

KALEVI KYLAHEIKO, Professor, Ph.D, Lappeenranta University of Technology, Lappeenranta, Finland
DRAGAN CISIC, Ph.D, Rijeka College of Maritime Studies
PAVAO KOMADINA, Ph.D, Rijeka College of Maritime Studies
Croatia

Application of Transaction Costs to Choice of Transport Corridors

Abstract:

Fundamental changes suggest new approaches in the research field concerning the role and impacts of transport corridors. We argue that the changes in dynamics of the hinterlands of seaports, as well as the changes in the logistic concepts are the main reasons for redefining the transport corridors. Traditionally, the transport rates and transport costs have been used as relevant determinants of the decisions concerning the use of corridors. In practice, however, direct monetary costs do not basically determine the relative attractiveness of the transport corridor. In this paper the authors will introduce qualitatively determined transaction costs as additional determinants when analyzing the decision problem concerned.

Transport corridors are generally composed by various modes under the management of different operators. Due to the lack of integration policies, isolated modes may have high level of productivity while the transport corridor, as a whole may be inefficient. Infrastructure deficiency, bureaucracy, and lack of appropriate supply chain management are usually related to the inefficiency of the transportation system. To make the intermodality effective, and the various activities of the supply chain efficient, it is of great importance the use of technological information on the logistic chain, as well as to consider all the costs. Fundamental developments are changing the transport corridors, and especially seaport, as node points of the transport corridors. From fixed outlined areas, transport corridor hinterlands are becoming difficult to demarcate. A transport corridor's hinterland is the continental area of origin and destination of traffic flows through a transport corridor, in other words, it is the interior region served by the transport corridor. As the region is the transport corridor's market, a prerequisite in developing a marketing strategy is to know its spatial dimensions.

One very simple method to define a transport corridor's hinterland is to

consider transport rates. In this approach, those places that can be served by the transport corridor cheaper than from other transport corridors belong to the transport corridor's hinterland.

Up to this point we assumed that only transportation costs are relevant in the determination of the hinterland. In practice, however, direct monetary costs do not determine the relative attractiveness of the transport corridor towards a certain inland market only. Transaction costs should also be considered.

