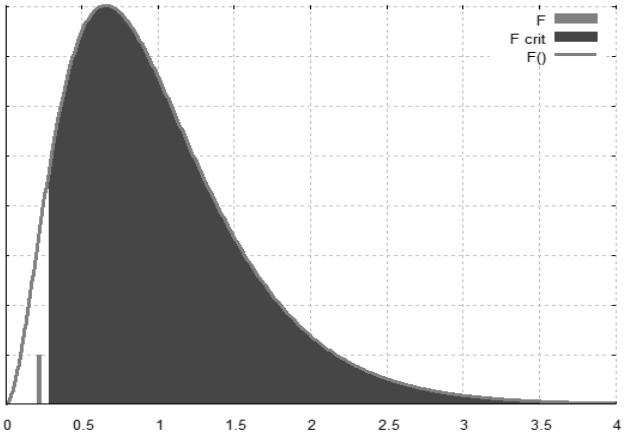

Fig. 4 F-test, Source: own calculation by using Maxima

The null hypothesis based on the argument that $\sigma_1^2 = \sigma_2^2$, was confirmed, because the value of the test criterion F does not lie in the domain of critical values. The domain of critical values is in the interval $(0, 0.026) \cup (0.290, \infty)$. The results of t-test are given in Table 7 and Fig. 5.

Table 7 T-test

	Group 1	Group 2
Mean value	17.89222	15.16667
Variance	0.068501	0.29875
t Stat	13.49258	
t crit (1)	1.745884	

Source: own calculation

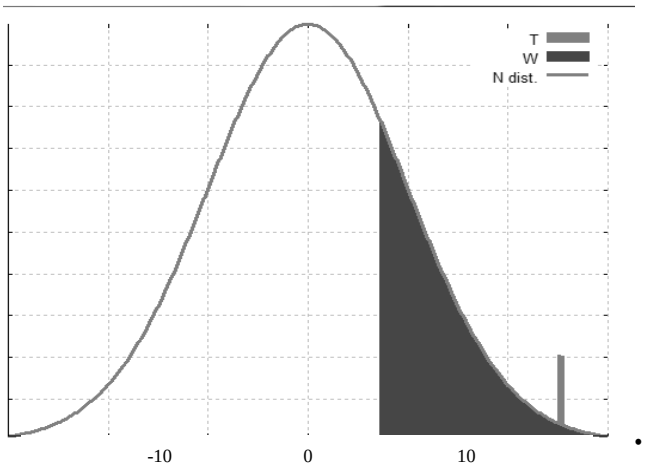

Fig. 5 T-test. Source: own calculation by using Maxima

The null hypothesis based on the argument that $\mu_1 = \mu_2$ was rejected, because the value of the test criterion (13.49) lies in the domain of critical values (1.74; ∞). Circulation speed of vehicles is not the same in both the traffics. At the 5% of significance level, there is accepted an alternative hypothesis $\mu_1 - \mu_2 > d_0$. Circulation speed of vehicles in Ostrava is higher.

Lower circulation speed of vehicles in Prague is caused mainly by a lower travel speed due to heavier traffic of individual transport in the capital city. In busy urban areas where traffic congestion is severe and bus frequencies are high, priorities are often provided to buses to reduce bus passengers' journey time and to improve regularity [28].

For the year 2014, it is possible to expect an increase in the circulation speed of vehicles in Ostrava, for there was a implementation of test run of so called alternating breaks on selected lines this year. This system of breaks has been used in the tram traction in Prague, in case of most lines, for several years.

C. Number of transported passengers and time accuracy of the transport

During the reference period, the time accuracy of urban public transport in Ostrava improved, but despite this trend, as shown in Table 8, the number of passengers declined. **The fourth null hypothesis** that there is no relation between the characters x_i and y_i is tested on the 5% of significance level using the Spearman's rank correlation coefficient.

Table 8 Spearman´s rank correlation coefficient

Year	Time accuracy x_i	Number of passengers y_i	i_x	i_y	$d_i = i_x - i_y$	d
2005	85.13	117 212	3.56	9.00	-5.43786	29.57031
2006	85.23	115 102	3.64	8.28	-4.64204	21.54852
2007	83.69	114 133	2.46	7.95	-5.48951	30.1347
2008	82.84	108 614	1.81	6.07	-4.25807	18.13118
2009	81.78	106 176	1.00	5.24	-4.23762	17.95743
2010	84.93	106 327	3.41	5.29	-1.87992	3.534104
2011	87.76	101 924	5.57	3.79	1.78558	3.188296
2012	87.97	96 369	5.73	1.89	3.839996	14.74557
2013	92.24	93 746	9.00	1.00	8	64
						202.8101

Source: own calculation

Substituting into equation (4) we obtain the value $r_s = -0.69$. The critical value $r_{\frac{p}{2}}(n)$, where n is the number of elements and p is the significance level, takes the amount of 0.683. Domain of critical values W lies in the interval $(-\infty; -0.683) \cup (0.683; \infty)$. R_s lies in the domain of critical values, therefore the fourth null hypothesis is rejected. A negative value r_s indicates the inverted order.

