

# Methodological Procedure for Evaluation and Valuation of Additional Services in Rail Freight Transport

Vladimír Klapita<sup>1</sup>, Lenka Černá<sup>1\*</sup> and Xiquan Liu<sup>2</sup>

<sup>1</sup> University of Žilina, Univerzitná 1, 010 26 Žilina, Slovak Republic,  
E-mail: [lenka.cerna@fpedas.uniza.sk](mailto:lenka.cerna@fpedas.uniza.sk), [vladimir.klapita@fpedas.uniza.sk](mailto:vladimir.klapita@fpedas.uniza.sk)

<sup>2</sup>Shandong Foreign Trade Vocational College, International Transportation and Logistics Management Department, Qingdao, Shandong Province, China; Email: [daniel4china@gmail.com](mailto:daniel4china@gmail.com)

**\*Corresponding Author:** Lenka Černá

**Abstract:** The pricing methodology is a system-based application that can provide a positive economic outcome for each operating activity that aims to increase a specific utility value or utility effect. Price calculation in transport is part of the general theory of pricing, while accepting specific business conditions in transport, or in its individual sectors, including rail transport. This paper describes a proposal of a suitable methodical procedure by means where it would be possible to effectively evaluate such additional services in rail freight transport that are provided beyond the carriers' basic activities in Slovak Republic conditions. The new methodology for evaluating and pricing ancillary services must aim at creating more favourable economic conditions regarding pricing for carriers, flexibility in the provision of additional services and the ability to respond to customer requirements. The secondary objective of the new methodology is to promote environmentally friendly transport modes, which in continental transport means increasing the share of rail transport in the transport market. This benefit of the newly proposed methodology, i.e. greening transport in general is also one of the EU's objectives.

**Keywords:** Pricing, freight transport, additional services, transport costs

## 1. Introduction

Pricing is a process whose main objective is to define a strategy that maximises transport companies' income. Determining the appropriate pricing process is rather complicated, as specific transport market factors need to be taken into account. Improper valuation of the service may result in a loss of customers as well as personal and corporate reputation [1]. The offer and implementation of additional services in rail freight transport plays a big role in the customer's decision on using a particular carrier's services, furthermore, costs for additional services are not subjected to regulation and their valuation is in full competence of the carriers. Therefore,

appropriate methodology for the evaluation and subsequent valuation of additional services in rail freight transport can influence the position of this goods transport segment on the transport market significantly [2].

In rail freight transport, there are three basic pricing strategies through which carriers set prices for transport services, namely:

- own cost assessment methodology,
- the competition method, and
- demand method.

It is up to the carriers themselves to choose the appropriate strategy for the pricing policy [2].

## **2. Data and Methods**

The systematics of dealing with such a demanding problem as evaluation proposal and pricing must accept appropriate scientific methodology.

The chosen problem-solving methodology is divided into several parts and its main objective is to achieve an effective valuation of additional services in rail freight transport provided by carriers beyond their core activity, i.e. relocation of goods. The methodology accepts the classic problem-solving process, i.e. sequence of these steps:

- description,
- analysis
- proposal.

Therefore, the first part of the methodology describes the monitored problem, which is related to customers current requirements to carry out additional activities in freight transport. This section also monitors the necessary support needed to provide services beyond the transport itself. The analytical part of the methodology is focused on those additional services that railway carriers generally perform in the Slovak Republic, i.e. those for which there is the greatest demand. The analysis mainly concerns the price decision-making issue in transport. On the basis of the performed analysis it's possible to propose a suitable methodical procedure for the valuation of ancillary services.

The methodology includes several important steps:

- elaboration of technological procedures for implementation of additional service,
- cost analysis,
- proposal for valuation of a specific additional service.

The methodology's conclusion is supplemented by a specific example of the valuation of a selected additional service, which proves its suitability. The proposed methodology represents a

sequence of steps that will not only ensure promotion of the efficient pricing of ancillary services, but also ensure the support of rail transport as a more environmentally friendly transport mode.

### 3. Price Decision-making in Rail Transport

Price decision-making is a continuous process through which business management can influence and manage profit. The price in this process represents two dimensions, on the one hand, it's customer value and a sales indicator, on the other hand, it's the value of direct and indirect costs that have to be spent on the rail transport service.

Price decision-making includes activities aimed at collecting, sorting and evaluating internal and external company information on factors affecting price levels on and off the market and making critical business decisions on the process and competence in the prices of services provided. These activities form a certain pricing business system, which consists of pricing strategy and pricing. The difficulty of price decision-making mainly results from the difficulty of the market mechanism. If a carrier wants to compete in this market, it must try to manage the demanding price decision process as successfully as possible. In doing so, it should not matter what the big transport undertaking is, even the price decision making at the level of a small undertaking must necessarily be based on an objective theoretical basis on which it can rely. Knowledge of this theoretical basis and, in particular, the ability to apply its knowledge in practical price decision-making is of great importance to any entrepreneur [3,4].

