



POSSIBILITIES FOR TRANSPORT COST DECREASING IN SLOVAKIAN COMPANY CONDITIONS

Katarína Čulková¹, Erik Weiss², Andrea Rosová³

¹ Technical University Košice, Faculty BERG, Institute of Earth Sources, tel.: +421 55 602 3116, e-mail: katarina.culkova@tuke.sk

² Technical University Košice, Faculty BERG, Institute of Earth Sources, tel.: +421 55 602 2332, email: erik.weiss@tuke.sk

³ Technical University Košice, Faculty BERG, Institute of Logistics, tel.: +421 55 602 3144, email: andrea.rosova@tuke.sk

Abstract: Transport present important part of economy. Development of transport is influenced by economical severity and speed of roads infrastructure construction. Slovakia has advantageous position in the frame of middle Europe and it is also important European transport joint in the frame of international business. Therefore there is necessary to know cost of transport with aim to determine effective and productive price. Through cost calculation in transport company there was determined possibilities for decreasing of transport cost and optimal solution of transport. The results show to the main possibilities, mainly to create association of transporters, exclude not serious transporters from the market, eliminate state of wagon stocks, decrease number of employees and wage costs.

Key words: transport, cost calculation, driving fuel, road traffic

1 INTRODUCTION

Transport presents individual branch of national economy. Its development is dependent on geographic conditions and construction of roads infrastructure. European Union design option that covers the vast majority of the cost-effective energy saving (Harmsen, et.al, 2014). There is necessary to know costs of transport with aim to determine proper price, where transport firm must have sufficient information and tools for evaluation of costs. In present condition companies must strengthen their position in competitive environment. One of the ways how to strengthen position of the companies is saving of costs by proper cost calculation, which could create space of development of the companies and increasing of their

competitiveness (Rushton, et.al, 2000). Freight Transport Time (FTT) is an important resource for manufacturing companies, firstly as a cost driver of logistics processes and secondly as a key factor of customer satisfaction. Temruk et.al (2013) give the examples of the influence of automobile transport development on the choice of optimal transportation scheme, taking into account the fact that this transport has been greatly advanced for several decades, especially in the carrying capacity area.

Yet, there is a lot of controversy between researchers regarding the strength of the link between changes in transport time and business performance and the methods used to measure this effect. In this context, the aim of this paper is to estimate the effect that changes in freight transport time have on the economic performance of transport consuming manufacturing companies (Sambracos and Ramfu, 2014). Gerbec et.al (2015) studied cost of public transport and comparison of their performance in terms of costs and benefits. Li et.al (2015) compared specific transport costs with patterns of suburban socio-economic disadvantage and demonstrated that the high transport cost increase household exposure to higher transport costs and compound other forms of transport disadvantage and vulnerability, particularly in outer suburban areas. Jørgensen and Mathisen (2014) considered that transport companies often have public owners and that managers have different objective than the owners, it is argued the firms maximize a weighted sum of profits, revenues and total consumer surplus. Mihaela (2014) created model, intended to be a source of help in the activities of companies seeking to optimize the transport system and analyzed the whole system after the implementation of model, being able to control the entire system, leading to the prevention and elimination of queues and appearance of possible accidents. The model can deduce new information without the high costs.

Logistics involves activities from raw materials processing and transport up to delivery of final products to consumers. One of the logistics roles is to ensure the lowest cost of these activities. In this area Staš et.al (2014) studied so called green logistics, bringing maximum of environmental friendliness, which presents world trend, helping many companies to gain a significant competitive advantage in the present globalized and turbulent environment. On the other hand in area of transport there is necessary to consider economic, social and environmental aspects, together with collaboration between independent transport users and transport service providers (Mindur and Hajdul, 2013).