Number of people who used the services of Ostrava transport company was lower in 2013 compared to 2005. In Prague, there is the opposite situation. The exact number of passengers in the period of years 2005 - 2013 is shown in Table 9. The data in Tab. are given in thousands. Reference [4] indicates that among the most important factors when deciding whether to use a means of urban transport, belongs the availability of a stop near the home, service frequency or ticket costs.

Table 9 Number of passengers in public transport in Prague and Ostrava [in million]

Year	2005	2006	2007	2008	2009
Ostrava	117,2	115,1	114,1	108,6	106,1
Prague	1 139 ,3	1 172,7	1 183,9	1 261,8	1 225,1
Year	2010	2011	2012	2013	
Ostrava	106,3	101,9	96,3	93,7	
Prague	1 211,8	1 110,7	1 216,5	1 219,9	

Source: annual reports of Ostrava Transport Company and Prague Public Transit Company

The trend in the number of passengers in Fig. 5 is evaluated using (5). While in Prague, the trend is a growing, the number of passengers in Ostrava declines every year. This is also the reason of the negative coefficient C_1 for the regression equation in case of tracking a dependency.

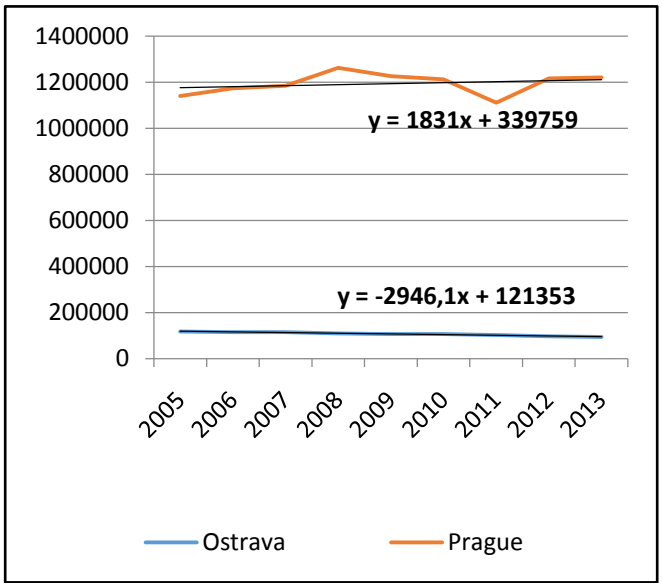

Fig. 6 Number of Passengers in Prague and Ostrava, Source: own calculation

It is true that for the number of passengers in Prague the argument H_5 is not valid. The reason of the increasing number of passengers is mainly a competitiveness of urban public transport with private transport, higher frequency of services (the introduction of so called metrolinks) or an increase in the number of intersections with a preference of public transport. The Metrolink successfully achieved its ridership projections [10]. The signal priority technology has great significance in the development of tram system [31].

D. Price of the basic 24-hour ticket

For the passenger, the ticket price is an important information. In Table 10, based on the availability, there are given the data of price of the basic 24-hour ticket that is valid for the territory of the city, i.e. in terms of Prague in zones P + 0 and in Ostrava in zones 1,2,3 and 4.

Table 10 Ticket price in Ostrava and Prague [in CZK]

Year	2005	2006	2007	2008	2009	2010
Ostrava	32	40	44	48	54	59
Prague	80	80	80	100	100	100
Year	2011	2012	2013	2014	2015	
Ostrava	65	75	75	80	80	
Prague	110	110	110	110	110	

Source: own calculation

The average growth rate for the all-day ticket valid for the territory of the city of Ostrava (k_1) and Prague (k_2) is calculated using (6).