Price decision-making risk is a part of business risk and especially financial risk. The following two baseline indicators are particularly used to assist price decision-making:

- certainty coefficient,
- level of risk.

The certainty coefficient expresses the extent to which the sales volume may fall to the level of profit or profit threshold. The smaller the share, the greater a company's risk of going below that point and becoming loss-making. The certainty coefficient ( $fc$ ) can be expressed as follows [5].

$$fc = \frac{R_m + R_b}{R_m} * 100 \quad (1)$$

$$R_b = \frac{TFC}{D_i} * P_i \quad (2)$$

where:  $R_m$  is maximum earned or predicted revenue for a particular demand and price;  $R_b$  is sales that fall at break-even point at a certain demand and price (border sales);  $TFC$  is total fixed costs;  $D_i$  is the difference between the price  $C_i$  and the variable costs  $VC_i$  at a certain price and demand;  $P_i$  is price per item of power at a certain volume.

Another price decision indicator is the indicator for the level of risk ( $L_r$ ) from pricing, which can be calculated by the following relation [5]:

$$L_r = \frac{R_b}{R_m} * 100 \quad (3)$$

or

$$L_r = \frac{Cb * P_i}{(Cc * P_i)} * 100 \quad (4)$$

where:  $L_r$  is risk level (%);  $Cb$  – output volume at break-even point;  $Cc$  – output volume at a certain price and demand.

The smaller the amount of output required to cover fixed costs, the lower the risk level and the more advantageous to the entrepreneur. If the confidence factor is known, the risk indicator can be calculated as  $100 + fc$  [5].

#### 4. Analysis of Additional Services in Rail Freight Transport

Price is a measure for determining the value of the service provided in transport. Price can be used to compare the same or similar services provided by the competition, but the quality isn't compared. Therefore, the price of the same service and quality is only a relative measure of the value [6]. Additional rail carrier services are generally perceived as some extra services, i.e. services offered beyond the basic focus of the transport undertaking - relocating goods from the loading place to the unloading place. In (basic) transport price these services are recorded as so-called additional charges. The carrier charges an additional fee in the following cases:

- The customer is unable to carry out the selected action (even if it's the obligation from the transport code to do so).
- Breach of the carriage contract (charges for breaching the provisions of the transport rules).
- The carrier carries out selected operations on behalf of the customer due to the urgency of special transports (the customer isn't present).

Therefore, the additional charge is a variable freight component, which is dependent on many indicators, the customer's requirements being decisive. In the process of carrying consignments, there may be several periods of time whereby activities are carried out beyond the transport itself and carried out by the carrier for a fee. The total amount of freight (the entire transport price) depends, in addition to the amount of freight, there is also a system of additional charges, whose structure and price level are determined individually by the carriers. The variability of additional services and therefore the additional fees are quite wide. Additional charges may arise at any point in the route, for various reasons on the part of the individual parties to the carriage contract, as a result of a change in the carriage conditions, depending on the type of shipment, etc [7].

## **5. Methodological Procedure for the Valuation of Additional Services in Rail Freight Transport**

Price also plays an acquisition role in rail transport and encourages customers to buy or the use the carriers other additional services. There are several economic or non-economic pricing options for services, the most commonly used are:

- cost-oriented pricing - pricing for additional service based on eligible costs and reasonable profit,
- competitive pricing - comparative analysis of competition prices,
- demand-oriented pricing - a combination of economic and non-economic options based on demand and supply.

Each pricing option has its advantages and disadvantages. Economy-based models are based on profitability, while non-economic models pay more attention to competition and market requirements. Therefore, the model that would respect market requirements, monitor competition and accept profitability seems to be the most advantageous. Such a combined model, i.e. the options of setting the price level of additional services would be predominantly cost-oriented but would also take the prices of services provided by competitors into account [8].

The methodology for valuing additional services according to the proposed model is as follows:

1. Processing customer requirements in the transport process.
2. Identifying specific additional services.
3. Technology of additional services – the carrier's technological operations within the implementation of additional service.
4. Identifying costs related to the performance of additional service.
5. Identifying individual cost items of additional service.
6. Total cost of additional service.
7. Cost valuation of an additional service - price for 1 act depending on the volume of performed tasks for the reference period.
8. Price for additional service (determination of reasonable profit).

The proposed methodology, i.e. its suitability for the application was then tested on a customer-requested additional service.

