COST CALCULATION IN CONDITIONS OF SLOVAKIAN TRANSPORT COMPANY

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Abstract

Logistics presents vast potential for effective acting of all companies, orientated to cost decreasing and by this way to profit maximizing. Logistic principles can be used in management of various sectors of national economy, while important part of economy in present time is area of transport. 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.

Keywords: Transport, cost calculation, driving fuel, road traffic, company

1.   INTRODUCTION

Transport presents individual branch of national economy. Its development is dependent on geographic conditions and construction of roads infrastructure. 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. Transport plays irreplaceable role in social and economic development of the society. The role of the public transport in the development of villages and cities or regions is also apparent and not only as a counterbalance to the individual transport. There are many reasons why the state is interested in the capability to specify and distinguish particular sorts of transport costs and consequently the necessity of the unified method of costs calculation which this article deals with (Říha and Tichý, 2015). Lada et. al (2016) applied statistical analysis to calculate the cost of transport and to receive a general assessment of the profitability / unprofitability of transport trip. They found factors influencing the transportation costs, as a basic set of parameters for the cost calculation. Their findings make it possible to get a proper assessment of profitability or unprofitability of a transportation direction taking into account the accumulated traffic statistics regarding a particular transport company. To support costing improvements in transport, Bokor (2011) aims to identify the shortcomings of currently used techniques and give a guideline on how to overcome them. The theoretical basics of a new transport costing model are developed while some experiences of early pilot applications are also considered, providing reliable cost information for decision makers on transport services.

2.   PRESENT STATE OF TRANSPORT COSTS IN SLOVAKIA AND EU COUNTRIES

Transport belongs to the tertiary sector of the economy. Transport development is influenced mainly by overcoming these obstacles, economic demands and the speed of construction of road infrastructure. Slovakia is due to its favorable location in the center of Europe an important European transport point able to take

advantage of its location in international trade. 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 (Gnap, 2005). In comparing with Czech Republic that is considered as country with most stable economy of former socialistic countries, Slovakia has the similar development. Czech Republic uses privileges, resulting from membership in EU through adaptation of rules, regulating economy and still extending export. Czech Republic is very favorable country from the view of transport, which provides big number of offers of free consignments and vehicles in the frame of Transport database. Transport is realized similarly as in whole EU through simplified legal principles. In the frame of Transport database there is possible to realize transactions in Germany, Slovakia, Great Britain, France, Poland, Austria and China (logintrans.sk). In Hungary small and medium sized road freight transport companies are facing strong competition on the logistics market. An advanced cost management system supporting decisions on capacity allocations or pricing may be a competitive advantage for them and indirectly for the whole economy as well. Still, they generally apply simple, traditional cost calculation regimes, potentially sufficient in case of a homogeneous service portfolio. Nevertheless, road haulage companies with heterogeneous service structures may witness information distortions when using traditional costing methods. So it might be recommended for them to introduce better costing principles. Bokor and Markovits-Somogyi (2015) introduced therefore a multi-level full cost allocation model. Volume of cost is one of the important facts that determine disposition of competitiveness in road transport. 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. 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. Wages present approximately 20-40% of costs, driving fuels 24-38% of total costs (**Figure 1**) (Gnap, 2005).
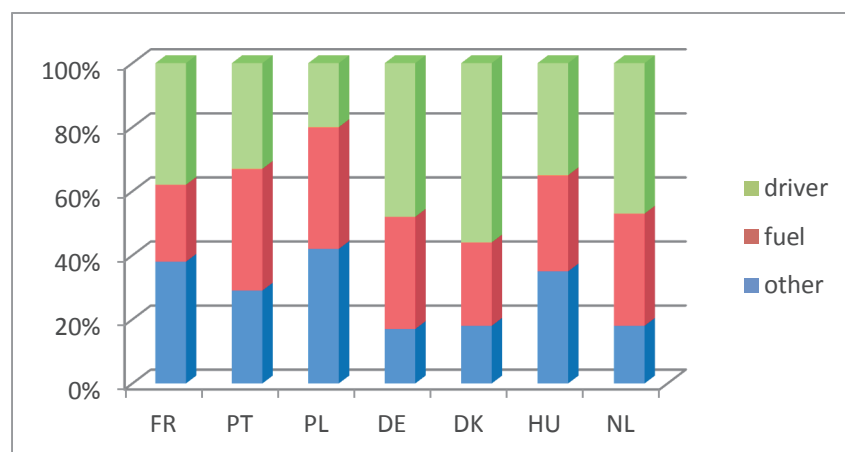