A good transport organisation implies devising a fast and efficient transport plan for the purpose of better use of transport resources, and if it is necessary, fast and precise review of the plan. Making quality transport plans can be done only by means of excellent knowledge of the user demands, the capacities of the transport resources and the conditions at which the transport will work. Cvetkovic S. And Cvetkovic M. (2012) computerized system for routing and arranging vehicles. By means of the efficient use of the system, shortening of the travel time and the number of kilometers crossed can be made possible, cutting down the costs of living and advancing of reliability.

2 COST IN AREA OF TRANSPORT

Slovakia is transitive country in the frame of EU with diverse geographical structure, which influences development of transport together with economical severity and speed of roads infrastructure construction.

Road transport in Slovakia has very important rate on whole transport volume, till 77% of total transport. In 27 member states of EU this type of transport present approximately 48% from total transport, since geographical conditions of these countries are yet more diverse

than in Slovakia. Rate of road transport is still increasing. Road transport in EU represents almost 600 000 SMEs with average 4 employees. In 2011 road transport employed approximately 3 million people (Christofakis, 2014).

Volume of cost is one of the important facts that determine disposition of competitiveness in road transport (Richter and Tarkowski, 1996). Similarly Łęgowik-Świącik (2015) underlines necessity of cost information in area of decision making process.

Some costs are connected with seat of member state – for example costs for registration and service of vehicle, taxes, and capital costs. Variable costs, for example fees for using of roads or taxes of driving fuel are connected also with seat of service in given member state (Gnap, 2006). Due to the certain balancing of wages with minimal norms in seat of service in member state cost of wages become partially variable. Therefore wages and driving fuel become most important costs in area of transport. Figure 1 illustrated wages that present approximately 20-40% of costs, driving fuels 24-38% of total costs (Harmsen, et.al, 2014).

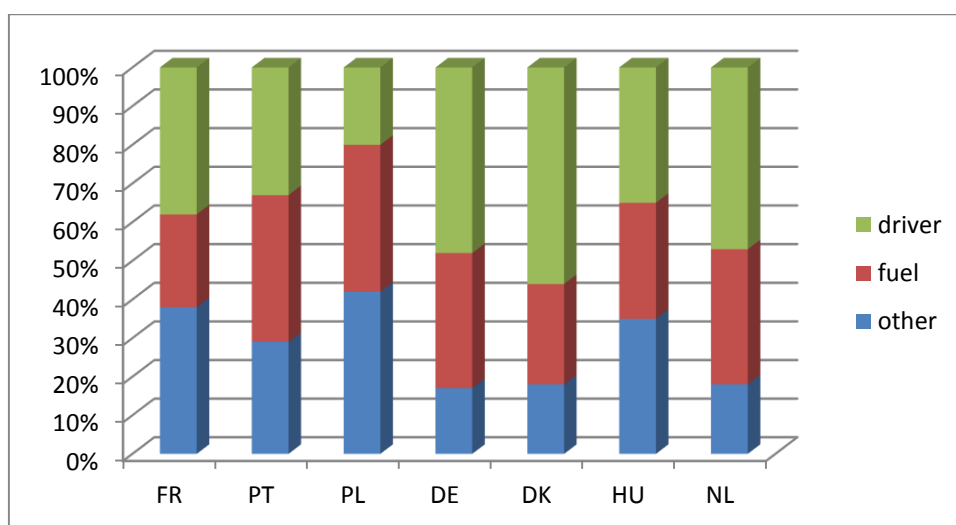


Fig. 1 Description of transport costs in chosen member states (own interpretation according Harmsen et.al, 2014)

As for the cost of road transport in Slovakia and EU countries, costs of driving fuels belong among highest transport companies and there must be given proper attention. For example in Germany price of driving fuels can be changed by day in week, region or daily hour (Christofakis, 2014). Figure 2 illustrates review of driving fuels prices during 2009-2013 in Slovakia, Czech Republic, Hungary and Germany, given in value added tax.