Transaction costs

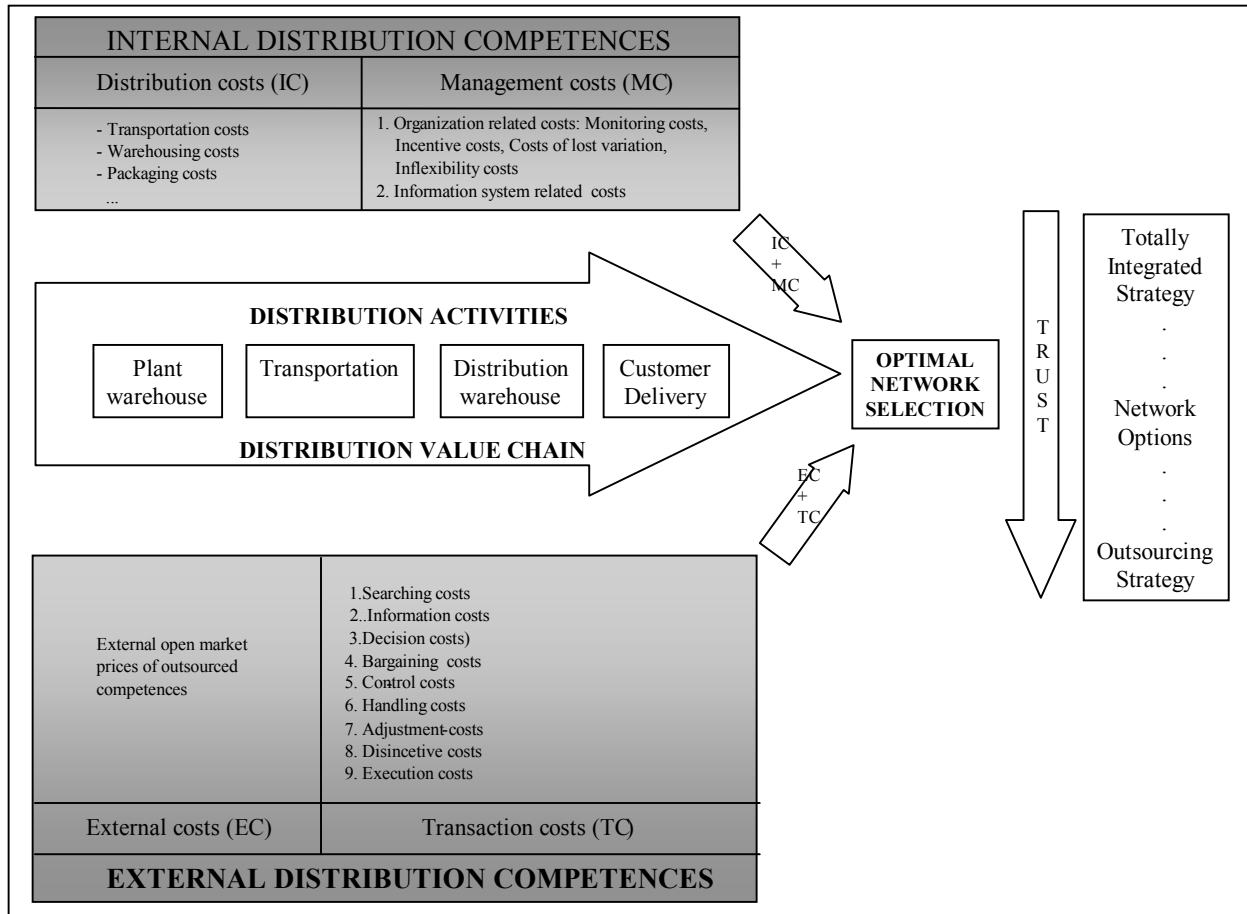
As Ronald Coase (1937) pointed out some 60 years ago, firms exist because there are transaction costs in the economic system. Every contract between economic agents presupposes a set of activities for its implementation, such as information gathering, bargaining, monitoring and enforcing. All these activities generate transaction costs. Whenever production costs were lower than transaction costs, firms will find opportunities to circumvent market operations through the expansion of in-house activities. Transaction costs can be generally summarized as "a cost of using the price mechanism". They include such non-production costs as search, planning, negotiating, monitoring, and enforcement costs related to the firm's activities. The Coasean decision rule is as follows: when the marginal costs of using markets ("transaction costs") are higher than the costs of running the firm ("management costs"), the transaction should be organized within the firm and vice versa.

Without transaction costs the market solution would be preferred, because it would make it possible to exploit the economies of scale, to utilize markets as variation-generating mechanisms, to decrease management costs, and to have high-powered incentives. In the real world, however, there is always a trade-off between the advantages and disadvantages of using markets because transaction costs are positive. Williamson (1991: 79-80) lists the following determinants that give rise to transaction costs

- (i) Bounded rationality,
- (ii) Opportunism,
- (iii) Asymmetric information,
- (iv) Frequency of transactions,
- (v) Uncertainty, and
- (vi) Asset specificity.

By combining these determinants one can construct constellations which can be used as starting points when an entrepreneur considers, for instance, whether to source activities internally or externally or whether to specialize in specific core competencies or to diversify the product range. Two technology strategy lessons can be drawn: The market solution is the most preferred option to organize activities, when uncertainty and knowledge imperfectness are minor, and there are frequent transactions and many alternative parties. The vertical integration is the best option, if the project is idiosyncratic, uncertain, and there are only few potential partners available.