The price of the 24-hour ticket in Ostrava increased each year on average by 9.59% ($k_1 = 1.0959$), while the price of the ticket in the capital city increased by 3.23% ($k_1 = 1.0323$). Expressed in Czech crowns it means that passengers in Ostrava had to pay each year for a ticket 4.80 CZK more, while in Prague 3 CZK more. Even this fact can be one of the reasons why the number of passengers decreases, despite increasing time-accuracy of urban public transport. It should be stressed that the all-day ticket is valid only within the city territory, therefore it is not valid in suburban zones. This restriction was ceased in Ostrava in 2014 and the all-day ticket is valid for traveling even into the tariff zone of territory of Ostrava XXL. The mentioned argument H_6 that the price of the ticket in Ostrava has increased more than in Prague is true.

As far as the price of the basic monthly pass is compared, its price in Prague and Ostrava is the same, i.e. 550 CZK. In case of a purchase of a ticket via e-cards Odiska for public transport in Ostrava, the price of such a ticket is 495 CZK. The public transport is subjected to the first reduced VAT rate. Expenditures to public transport are a part of the consumer basket. The role of VAT rates on the selected commodities in the consumer basket deals [24].

V. Conclusion

The aim of this paper was to verify or refute claims and hypotheses formulated on the basis of the information in an annual report. An annual report developed by commercial companies provides information on the financial standing, profit or loss, cash flow, as well as any other information that is relevant to its users to make a variety of important decisions [15]. To provide information, accounting systems prepare reports at regular interval [27] that comes once in the accounting period. Accounting is the primary source of information, not only in this case of hypothesis testing, but also as a source of financial analysis or other economic analyzes.

In both cities, time accuracy of urban public transport improves. Even though, there is a decrease in the number of transported passengers in Ostrava. The higher the time accuracy of the urban public transport system in Ostrava, the less passengers were transported. On the other hand, it should be noted that one of the causes might be a higher increase in ticket price compared to the increase in ticket price in Prague traffic. Another factor is the limited competitiveness of urban public transport in comparison with the conditions in Prague.

It was found form the annual reports of Ostrava transport company that the number of transported passengers has decreased, time accuracy improved, the number of dispatched low-floor vehicles and transport convenience has increased. With the decrease in the number of passengers there is also a relation to cancellation or change of route of selected lines.

The annual reports of the Prague public transit company show that the trend of the number of passengers, on the contrary, is growing at this moment. Also in this traffic, there is an increase in the number of modern low-floor vehicles in all operated tractions. In the reference period, there were changes in line routes, with respect to the change in demand there were adjustments in offered transport capacity. In both of the analyzed transport company there was not an increase in the circulation speed of vehicles.

One of the factors that may lead to an increase in the number of transported passengers is an increase of the attractiveness of urban public transport by means of increasing the travel speed of vehicles. Increasing of circulation speed might be a way how to cut costs. Also the ticket price, quality fleet, time accuracy of services or cleanliness of vehicles are the factors that have an influence on this fact.

References

[1] R. Ball, S. P. Kothari, A. Robin, "The Effect of International Institutional Factors on Properties of Accounting Earning," *Journal of Accounting and Economics*, vol. 29, no. 1, pp. 1-51, 2000.

[2] M. Barrow, *Statistics for Economics Accounting and Business Studies.* London: Longman, 1988.

[3] J. Buglear, *Quantitative Methods for Business and Management.* Harlow: Pearson, 2012.

[4] L. Eboli, G. Mazzulla, "How to Capture the Passengers' Point of View on a Transit Service through Rating and Choice Options," *Transport Reviews*, vol. 30, no. 4, pp. 435–450, 2010.

[5] B. Elliott, J. Elliott, *Financial Accounting and Reporting*. Harlow: Pearson, 2013.

[6] P. K. Else, "Optimal Pricing and Subsidies for Scheduled Transport Services, "*Journal of Transport Economics & Policy*, vol. 19, pp. 263-279, 1985

[7] J. Hakalová, *Účetní závěrka a auditing.* Brno: Tribun, 2010.

[8] J. Hakalová, Y. Pšenková and M. Losová, "First-time Adoption of International Financial Reporting Standards for Business Corporations Based in EU Member State that Are Issuers of Securities Admitted to Trading on Regulated Market," in: *2nd International Conference on European Integration – ICEI 2014, Ostrava*, 2014, pp. 192-201.

[9] P. M. Healy, K. G. Palepu, "Information Asymmetry, Corporate Disclosure and the Capital Markets: a Review of the Empirical Disclosure Literature," *J Account Econ*, vol. 31, pp. 405–440, 2001.

[10] D. R. Knowles, "What Future for Light Rail in the UK after Ten Year Transport Plan Targets are Scrapped?" *Transport Policy*, vol. 14, pp. 81–93, 2007.

[11] M. Krajňák, "IAS/IFRS as One of the Tools of Accounting Harmonization of European Union," in: *2nd International Conference on European Integration 2014 - ICEI 2014*, Ostrava, 2014, pp. 372-381.

