INTERNATIONALISING EUROPEAN RAIL FREIGHT SERVICES

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ABSTRACT

European consignors long for seamless end-to-end rail international services, which are unfortunately not a viable business choice yet along many international freight corridors. The present paper aims to develop a theoretical ground for why rail freight operators mostly confine their service provision to national boundaries and show little interest to actively expand their transport operations to neighbouring states.

A case study is conducted to investigate in-depth two rail operators' international transport operating mode choices, as well as the rationality behind. Four measurements are extracted from the decision making process and are linked to variables of transaction cost theory and industrial network approach. An operating mode decision matrix, built from these measurements, explicates the decision-making process of the rail operators. The study argues that when integrated, the two theoretical approaches can explain the logic behind the operating mode decisions by rail freight operators.

KEY WORDS

GOODS TRANSPORT, TRANSACTION COST, NETWORK, RAIL, INTERNATIONALISE

INTRODUCTION

Rail freight has lost market share on cross-border transport, primarily due to its service quality problems (EUROPA, 2004). To revitalize the European rail sector, the European Union has put significant effort into reforms aiming at increased competitive capability and effectiveness. The key reform of Directive 91/440/EEC and Directive 2001/12/EC were to require the national railways to separate infrastructure management from transport operations. The idea behind the directives was that open access to the tracks would encourage new service offerings and innovations.

The above Directives, by separating infrastructure management from transport service provision makes it possible for independent train operators to provide pan-European seamless international through services, at least in principle. Such arrangement where railway undertakings project into adjacent states or even haul international trains from origins to destinations under a single carrier's responsibility is named single carrier mode of operating international trains. This service organizing mode is in contrast with the traditional successive carriage mode which means international trains are transferred upon crossing a state border from delivery railways to accepting railways. Under the successive carriage mode, revenue, traction and safety responsibilities are transferred at the same point at or near state border.

The single carrier mode with one operator end-to-end haulage provides simple interface to clients and presumes better efficiency than a collection of two or more operators in international services. It responds to the European consigners' demand for better rail service quality on the fast growing cross-border freight traffic. However, in current EU rail freight market, the traditional successive carriage mode continues to dominate the supply of international freight services. Incomplete interoperability implementation in Europe is widely recognized as one reason for the prevalent practice of switching batch responsibility among rail operators in international transport. In fact, how rail operators choose between the two operating modes taking into consideration such condition as well as other unknown factors is unclear. Therefore, a core research question for the current paper is: How rail operators make choice between the single carrier mode and the successive carriage mode in order to provide international rail freight services?

The present paper has two purposes. Firstly, it seeks to understand how rail operators actually choose between the two operating modes for international rail freight services. And based on this, the paper will, secondly, find out what specific measures can be installed to encourage rail operators to break borders' confining and provide seamless international through service.

The paper is structured as follows. Firstly, transaction cost theory and industrial network approach are reviewed as two alternative theoretical approaches to understand firms' governance strategy. Next, Chapter 3 presents the case study approach for the present work, data collection, data analysis methods and assesses validity and reliability of the study. Chapter 4 provides a description of the case rail operators and their operating mode

decision-making process. Chapter 5 provides an overview of four measurements that have been refined from the case materials. Chapter 6 presents the operating mode assessment matrix which is the main finding of the paper. In the last, implications of the findings are probed and further research areas are suggested.

THEORETICAL APPROACHES

To the authors' best knowledge, existing literature has not provided a theoretical explanation to rail operators' choice-making between the above mentioned two operating modes. Two theoretical approaches, however, seem promising to attend to the above research question. The essence of the successive carriage mode is that railway undertakings enter a partnership to collectively perform train movement over two or more national networks. In another word, using the "collaboration" strategy, as stipulated by industrial network approach (INA), to organise cross-border transport services is the substance of successive carriage mode. In comparison, by the single carrier mode, freight service on foreign networks is provided within the same focal company. Applying the governance mechanism of "hierarchy", stipulated by transaction cost theory (TCT), is the key characteristics of such operating mode. Choosing between the two operating modes hence becomes a choice between two alternative governance strategies (collaboration or hierarchy), which in turn are analyzed by INA and TCT respectively. Researchers have increasingly sought to use a transaction cost perspective to understand the forms, functions and effectiveness of inter-organizational strategies (Zajac and Olsen, 1993). On the other hand, INA has become one of the most influential theories in explaining the cooperation mode of inter-organizational strategies of nowadays. The present work will thus examine whether and how the two theoretical approaches can be employed to understand railways' actual operating mode choices.