Figure 1 Description of transport costs in chosen member states
(own processing according Gnap, 2005)

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.
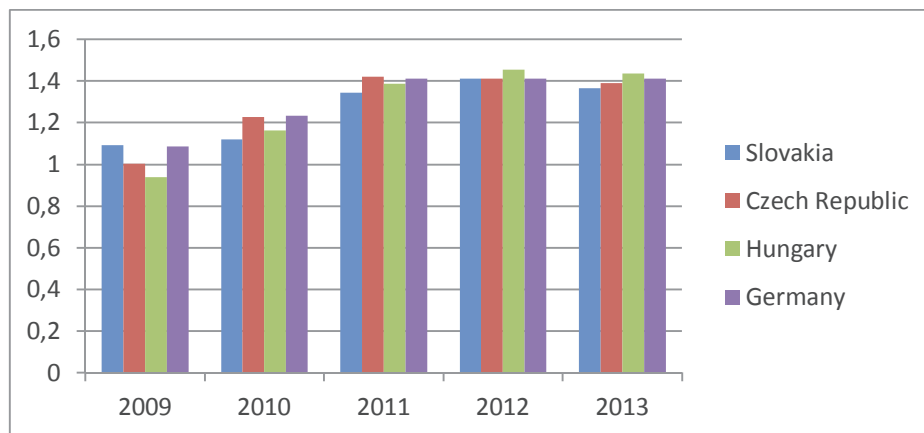
Figure 2 Prices of driving fuels in Slovakia and chosen EU countries in l / €
(own elaboration, according Gnap, 2005)

Average monthly wage in transport in chosen EU states are developed as illustrated by **Table 1**. Wages present gross income in area of transport in EU countries. Wages are calculated according available exchange rate of the National Bank of Slovakia in 2013.

Table 1 Average monthly wage in SR and EU

State	Currency	Gross income	Exchange rate	Calculation to €
Slovakia	EUR	803	1	803.00
Czech Republic	CZK	22 191	27.427	809.09
Hungary	HUF	223 351	297.04	751.92
Germany	EUR	2 894	1	2 894.00

From the table we see that Slovakia, Czech Republic and Hungary have almost the same wages, since they went through similar development of economy.

2.1. Costs calculation and price creation in transport

Due to the cost calculation there is necessary to know logistics indexes for transport (**Table 2**).

Table 2 Structure of logistics indexes in transport

Number of clients	Active Passive
dispatched consignments per unit	Total number of dispatched consignments / time period (consignments / month (year)
Number of stocking levels	Central stocks Regional stocks Expedition stocks
	Total turnover / number of clients Euro / client
Average volume of order	Number of products / number of orders
Average distance between stocking levels	km
Rate of distribution workers	Rate of workers in distribution / total number of clients x 100 (%)
Number of stocking places	Number (min)

Source: own processing, according Rosová, 2010

Cost calculation 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 [7]. Own costs in transport are created by work and financial means consumption, produced for transport during certain period. Price of transport presents agreement among transport and consignor. It consists from several items, for example transit rate, taxes of driving fuels, road toll, parking charge, vehicle evidence, insurance etc. (Teplická, 2009). Price of transport should be determined by transport experts. Such price must be determined properly with aim to cover costs and bring profit, but also with aim to be competitive and saleable (Gnap, 2006). Whole logistic process of transport in the company is realized according **Figure 3**.
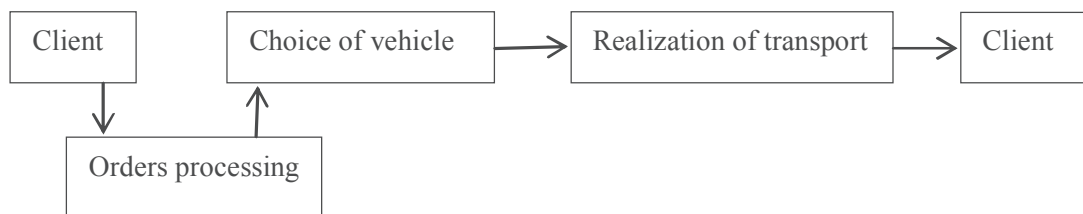

Figure 3 Logistics process of transport company
(own elaboration, according internal data of the company)

The main goal of Transport Company is to achieve satisfaction of the clients in every direction: price, quality, service, etc., in case company is single supplier or provider of transport.