Cost calculation and price creation in transport present activity with aim to calculate and express costs of transport performance in road transport. By this way company is able to obtain information about volume, structure and subject of calculation (Christofakis, 2014).

3 METHODOLOGY

Calculation of transport cost had been analyzed in company PESCH TRANS, ltd. Company is orientated to dispatch and transport activities and it is registered in international database of dispatch companies RAAL TRANS and TIMOCOM.

From the obtained data we analyzed development of costs of service and maintenance, overhead material and work clothing for drivers, stocking of administrative necessities, leasing interests, costs of purchase, repair and change of tires and finally road fee. Costs of service and maintenance increased every year, overhead had varying development. Cost of tires development was not explicit; it could be caused by using of protector tires. Also cost of leasing credit increased. Road fee had been marked as item, significantly disadvantaged transporters and increasing their costs (Gnap, 2006). But unfortunately quality of Slovakian road infrastructure is still not proper, which has influence also to the wearing of tires and increasing of their costs. In the frame of calculation according data from transport firm we constructed entry configuration and calculation form with determination of minimal costs rate per 1 passed kilometer, 1 loaded kilometer and 1 hour of stand time (Čaplová, 2011).

I. Total time of service in hour / month

Total time of service (T_s)

$$T_s = T_{sd} \times WD \quad (1)$$

T_s = total time of service

T_{sd} = service time per day

WD = working days per month

II. Consumption of driving fuel

Consumption of driving fuel (DF)

$$DF = P_f \times C \quad (2)$$

DF = Consumption of driving fuel

P_f = Price of fuel per litter

C = consumption per 100 km, per month

III. Cost of tires

Cost of tires (C_t)

$$C_t = N_t \times P_t \quad (3)$$

C_t = cost of tires

N_t = number of tires

P_t = price per 1 tire / durability of tire

3 RESULTS AND DISCUSSION

While in last year prices of transport reflected transport cost properly and in Slovakia there was not existing fee for using of highway, in present period profits of the company enabled extension of wagon stocks. On the other hand legislative conditions and increasing crisis caused decline of transporters, as well as decline of demand on transport. Prices of transport had been decreasing, but driving fuel costs and highway charges decreased, therefore number of transport companies terminated their activity. Neither less of competition on the market did not stop decreased profits from transport. Also PESCH Trans, ltd had been forced to evaluate and actualize its strategy and minimize its costs. It reflected for example in limitation of periodicity of repairs of vehicles and decreasing of wages. One of the good

alternatives was moving to partially own spaces and by this way decreasing of costs of stock and administration space.

Situation at the market forced also employer and employees to access their work responsibly, to save costs (Grabara, 2013). At the same time company made strategy for operative adaptation to the real demands on the market. Sometimes despite of rejection of transport, since offered price did not cover all costs. Company had been forced to increase its activity also in area of sale and purchase of transported commodities. At the same time profit from business with such commodities became tool how to overcome crisis in transport.

Tab. 1 Entry configuration

Vehicle	Value in € / Unit
Driving performance	7000 / km/ month
Daily service time	9/ hour
Total service time	153/ hour / month
Technical speed	64 km / hour
Coefficient of driving using	0,81
Driving fuels	3573,57 / month
Tires	159,642
Wages	560
Fund of repair	142
Travelling replacement	72
Road tax	211,7775
Insurance	163
Overhead	63
Highway charges	90
Depreciation	1678,64

Through data from entry configuration we made calculation, necessary for calculation form, which is presented in table 2.