A plethora of technological innovations – which includes personal computers, software, fax machines, modems and better telecommunication systems – has allowed a sharp decline of transaction costs worldwide and, consequently, created new forms of competition. To face the new economic environment, firms had to refocus their strategies, by reducing the scope of their production lines in order to keep only those activities they could perform according to the best international practice. This restructuring process opened new markets for intermediate products and services at home and abroad. The new markets are reached by the transportation systems and through transport corridors stretched between the firms in concern. Picture 1 shows the cost and network selection for the distribution value chain. Transaction-costs are caused by transactions running without frictions. Transaction-costs are understood as a lack of frictions that are caused by the assignment of property rights (Picot 1993a). This assignment is necessary to bridge space- and time-differences between the potential parties of a contract.



Pict 1. Distribution value chain

Transaction-costs can emerge in all phases of transactions: preparation, handling and controlling (Brand 1990). Depending on the phases, different forms of transaction-costs can be described (Appel 1998):

- **Searching costs**

Searching costs are transaction-costs that are caused by the search for transaction partners or alternative actions (examples are: the amount of time needed for the search at special organizations or institutions, costs which are caused by the use of telecommunication, online services or special publications or management consultants).

- **Information costs**

Information costs are defined as transaction-costs that are caused by the lack of information in the process of interaction. This covers costs that are caused by the use of different languages (e.g. translation costs) or by technical problems that disturb the exchange of information (costs of technical equipment to overcome this disturbance).

- **Decision costs**

Decision costs are transaction-costs that arise from the participation of a group in the decision process. Due to different aims and motives of participants of decision groups, coming to an (shared) agreement is a very time-consuming process. Moreover, decision costs are caused by contracts that were not fulfilled in the way they were negotiated or by contracts that were not closed in the intended meaning.

- **Bargaining costs**
Bargaining costs are defined as transaction-costs that are caused by the process of negotiation (examples: costs of lawyers and consultants, costs of the required resources like costs of traveling and traveling time).
- **Control costs**
Control costs emerge from the adaptation and supervision of transaction results (examples: costs controlling payments or arranged technical standards or quality).
- **Handling costs**
Handling costs are transaction-costs that emerge from the management of converging action cooperation (examples: costs involving human resources, costs which are caused by the definition of business processes).
- **Adjustment costs**
All transaction-costs caused by the change of transaction conditions can be defined as costs of adjustment (examples: costs which are caused by the implementation of new laws or new IT-standards).
- **Disincentive costs**
Disincentive costs emerge by an opportunistic behavior of the transaction partners or employees, i.e. every partner tries to interpret the contract to his own advantage (examples: unannounced high increase of prices by a supplier of products which have a very high level of specificity).
- **Execution costs**
Execution costs are transaction-costs that arise from the collection of overdue performances or payments. A possible example is the collection of proceedings.

