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**SUBJECTS OF TRANSPORTATION PROCESSES AND THEIR
RELATIONSHIPS**

Václav CEMPÍREK, Rudolf KAMPF

Katedra technologie a řízení dopravy

Introduction

This article was created as a part of researched grant project (GA ČR) „Outsourcing Transportation - Logistical Processes“ on the Jan Perner Transport Faculty, University of Pardubice.

The main aim of the project is to determine and propose the suitable methodology and decision criteria for implementation of outsourcing of transportation – logistical processes. This solution is focused on the transportation – logistical processes aimed on creation of theoretic presumption for implementation of outsourcing of mentioned processes.

Nowadays, the project is in 2nd year of research. Team of researchers elaborated theoretically in first year of research (2005) [4]:

- a) Recherche and analysis of accessible domestic and foreign materials that are related to:
- transportation - logistical processes outsourcing and generally by outsourcing,
 - process management and transportation - logistical processes,

- logistics that focuses on company logistics,
 - financial and economic questions.
- b) Determination of basic philosophy of the application of the transportation - logistical processes outsourcing, elaboration of advantages and disadvantages outsourcing including influence of implementation of outsourcing on organizational structure of company and impacts on employees.
- c) Basic characteristics of the transportation - logistical processes in company including the definition of the most often used logistic systems nowadays.
- d) Analysis of factors (involving single transportation - logistical processes) that are outputs from basic processes which happen in company and are related to company logistics.

Determination and analysis of transportation – logistical costs in company were processed within the financial and economic analysis. The impact of outsourcing on decrease in costs was processed and analyses of risk, costs and asset analysis were processed, that is critical question for company in the case outsourcing.

Research of effectiveness of outsourcing to expended costs was made.

The article in the following part describes subjects that refer to problem of selection of form of transport as the part of transportation processes and relationships between participants of transportation processes.

1. Relationships between the participants on transportation processes

Subjects that are classified like customers, transport operators, forwarders, state (society) are defined in transportation processes.

Differences between middleman and forwarders are explained in more detail. The middleman is only mediator between customer and transport operator. Forwarder is transport operator in view of customer and forwarder is the shipper in view of transport operator. The forwarder can assure the transport of all forms of transportation in contrast to middleman. It means that forwarder chooses the form of transportation in case that customer (it is somebody who orders transportation services) didn't specify the concrete form of transportation in advance. Possible relationships between the participants of transportation processes are demonstrated on *fig. 1* [2].