### ***Application of methodical procedure for evaluation and valuation of selected additional service in rail freight transport***

The analysis for the provided additional services in freight transport showed that one of the most frequently performed additional services implemented on the customer's initiative or on the

carrier's initiative in case of suspicion of congestion of the railway wagon is weighting [9]. Application of the proposed methodical procedure is as follows:

*A: Fee Identification - Weight detection fee:*

In the consignment note the consignor is obliged to state (hereinafter referred to as CN) the weight of the goods for the purpose of concluding the carriage contract. If the consignor asks for the carrier's weight and there is a railroad weight at the departure station and the operating conditions allow, the weight of the consignment loaded on the general loading and unloading track (hereinafter GLUT) may be detected at the departure station. For determining the weight, the carrier charges a fee for implementing this service. The carrier is also entitled to check the weight of the consignment stated by the consignor in the consignment note. The weight declared by the consignor in the consignment note shall be deemed to be correct for the calculation of the carriage charge, if the result of the weight check is not higher than that prescribed by the International Rail Transport Regulation compared to the weight indicated by the consignor in the consignment note. If excess weight was found by testing, in addition to the freight charge from the point of departure to the point of arrival, the carrier shall charge a fee for the carriage of the consignment.

*B: Weight detection technology:*

- The customer's acceptance of disposition.
- Checking the feasibility of an additional service.
- Feasibility notice for the additional service to the customer.
- Notification of the employee to be weighed
- Shift to rail scale.
- Weighing the shipment.
- Weighing list.
- Shift to GLUT.
- Record weighing in CN.
- Record into the information system.
- Preparing the accounting document.
- Attaching weight card to documentation.
- Charging fee.

*C: Identification of additional service costs [10,11]:*

- Staff costs:
  - o Shunters -% of annual cost per employee,
  - o Commercial worker -% of annual cost per employee.
- Rail weight cost:
  - o Repair and maintenance – total cost

- Arranging price – total cost
- Document costs -% of annual document costs.
- Office space costs -% of annual office space costs.
- Instrument cost -% of annual instrument cost.
- Shunting locomotive cost -% of annual locomotive shunting cost.
- Overheads - % of annual overhead costs.

*D: Total cost of the additional "Weighing of shipments" service*

$$N_{C\text{-weighing}} = N_{\text{staff}} + N_{\text{equipment}} + N_{\text{documents}} + N_{\text{office space}} + N_{\text{instrumentation}} + N_{\text{locomotive}} + N_{\text{overhead}} \quad (5)$$

*E: Additional service cost valuation*

The valuation of additional service is expressed as the price for 1 operation (transported one wagon with goods) depending on the volume of performed operations for the reference period [12,13]:

$$\frac{\%C_{\text{shunter}}^Y + \%C_{\text{commercial worker}}^Y + \%C_{\text{shunter}}^Y + C_{\text{rail weight}}^{\text{maintenance}} + C_{\text{rail weight}}^{\text{acquisition}} + \%C_{\text{paper}}^R + \%C_{\text{office}}^R + \%C_{\text{instrumentation}}^R + \%C_{\text{HKV}}^R + \%C_{\text{overhead}}^R}{\Sigma \text{wagon weighing (year)}} \quad (6)$$

*F: Additional service (AS) Price:*

$$\text{AS price} = \text{Freight pricing of weighing} + \text{average profit} \quad (7)$$

Depending on profit function in pricing additional charges.

## 6. Discussion

As mentioned in the introduction, pricing is a process aimed at establishing a suitable strategy to maximise the revenue of a transport undertaking, but also serves as an acquisition tool and, of course, to increase the share of performance in the transport market [14]. Therefore, determining an appropriate pricing methodology is a relatively complicated process whereby the specificities of the transport market must be taken into account. Relying on cost-oriented models only may result in the loss of the customer in the pricing process.

Usually, the most common errors in a transport company's pricing are:

- pricing is too cost-oriented,
- price adjustments are not sufficiently prompt and do not reflect market change.

Making the right price decision is a process that determines the future success of the sale of the transport service. If it doesn't take all the influences that affect it and all its effects into account, the carrier may calculate an amount that the customer won't accept, and the service won't be sold. Such an erroneously high price, calculated solely on the basis of economic criteria, may even encourage the sale of the service to competing carriers [15,16]. Conversely, if the price is significantly lower than the competitor's service price, the carrier is unnecessarily deprived of potential profit. Decisions on transport pricing must be coordinated with decisions on potential service delivery, promotion and sales promotion to harmonise and create an effective marketing programme together.

## 7. Conclusion

Pricing policy is the process of pricing and their flexible adaptation to changing market conditions. The basis of the railway business is the correct pricing of the service. If the price is very high, customers aren't interested in buying the service. On the other hand, a very low price has an adverse effect on profits and, furthermore, often creates distrust of customers regarding the quality of the service provided. Part of the pricing policy is to find suitable methods and tools for price adaptation, timely initiation of price changes, flexible response to changing conditions on the transport market, etc. The aim of this paper is to propose a methodological procedure for valuation of additional services in rail freight transport, which can become an effective tool of the carrier for keeping on the transport market and also a tool for promoting a more environmentally friendly transport mode.

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