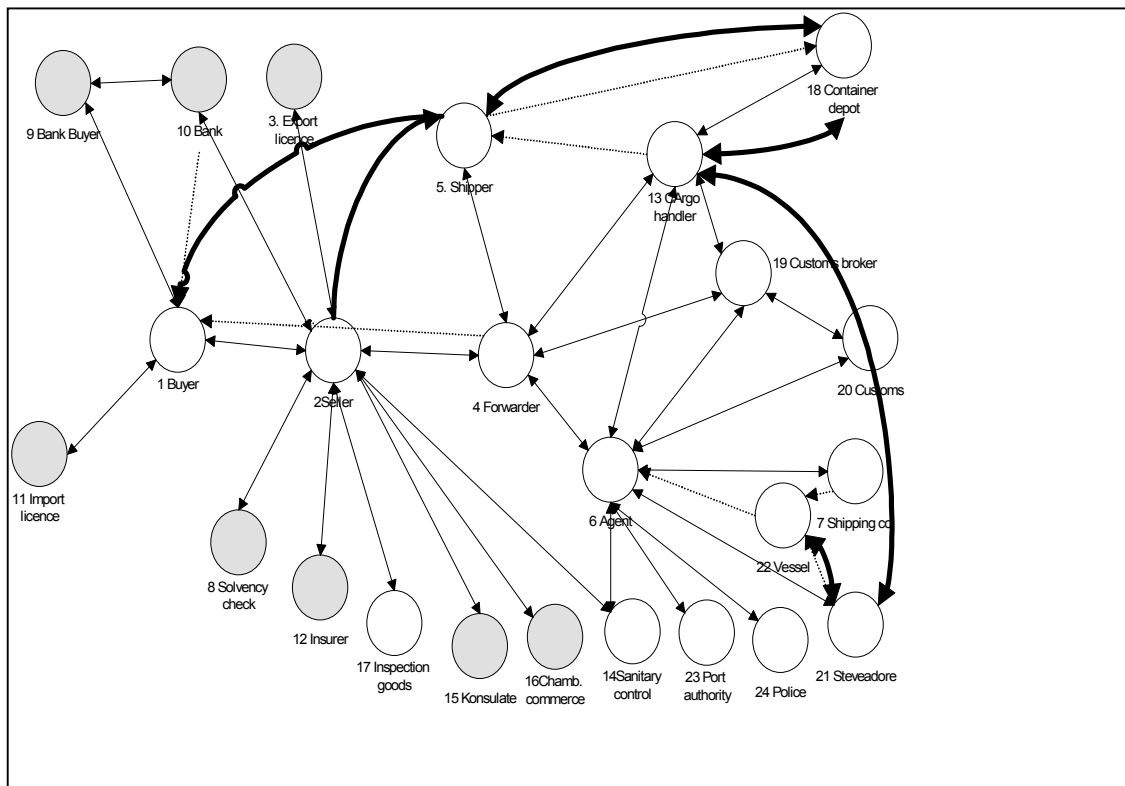
As Carl Dahlman (1979) well explained, information gathering is needed because there is insufficient data about the profile of trading opportunities, bargaining costs result from the lack of information on the preferences of economic agents, monitoring and enforcing costs exist because contracts are always incomplete. In fact some of the authors argue that there would be no transaction costs if all informations are known.

It should be noted that this approach to transaction costs is rather different from the conventional view presented in the international trade literature, which does not distinguish such costs from transportation costs. According to Frankel (1995), for instance, the "notion of transportation costs should probably be understood as transaction costs, encompassing not just physical transportation of goods but also costs of communications (1995, p.76)."

Transport corridors

In order to define the posture of the transport corridor in the supply-chain system, authors have used refined generic supply chain model presented by Čišić (1999a, 1999b) and Komadina (1999). The research model represented in figure 2 consists from 24 different generic companies with 103 generic documents interchanged. In order to keep the model relatively small a number of the companies and documents have been excluded. The links in the original model represent document flow, and bold links are included to represent the cargo flow. From the model it is visible that from 24 companies in the supply chain model only seven are directly embedded in cargo flow, and others are mainly concerned with document flow. There are eight companies not included in the transport corridor, and they are grey coloured on picture 2.

From the model one can conclude that sixteen different generic companies are part of the generic transport corridor, and only seven are embedded in the cargo flow. Companies in the modeled generic transport corridor interchange 76 different documents.



Picture 2. Model of the generic supply chain network

Transport corridors and transaction costs

The hinterland potential of a transport corridor is dynamic. It can change due to fundamental developments in technology, economy and society, which have an impact on the demand of shippers for transport services as well as on generalized transport costs. For the transport corridor, the demand for services (the import and export of the regions) is merely exogenous. To a large extent, this is also true for generalized transport costs. Transport costs for the seller are not only direct monetary costs but costs related to risks and time should also be considered. Together with direct monetary costs, these costs are included in the concept of generalized transport costs. Generalized transport costs could be minimized by decreasing of the transaction costs.

In order to confirm previous thesis a series of postulates will be defined:

(P1) Companies within transport corridors form an virtual organization.