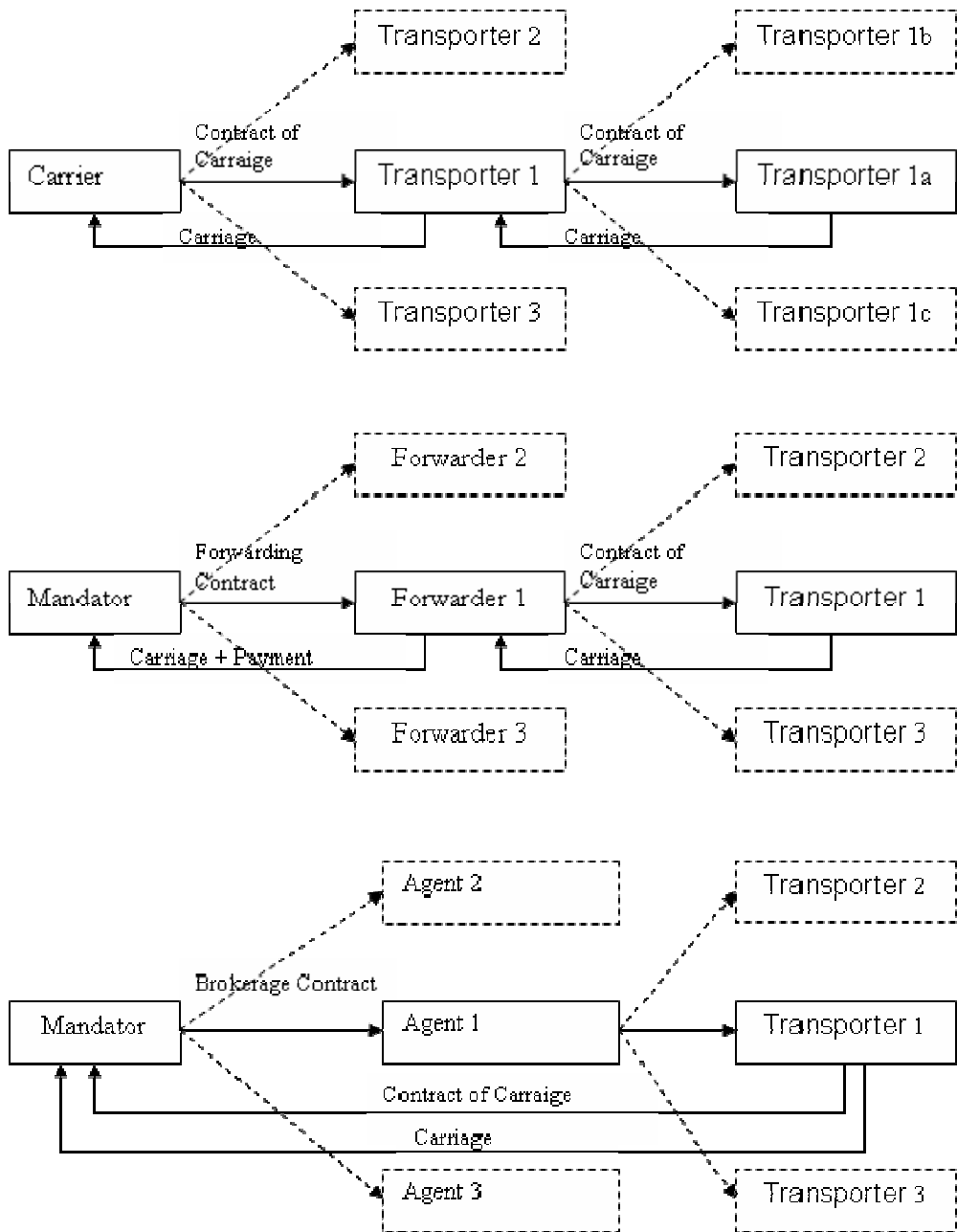


Fig.1 Relationships between the participants on transportation processes

The state is subject that doesn't participate on transportation processes directly but state can involve them by some ways.

The state is not able to involve decision about selection of form of transport directly but the state is able to involve supply and demand on transportation market and distribution of labour.

Regulation tools [3]:

- generally legal legislation and norms
- tax system, fees, tariffs, prices
- financial support of public budgets
- state participation in business

These tools are able to be used like regulating, incentive, organizational and technical measures in the interest of implementation of state according to preservation of functional competitive market place.

2. Selection of transport operator

Practically more different methods of decision-making about choice of form of transport that classify into these groups are used at company level [5]:

- Economic method – selection of the form of transport is realized on economic (cost) principles (economic value is analysed, for example costs).
- Technological method - selection of the form of transport consists of relationship between transportation system and transport cargo (**transport unit of production is analysed**).
- Behavioristic method - selection of the form of transport is realized on the basis of experiences and intuition somebody who decides (person is analysed).

3. Classic economical model

Classic economical model is the oldest model of selection of form of transport.

This model compares variable and fixed costs of various forms of transport in dependence on distance.

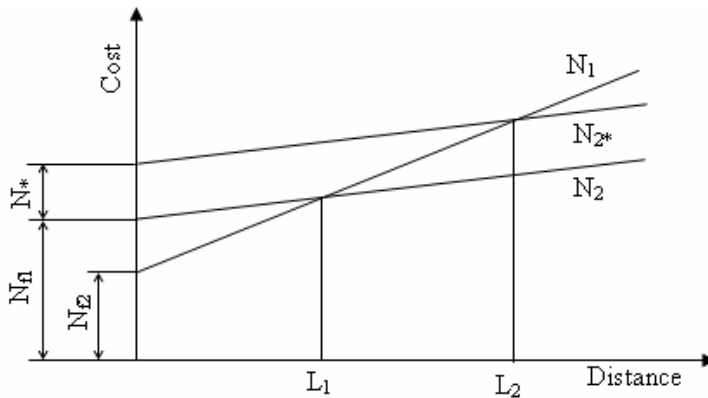


Fig. 2 Classic economical model

Explanation of abbreviations [6]:

- L_1 – marginal distance of compared forms of transport [km]
- L_2 – marginal distance in relation to operating advantages “more expensive” form of transport [km]
- N_{f1} , N_{f2} – fixed costs compared to other forms of transport [Kč]
- N_1 , N_2 – total costs compared to other forms of transport [Kč]

Marginal distance (L_1) is decisive that means limit of economic advantage of compared forms of transport.

Later studies impugned information capability of the model because they don't take some relevant factors that can be more important than is transport distance (quantity and parameters of transport cargo) into account.

4. Model of total logistic costs

This model is based on optimization of size of consignment depending on transport costs and total storing costs (*fig. 3*). Total storing costs consist of storing costs during transportation and fixed storing costs. This model was used for creation of computer program for railway company “Burlington Northern Railroad” in the USA. It made comparison between road and railway transport available [1].