Tab. 2 Calculation form

Entries of costs	Costs in € / km	Costs € / hour
Driving fuel	0,51051	
Oil to engine	0,003483	
Oil to gear box	0,0003077	
Tires	0,022806	
Maintenance, repairs	0,02028	
∑ variable costs	0,5573867	
Wages	0,08	5,12
Insurance	0,0232857	1,4902857
Depreciation	0,2398057	12,27804952
Highway charges	0,012857	0,82285
Overhead	0,009	0,576
Travelling replacement	0,0002857	0,0182857
∑ unit fixed costs	0,3652341	20,30547092
∑ total individual costs	0,9226208	20,30547092

By the way of cost calculation we determined price of transport according following calculation:

I. Price of transport

Result price (R_T)

$$R_T = L \times P_u + N_{st} \times P_{st} \quad (4)$$

R_T = result price

L = load kilometer

P_u = price per 1 loaded kilometer

N_{st} = number of stand time in hour

P_{st} = price per 1 hour of stand time

Result sum of transport price (P_T)

$$P_T = R_T + P_e + 20\% \text{ VAT} \quad (5)$$

P_T = price of transport

R_T = result price

P_e = expected profit

VAT = value added tax

Results of calculation had been proved also by calculation per concrete transport. We followed up cost of transport for vehicle DAF XF 105. Vehicle transported material with volume 24,5 tones, 384 km with load, total distance 553 km. Invoiced amount was 427,96 EUR without VAT, and 513,552 EUR with VAT. According previous results we applied our values for this transport at 437, 3906 EUR.

From results there is obvious that invoiced amount did not cover variable and fixed cost and by this way there was no recorded profit from this transport. But transporter could cover this loss by better using of vehicle or better price per loading during reverse vehicle loading or during next transport in given month.

For calculation of cost there is necessary to use actual table for cost calculation of every transport, as well as to have proper software, which could calculate total costs per concrete transport more rapidly and to suggest optimal solution of transport. By this way capacity of vehicles can be used maximally, and number of stand time and not loaded kilometer can be decreased (Malindžáková, 2011 and Straka, 2010).

Following possibility is to decrease costs of driving fuels, which belongs among most costly items. Since company cannot influence consumption tax, there is necessary to find out possibilities for driving fuel purchase at lower prices. One of the possibilities is to find out cheaper supplier or to purchase in greater volumes for better prices. But this possibility demands to prove proper stocking of greater volume of driving fuel. By this way company could record not only saving of driving fuel costs, but also saving of consumption, since riders of vehicles should approach fueling more responsibly (Gnap, 2006).

General possible cost decreasing can be proper price – goal of transport firm is to make transport at most convenient price, which could bring profit and full using of vehicle capacity. Fuel cards can provide for transporters information about driving fuel with best price. In case company disposes modern wagon stock, it saves not only living environment, but also its costs of driving fuel, service or maintenance of vehicles. Present trend of driving fuel prices in Slovakia and EU countries forces transporters to follow up the prices, since there is no preferable fueling in abroad.

6 CONCLUSIONS

Business in road transport is not simple and to penetrate at transport market is also difficult. Transport firm must regard during its activity number of factors that influence its existence and at the same time it must evaluate and actualize them regularly. Skills of company management in area of transport and logistics become basic pillars of future development, achieving of business aims and effective using of market possibilities in given area. Proper regional conditions and not used transport capacity present also positive assumption for development of transport area. Company has clear vision and goals. It wants to be still leader at transport market and to satisfy needs and claims of its consumers. But it must therefore to find out tools and ways for transport costs decreasing.

Since in near surroundings there are several transporters, offering similar transport services, one of the possibility is to create association of transporters, which could stand against existing costs of transport and to obtain orders, adequately evaluated. Next possibility is to exclude from the market through natural serious completion not serious transporters. Important part in present economic situation plays also tax and education charge of businessmen, heavy business environment and various legislative obstacles. Further possibility how to decrease transport cost is to eliminate state of wagon stocks, decreasing of number of employees, which means also decreasing of service and wage costs, since they present biggest rate of company costs. There is number of possibilities for costs decreasing, it depends on management of the company how to face such actual problem solving.

Acknowledgement

This paper is a part of VEGA grant project No 1/0216/13 “Methods and new approaches study to measurement, evaluation and diagnostic performance of business processes in the context of logistics management company.”