[12] X. Li, J. Preston, "Assessing the Financial and Social Costs of Public Transport in Differing Operating Environments and with Endogenous Demand," *Transportation Planing and Technology*, vol. 38, no. 1, pp. 28-43, 2014.

[13] D. Leiwy, R. Perks, *Accounting – Understanding and Practice*. London: McGraw-Hill, 2013.

[14] J. McKeith, B. Collins, *Financial Accounting and Reporting*. London: McGraw-Hill, 2013.

[15] I. Millere, "The Comparison of the Accounting Legislation of the Republic of Latvia with the International Requirements Concerning the Components of the Annual Reports Developed by Commercial Companies," *New Challenges of Economic and Business Development*, pp. 432-444, 2013.

[16] C. Morris, *Quantitative Approaches in Business Studies*. Harlow: Pearson, 2012.
[17] W. Neumann, *Social Research Methods.* Boston: Ally & Bacon, 2000.
[18] P. Newbold, W. L. Carlson, B. M. Thorne, *Statistics for Business and Economics.* Harlow: Pearson, 2013.
[19] A. De Palma, R. Lindsey, "Optimal Timetables for Public Transportation," *Transportation Research Part B: Methodological*, vol. 35, no. 8, pp. 789-813, 2000.
[20] J. Parbo, O. A. Nielsen, C.G. Prato, "User Perspectives in Public Transport Timetable Optimisation," *Transportation Research Part C: Emerging Technologies*, vol. 48, pp. 269-284, 2014.
[21] W. Pirie, *Enclyclopedia of Statistical Sciences.* John Wiley, 2006.
[22] L. Redman, M. Friman, T. Gärling, T. Hartig, "Quality Attributes of Public Transport that Attracts Car Users a Research Review," *Trans. Policy*, vol. 25, pp. 119–127, 2013.
[23] J. M. Samuels, F. M. Wilkes, R. E. Brayshaw, *Financial Management & Decision Making*. London: Thomson Business Press, 1999.
[24] J. Široký, A. Kovářová, K. Randová, "The Role of the Value Added Tax on Foodstuffs in the Consumer Basket," *Agricultural Economics*, vol. 58, no. 8, pp. 387-395, 2012.
[25] P. Tisato, "User Costs in Public Transport: a Cost Minimum Approach," *International Journal of Transport Economics*, vol. 18, no. 2, pp. 167-193, 1991.
[26] I. Vrabková, I. Vaňková, I. Ivan, "The Efficiency and Public Transport Accessibility of Indirect State Administration in the Czech Republic," *Review of Economical Perspectives*, vol. 16, no. 2, pp. 135-156, 2016.
[27] J. Wild, K. Larson, B. Chiappetta, *Fundamental Accounting Principles.* New York: McGraw-Hill, 1998.
[28] J. Wu, N. Hounsel, "Bus Priority Using Pre-signals," *Transportation Research Part A: Policy and Practice*, vol. 32, no. 8, pp. 563-583, 1998.
[29] Y. H. Wu, J. F. Tang, "Optimizing Timetable Synchronization for Regional Public Transit with Minimum Transfer Waiting Times," in: *24th Chinese Control and Decision Conference*, Taiyuan, 2012, pp. 269-284.
[30] J. H. Zar, "Significance Testing of the Spearman Rank Correlation Coefficient," *Journal of the American Statistical Association*, vol. 67, pp. 578-580, 2012.
[31] B. Zhao, Y. Zhang, Z. Zhang, M. Jin, Z. Li, "Study on Signal Priority Implement Technology of Tram System," *Procedia - Social and Behavioral Sciences*, vol. 96, pp. 905 – 913, 2013.

Michal Krajňák was born in Ostrava (Czech Republic) on September 25th, 1985. He graduated MSc in Accounting and Taxes at VSB-Technical University Ostrava (2010) and doctoral studies in Business Economy and Management at VŠB-Technical University Ostrava (2015).

Since 2010 he has been teaching Accounting in the Department of Accounting in Economics Faculty of Economics, VSB - Technical University Ostrava. He has been working as the ASSISTANT PROFESSOR at the same university. He also cooperates with company Oswald, JSC that runs a portal that is specialized on accounting and taxes. His research interest is application of IFRS to the Czech Accounting legislation, indirect and direct taxes. He is also lector and consultant in company Start podnikání.

Ing. Krajňák, Ph.D. is a member of IFA – International Fiscal Association, Netherlands and Czech Economics Society

.