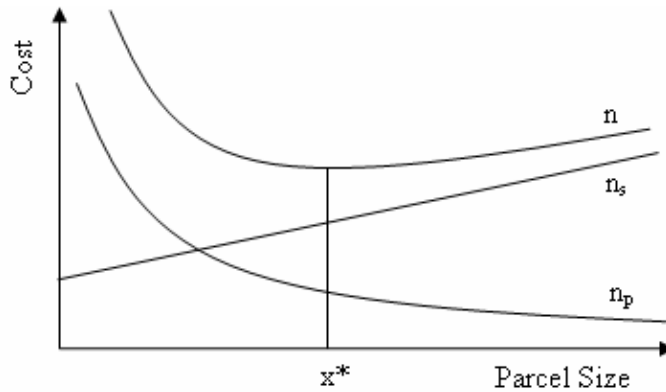


Fig. 3 Model of total logistic costs

Total logistic costs per transport unit (tons, m³, pieces,...):

$$n(x) = n_s(x) + n_p(x)$$

- $n(x)$ – total logistic costs per transport unit [Kč/unit]
- $n_s(x)$ – total storing costs per transport unit [Kč/unit]
- $n_p(x)$ – transport costs per unit [Kč/unit]

Optimal size of consignment:

$$x^* = \min\left\{u, sT, \sqrt{2sN_p/n_s}\right\}$$

where:

- x^* - optimal size of consignment [tons, m³, pieces,..]
- u – capacity of vehicle [tons, m³, pieces,..]
- s – size of material flow per time unit [tons, m³, pieces,.. / hour, day]
- T – maximum size of interval between single supplies [hour, day, ...]
- N_p – transport costs of one consignment [Kč]
- n_s – storing costs per unit [Kč/ ton, m³, piece, ...]

This model is based on economical ordered quantity (Wilson-Camp formula) and it supposes compromise between storing and transport costs. Its application is conditional then, but it gives more realist results, than classic economical model [3].

Conclusion

Nowadays (in 2nd year of research) team of researchers begins working on proposal of suitable methodology of implementation of outsourcing transportation – logistical processes.

On the basics of knowledges obtained in the first stage, the relations with surroundings company and external providers with the target to identify basic steps in the implementation of outsourcing and to create flow chart successive steps of implementation of transportation – logistical processes outsourcing will be analyzed. In the second stage of researched grant project, modelling of critical processing during implementation of transportation – logistical processes outsourcing in chosen parts and processes will be processed. Preparing of publication “Transportation – logistical processes outsourcing” will start in the same time [4].

Lektoroval: Doc. Ing. Alexandr Čestnější, CSc.

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Resumé

SUBJEKTY DOPRAVNÍCH A PŘEPRAVNÍCH PROCESŮ A JEJICH VZÁJEMNÉ VZTAHY

Václav Cempírek, Rudolf Kampf

Příspěvek vznikl v rámci řešení grantového projektu (GA ČR) „Outsourcing dopravně-logistických procesů“ na Dopravní fakultě Jana Pernera Univerzity Pardubice.

V příspěvku jsou charakterizované subjekty, kterých se nejvíce týká problém výběru druhu dopravy v rámci dopravních a přepravních procesů tj. zákazníci, dopravci, zasilatelé, stát (resp. společnost) a vztahy mezi těmito účastníky dopravních a přepravních procesů. Dále příspěvek uvádí dva základní modely výběru druhu dopravy a to klasický ekonomický model a model celkových logistických nákladů.

Zusammenfassung

DIE SUBJEKTE IN DER TRANSPORTPROZESSE UND IHRE BEZIEHUNGEN

Václav Cempírek, Rudolf Kampf

Der Beitrag hat im Rahmen der Lösung des Projekts (Grant Agentur der Tschechischen Republik) „Outsourcing der Transport- und Logistikprozesse an der Transport Fakultät des Universität Pardubice entsteht.

Der Beitrag charakterisiert die Subjekte, die sind mit dem Problem der Auswahl der Transportart im Rahmen der Transportprozesse verknüpfen. Das sind Kunden, Transportunternehmen, Spediteuren, Staat und die Beziehungen zwischen diesen Teilnehmer der Transportprozesse. Weiter der Beitrag stellt zwei Grundmodelle für die Auswahl der Transportart dar und das den klassischen ökonomischen Modell und den Modell der ganzen logistischen Kosten.

Summary

SUBJECTS OF TRANSPORTATION PROCESSES AND THEIR RELATIONSHIPS

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This article was created as a part of researched grant project (GA ČR) „Transportation - logistical processes outsourcing“ on the Jan Perner Transport Faculty, University of Pardubice.

The subjects are described in this article that are related to problem of selection of the form of transport as a part of transportation processes (customers, transport operators, forwarders, state (society) and relationships between the participants of transportation processes. Two basic models of selection of form of transport (Classic economical model and Model of total logistic costs) are described in the next part of this article.