The seller has a sight of transport system through freight forwarder. The transport system within the transport corridor from the seller standpoint, could be seen as an organization. To verify this idea, the definitions of the virtual corporation will be estimated. First definition is developed by Christie (1998) :

“A virtual corporation is a temporary network or loose coalition of manufacturing and administrative services that come together for a specific business purpose and then disassembles when the purpose has been met. Firms team up in a virtual corporation to exploit an opportunity in the market before it evaporates. Once an intended objective is met, the alliance is disbanded. These ad hoc alliances are short lived, extremely focused, goal driven, and powered by time-based competition. They are both created and dissolved quickly. The live cycle of a virtual corporation depends upon factors such as the intended objective (s) of the alliance, the type of products manufactured, or the services rendered. Organisations that are partners in one instance can be rivals and competitors in the next. Virtual corporations are continuously evolving networks of independent companies linked together to share skills, costs, and access to one another’s markets and data.”

The alliances between the companies in the transport corridors could last for one or more transportation of the goods. When the transport is completed the connection is dissolved, until another task. As the real organizations in the transport corridor comply more than one generic business defined in the model, they are usually competitors. Some authors use technology to define virtual corporation (Blutje (1998)):

“The Virtual Corporation is a temporary network of independent companies linked by information technology to share skill, costs and access to one another’s markets. The companies quickly unite to exploit a specific opportunity and will disperse afterwards”

The problem with this definition arises from technological segment - information technology. The companies in the transport chain are linked and coordinated using documentation (information) flow; there are even generic companies, who coordinate whole system only using information flow.

(P2) Transportation costs include goods movement costs (distribution costs) and transaction costs between the organizations in the transportation corridor.

Transportation costs include sum of all costs in transport corridor. The distribution costs include costs for actual transportation of the goods, warehousing costs and even packaging costs.

Transaction costs rise from the fact that there are more 16 companies included in the process of transporting the goods from one place to other. There are transactions between these companies, and the document flow alone is voluminous. Between any two of the linked companies in the transportation network all the transaction costs types could arise.

(P3) Diminution of the transaction costs significantly decreases transportation costs

UNCID has estimated that the costs of the data flows associated with international trade to be between 4 to 7 % of the value of the goods, and that the complete distribution costs are up to 16% of the net value of the goods.

If only data flow costs are from 25% to 44% (depending on the length of the transport, and number of border crossed), then the sum of all other transaction costs: searching costs, decision costs, bargaining costs, control costs, handling costs, adjustment costs and execution costs has to exceed 50% of the transportation costs.

(P4) Usage of the information systems and electronic commerce technologies decrease transaction costs

Several researchers have unveiled that usage of the electronic commerce technologies decrease costs, especially information costs. Čišić (1999a) and Komadina (1999) have shown that using electronic documents (electronic data interchange) between all partners in the supply chain leads to document cost diminution in average amount of 40%. This savings do not include savings from business process reorganization that is elementary in process of new business procedures initiation.

Other example could be deducted from data from US NAVY SPEDI Transaction Cost Comparison. SNA cost to process customer order to automated (information) system was (one document) : for

phone order	3.76\$
paper/FAX order	1.04\$
and EDI order	0.12\$.

The cost of the SNA customer to submit an order was: for

Manual post order	109.00\$
Faxed form	81.00\$
On line non EDI	15.00\$
Full EDI	5.00\$.

Using this data for orientation, for 109 documents in the supply chain, or 76 documents in the transport corridor it is evident that electronic commerce technologies decrease transaction costs

Conclusion:

The transport rates have been used to define a transport corridor's hinterland. In this approach, those places that can be served by the transport corridor cheaper than from other transport corridors belong to the transport corridor's hinterland. In the paper authors have determined that a considerable part of the transport rates are in fact transaction cost between the companies in the transport corridor.

Using virtual organizations theory, authors have determined that the companies in the transport corridor are connected in a virtual corporation structure. This structure is organized and managed by the information (document) flow.

Using various research projects, authors have postulated and deducted that the transaction cost in the transport corridor could exceed more than 50% of the total transportation costs.

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