Transaction cost theory (TCT)

TCT stipulates that the most efficient governance structure (market, hierarchy or alliance) is determined by the characteristics of transactions (Williamson, 1975). A transaction is the transfer of goods or services between technologically separate units (Williamson, 1981). Opportunism and bounded rationality are the behaviourial assumptions of transaction cost approach. Opportunism is defined as "self-interest seeking with guile" (Williamson, 1985). Bounded rationality consists of a total, or simply partial, lack of the information and knowledge needed to carry out specific company operations in a rational way. Due to the "opportunistic" assumption of human behaviour, it is necessary to safeguard your own interests in inter-firm relationships. Legislative contracts covering as many aspects of the relationship as possible, and private agreements emphasizing a balance of reciprocity are the safeguards recommended by Williamson (1979, 1981).

Transaction difficulties and costs increase when transactions are characterized by asset specificity and uncertainty. Asset specificity refers to the transferability of assets that support a given transaction. It occurs when exchange requires specific investments to enter into valid

contracts or when peculiar knowledge is acquired during the fulfilment of contracts. High asset specific investments represent costs that have little or no value outside the transaction. These costs are in the form of human asset specificity, physical asset specificity and information system specificity. Uncertainty refers to the unanticipated changes in circumstances surrounding a transaction. Environmental uncertainty is reflected in constructs such as unpredictability of the environment, technology, and demand. Behavioural uncertainty includes performance evaluation and information asymmetry problems.

The variety of organizational forms in economic activities originates from the need to reduce transaction costs, i.e. searching for efficiency (Williamson, 1975, 1981). When asset specificity and uncertainty are low, and transactions are relatively frequent, transactions will be governed by markets (Williamson, 1975). Hierarchical governance occurs when uncertainty and high asset specificity lead to transactional difficulties.

Industrial network approach (INA)

INA is the outcome of a fairly broad research program dealing primarily with the functioning of business markets (Håkansson and Snehota, 2006). The program can be described as a collection of studies with a largely common frame of reference: Ford et al. (1986); Håkansson (1982, 1987, 1989); Hammarkvist et al. (1982); Mattsson (1985); Thorelli (1986); Turnbull and Valla (1986).

The propositions of INA refer to situations and cases in which the environment of the organizations is of a concentrated and structured kind, i.e. it is constituted by a set of other active organizations. The industrial network model has three basic classes of variables: actors, activities and resources (Håkansson and Johanson, 1992). Actors are defined as those who perform activities and/or control resources, which are individuals, part of firms and firms. A network is governed by the interests of a number of different actors and not by some common norm (Easten, 1992). Resources are means used by actors when they perform activities. As the resources of a single actor are far exceeded by the resources of the network, the actor's probability of succeeding in its attempt to change the network will be extremely small. One possible alternative, according to INA, is to move towards other parts of the network more committed to the mobilization process by means of indirect relationships. Indirect control of resources is based on relationships with other actors who directly control resources. The performance and effectiveness of organizations operating in a network, become dependent not only on how well the organization itself performs in interaction with its direct counterparts, but also on how these counterparts in turn manage their relationships with organizations other than the focal one. Networking is a mode of organization that is not based strictly on price mechanisms, or on hierarchical fiat, but on coordination through adaptation between independent and self-regulating units (Jarillo, 1988).

A change considered by an actor will affect either the performance of one or more activities and/or the use of resources (Gadde and Håkansson, 1994). The actors involved in carrying out these activities will consider not only the change per se, but also how the change might

affect their positions vis-à-vis other actors. Value is a concept commonly used by both academics and practitioners. To a party engaged in an exchange relationship with another organization, the expected value of the exchange is given by the amount of resources that can be accessed and the activities, which the organization can perform for the focal party within the relationship. The consequent reduction in uncertainty and increase in stability may be very valuable objectives for many organizations (Easton, 1992). Moreover, trust reduces the inclination to guard against opportunistic behaviour that is the key source of transaction cost (Zaheer, McEvily and Perrone, 1998).

Comparing TCT and INA

In spite of its popularity in explaining industrial networks, TCT has been criticized by proponents of INA for its singular focus on opportunism and purely economic perspective. A major weakness of transaction cost approach is that it over emphasizes cost minimization and neglects the value creation aspect of a transaction (Zajac and Olsen, 1993). It barely recognizes the influence of social structure on economic life (Uzzi, 1997).