References

- [1] Cvetkovic, S., Cvetkovic, M.: Rationality of the transport of stationary communal waste. *Journal of environmental protection and ecology*, 2012, 13, 2, 775-780.
- [2] Čaplová, P.: *Transport and carrying*, Bratislava : KONTAKT PLUS s.r.o., 2011, 100p.
- [3] Gerbec, M., Samuel, R.O., Kontić, D.: Cost benefit analysis of three different urban bus drive systems using real driving data. *Transportation Research part D: Transport and environment*. 2015, 41, 433-444.
- [4] Gnap, J.: *Transport and carrying in international business*, Bratislava : Slovenská obchodná a priemyselná komora, 2005, 192p.
- [5] Gnap, J.: *Calculation of own costs and price creation in road transport*, Žilina : EDIS-vydavateľstvo ŽU, 2006, 243p.
- [6] Grabara, J.: Employer’s expectations towards the employees from the marketing and management department. *Polish Journal of Management Studies*, 2013, 7, 58-70.
- [7] Harmsen, R., Eichhammer, W., Wesselink, B.: An exploration of possible design options for a binding energy savings target in Europe. *Energy Efficiency*, 2014, 7, 1, 97-113.
- [8] Christofakis, M.: Transport cost in local practice and economic geography: Traditional theories, some new dimensions and policy implications, *Bulletin of Geography*, 2014. 25, 25, 55-67.

- [9] Jørgensen, F., Mathisen, T.A.: Market equilibriums for transport operators with several goals. *European Transport Research Review*, 2014, 6, 3, 241-251.
- [10] Łęgowik-Świącik, S.: Evaluation of decision – making processes with reference to cost information management. *Polish Journal of Management Studies*, 2015, 11, 2, 91-99.
- [11] Li, T., Dodson, J., Sipe, N.: Differentiating metropolitan transport disadvantage by mode: Household expenditure on private vehicle fuel and public transport fares in Brisbane, Australia. *Journal of Transport Geography*. 2015, 49, 16-25.
- [12] Malindžáková, M.: Coordination of enterprise management systems, *Kvalita pro život*, 2011, 12, 2, 40-44.
- [13] Mihaela, C.E.: Analytical interpretation to optimize transport systems. *Advances Materials Research*. 2014, 1036, 881-884.
- [14] Mindur, L., Hajdul, M.: The concept of organizing transport and logistics processes, taking into account the economic, social and environmental aspects. *Transport Problems*, 2013, 8, 4, 121-128.
- [15] Richter K., Tarkowski J.: *Znaczenie centrów logistycznych dla nowoczesnego gospodarowania*, Berlin, Springer Verlag, 1996.
- [16] Rushton A., Croucher P., Baker P.: *Logistics and distribution management*, London, Kogan Pade Limited, 2000.
- [17] Sambracos, E., Ramfu, I.: The effect of freight transport time changes on the performance of manufacturing companies. *European Research Studies Journal*, 2014, 17, 1, 119-138.
- [18] Staš, D., Lenort, R., Vystavěl, F.: Design of green logistics audit for industrial company transport. *METAL 2014 - 23rd International Conference on Metallurgy and Materials, Conference Proceedings*, 2014, 1889-1895.
- [19] Straka, M.: System of distribution logistics of enterprise Alfa, a.s., *Acta Montanistica Slovaca*, 2010, 15, 1, 34-43.
- [20] Tan J., Hui L., Wee-Teo Ch.: *Distribution Centre management*, UK, McGraw Hill, 2006.
- [21] Temruk, V.A., Leybenzon, P.G., Strelkov, D.B.: Choice of optimal transport scheme of technological cargo transportation. *Tsventnye Metally*, 2013, 10, 71-73.
- [22] Teplická, K.: Cost Managementmania, *Manažment v teórii a praxi*, 2009, 5, 1-2/2, 1-5.