In the frame of cost calculation determination of minimal costs rate per 1passed kilometer, 1 loaded kilometer and 1 hour of stand time can be calculated as follows:

I. **Total time of service in hour / month**
   Total time of service (T_S)

$$\mathbf{T_S = T_{sd} \; x \; WD} \qquad (1)$$

   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)

$$\mathbf{DF = P_f \; x \; C} \qquad (2)$$

   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)

$$\mathbf{C_t = N_t \; x \; P_t} \qquad (3)$$

   Ct = cost of tires
   Nt = number of tires
   Pt = price per 1 tire / durability of tire

IV. **Price of transport**
    Result price (R_T)

$$\mathbf{R_T = L \; x \; P_u + N_{st} \; x \; P_{st}} \qquad (4)$$

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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 [4]

During costs and price calculation there is necessary to consider:

- price per 1 km (in case there is bulk goods)
- price per 1 t, when there is possible to know if maximal weight of consignment could be 25 t
- price per whole vehicle
- length of transport,
- costs, connected with whole process,
- profit.

3. COSTS CALCULATION IN CHOSEN SLOVAKIAN TRANSPORT COMPANY

Costs of transport 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. 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. At the same time company made strategy for operative adaptation to the real demands on the market. Sometimes company rejected 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. 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. 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 1passed kilometer, 1 loaded kilometer and 1 hour of stand time.

Table 3 Entry configuration (Caplová, 2011)

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 4**.

By the way of cost calculation we determined price of transport. 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.

Table 4 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**

ADDITIONAL INFORMATION FOR PRICE CALCULATION:

Route: Čierna nad Tisou (Slovakia - Žatec (Slovenia) = 702 km mainly 7 hour 31min.

Since company makes international transport, there is necessary to consider also main overhead and all risks that can influence final price due to the possible time of vehicle stop, for example 1-3 days, since stationary vehicle is not bringing profit.

Costs per vehicle: company calculates costs per minimally 0, 73 Euro/km, where there are included:

- leasing payments per 1 km
- diesel oil, fuel,
- amortization
- purchase of accessories, etc.

Further there is necessary to include also other costs, mainly:

- job of driver,
- toll fees (Slovakian territory)
- highways fees (Hungary and Slovenia territory)

P = 1.21 × 702

P = 850 €

Profit: is dependable on concrete market situation and on the regularity of transport. Due to the all costs and possible risks company determined price of transport (P) per 1km = 1.21 Euro, from which results that total price of transport of free loaded goods according planed tour presents 850 Euro for client of shipment.

4.   DISCUSSION

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 fuelling in abroad. Except price per ordered transport we can calculate also price of whole logistic process that begins at the order from the view of efficiency in the seat of the company. The information can be obtained from daily report of vehicle performance, from which whole process of transport from the beginning to the end together with time data can be determined. Granichin et.al (2013) discuss the different organizational models of cargo transportation for truck companies have influence on transport costs, mainly in situation, where trucks return back to their garage after each trip, and more flexible, where trucks wait for new orders at the unloading positions, where trucks can be late but pay a penalty for this, and finally where orders can be adaptively rescheduled. One of the main difficulties in transportation

companies is to determine and evaluate true cost of their operations and services. ABC method can be very helpful for transportation companies to determine cost of their operations with higher correctness. ABC method is quite effective in costing in transportation company, in comparing with existing traditional costing systems (Baykasoğlu, and Kaplanoğlu, 2008). Activity-Based Cost is widely used in enterprises in the United States, Japan and European Union. Indirect cost accounts for a comparatively higher percentage in logistic enterprise's total cost, whose greatest feature is that it is without inventory cost. Ma et.al (2011) considers the characteristics of cost structure for logistic enterprise and derives a practical logistic enterprise activity cost accounting model from basic activity cost model.

5. CONCLUSION

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.

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