Transaction cost as a key concept of TCT, increases when transactions are characterized by asset specificity and uncertainty. Grover et al. (2003) provide a reliable and valid measure of four direct types of transaction costs for TCT-based empirical studies: effort required in developing the relationship (effort); monitoring the performance (monitor); addressing problems that might arise in the relationship (problem); the likelihood of partner taking advantage of the relationship (advantage). On the other hand, the exact meaning of the concept "value" used in industrial network context is not clearly defined. In this article, we therefore adopt the definition by Ford et al. (1999): value in business relationships is the value managers assign to the effects of their decisions and actions. According to this definition, effects of an action are decomposed into four levels: a) Effects in the relationship: a number of immediate effects in that relationship as a result of any action by a relationship participant; b) Effects on the relationship: value in terms of change to the state of the relationship between the companies; c) Effects on a portfolio: effects of a decision on other relationships in the company's portfolio; d) Effects on a network: effects of a decision within a relationship on the wider network. Such a method allows the actual factors that are most important to rail companies to be uncovered. The above measures of the key concepts "transaction costs" and "value" will be applied during the coding of empirical evidences in the present study.

The advised governance structure by TCT and INA can be different or even contradictory. The goal in the network ideology is to create cooperative advantage in order to produce superior value for the customer. It emphasizes the ability of organizations to influence both direct and indirect players. TCT instead gives transaction costs a major role in determining which organizational form is most likely to emerge, whereas it has little to say about the relational governance of alliance. The conflicting views of TCT and INA are, to certain extent, due to the disparate assumptions of human beings.

Nevertheless, using TCT and INA in a combined manner for the analysis of the rail operators' governance strategies is considered justified. We argue that the different emphases of TCT and INA are not contradictory but rather complementary. First, Noorderhaven (1995) tries to reach conformity of TCT and INA by suggesting human nature is a complex balance of opportunism and trustworthiness, both of which play a role in the development of inter-firm relations. A combined model drawing arguments from both TCT and INA explains relational governance better than a model based on any single determinant of governance form alone (Zaheer and Venkatraman, 1995). Second, coordination of firms in an industrial system is effected by three mechanisms (i.e. market, hierarchy and network). TCT and the INA are combined in order to compare governance choices as suggested by the former and that by the latter. Jarillo (1988) argued that networks are economically efficient by reducing transaction cost and allowing a firm to specialize in those activities of the value chain that are essential to its competitive advantage. Third, the two approaches provide different choices of measures against opportunism in non-hierarchical inter-firm arrangement: contracting, trusting and hostage. Each has its merits and place in the scheme of things and impact on the process by which governance can be achieved. Last but not least, in some circumstances, the two theoretical standpoints can advise the same governance strategy. When the potential for opportunism is low and the focal company depends on an external organization for critical resources to maintain its competitiveness, neither TCT nor INA recommends such activity to be hold within a firm.

TCT offers a powerful approach to lift this argument. In single relationships and networks, firms have to decide the trade-off between cooperation, necessary in order to create benefit, and competition over the control, ownership or share of the resource so created (Easton, 1992). Whether and how the two theories can possibly be combined to inform railway operators' operating mode decisions will be explored below.

METHODOLOGY

A case study approach was chosen for the study. Case study has strength in investigating relationship-based (including inter-organizational) research (Frankel et al., 2005), which is not possible via a quantitative approach alone (Miles and Huberman, 1994). Managers predict and make sense of possible effects to be triggered by certain actions by themselves and/or their partners, before they make decisions on what actions to take. Case study provides in-depth materials to assess the perceived value of a relationship by individual companies. A case study also allows the study of complexity, context, ambiguity and chaos. It allows identification and description of critical variables (Stuart et al., 2002) by exploring in great details a few specific cases.

In-depth case study was conducted with one focal company (referred to as Operator A for confidentiality reasons), which is the largest privately-owned rail operator in its home country. Operator A's potential partner in the neighbouring country is operator B, which is a national rail operator. Operator B is still organizationally connected to its national infrastructure manager under the same state-owned holding company. It has established collaborative relationships with national as well as private rail operators in several neighbouring countries.

The dyad of operator A and operator B is chosen in the case due to three considerations. Operator A has been strongly committed to expanding its international rail freight services. Including both private railway operator (operator A) and national railway (operator B) enables the result of the case study make sense to either type of railway undertakings. Still another reason is the focal company allowed full access to its key personnel and company archives which greatly eased the data collection from different informants.

Data collection started from an exploratory questionnaire of general factual questions used to target key dimensions in the specific case context. This was followed by semi-structured interviews as well as additional site visits. Open-ended interview design allows probing the most critical considerations behind each company's actual international strategies instead of confining the response by pre-existing theoretical constructs. In another word, the theoretical concepts were not directly measured in the interview questions. Instead, the interview data were later used to detect the presence of the theoretical constructs during the data analysis. The informants included operator A's top managers, as well as employees at local levels who directly participated in executing cross-border freight transport. On the side of operator B, a senior manager and several employees involved in the collaboration were interviewed. The interviews covered the following topics: 1) Actual operating mode choice by operator A, and the perceived pros and cons of alternative choices; 2) Assessment of the partnership. This topic covered the grounds driving the relationship establishing and developing, perceived importance to the partners, interaction process and pattern. The assessment of operator A was compared with that of operator B; 3) Envisioned relationship development in near future. This revolved about how operator A and B define their roles in the relationship and what attitude/ approaches will most likely to be taken.

Data collected from different channels were transcribed and sent back to relevant informants for corrections and acceptance. Then a content analysis was conducted to reduce the volume of qualitative and quantitative data, categorizing them and extracting patterns out of the case materials. The data analysis aims to find out the variables underlying the actual operating mode decision. TCT and INA are the theoretical lenses for the current work, from which themes or constructs have been derived to analyze the empirical data from the case study. One focus of the data analysis was to link the theoretical concepts/constructs with the empirical evidences. The case materials were coded by using two types of codes:

1. Theoretical codes: codes/labels derived from TCT and INA. Such codes are, for example, asset specificity, uncertainty, and so on. These constructs were used as provisional codes. However, a mere dependency on such codes for analyzing the case materials may suffer from the accusation of force-fitting the data according to pre-existing coding scheme. Therefore, type 2 codes were also applied to the analysis.

2. Codes identified from the data itself or by the informants. These constructs are based on the author's understanding of the case context and thought to have certain explanatory relevance to the research questions. Although less established, the type 2 coding has the strength of reflecting the specific case context. Such coding released the analysis from the restrain of pre-existing codes, thus data can be examined in a more open-minded manner.

The case materials were coded in the text using the above two different types of codes respectively. Those items or text sections which share common codes were grouped together under each code name. The codes were then listed and the relationships among either type of codes were reviewed. Then, how type 1 codes are linked to type 2 codes are reviewed. The two types of codes were merged by grouping codes with similar characteristics into broader categories, and the abstraction level of type 2 codes was gradually increased in the course of the data analysis, By so doing, the original two sets of codes were refined to four measurements as illustrated in the "measurements" section below.

Validity and reliability (Yin, 1984) was attended to in the case study. Reliability was enhanced by collecting data in the procedures stipulated by the case study protocol, which actually indicates the link between the content of the protocol and the initial study questions. Empirical evidence was collected in different methods: questionnaire, interview and site visit. Triangulating data from the different sources and different methods improved the construct validity of the study. Prolonged engagement, triangulation and addressing rival explanations were used to increase the probability that credible findings are produced from the study.

CASE DESCRIPTION

As markets in the enlarged EU become increasingly international, growth of the transport sector as a whole is led by cross-border traffic. Moreover, the case rail operators experience fierce competition from not only rail but also road whose service offering is not limited by national territory. However, rail transport service has been bounded to domestic territories, thus to secure smooth cargo movement to/on foreign rail network is often beyond individual rail companies' expertise. To catch this part of freight market growth, rail operators have to develop a suitable solution to offer international freight services.

The successive carriage mode where operator A depends on the partner operator to handle the freight movement on the adjacent network is perceived to provide several advantages. Firstly, the existing collaboration framework between the two countries' national rail operators for organizing international transport can be emulated. Secondly, operator B performed satisfactory during its previous collaboration with several neighbouring countries' national railways. Still another important factor involves operator B's institutional link as well as the informal connection with its national infrastructure manager, which help secure operator B's favourable conditions in track access and service facilities usage. The conduit role of operator B was highly valued by operator A, in addition to the expertise and experience of operator B.

The alternative solution of single carrier mode means operator A penetrates into the operator B dominated market, directly confronting operator B. By so doing, operator A is able to expand the geographical coverage of its business, as well as harvest economy of scale based on increased hauling distance, improving productivity of its freight wagon fleet. In the meanwhile, such solution is appreciated by shippers and consigners since the origin-destination service quality may be enhanced by not at least simple interface with clients.

However, a serious pullback of this mode is substantial specific investment being a pre-requisite. Another major drawback was evaluated as the problems arising from the rivalry with operator B. The separation of the infrastructure manager from operator B is mainly done just on the paper and not always followed in practice thus put equal access to railway infrastructure and service facilities unsecured.

The two operators decided to forge an inter-organizational alliance. operator A believed that the cost of penetrating into the neighbouring country would far surpass the benefit expected. The successive carriage mode however, provides access to critical complementary resources operator A could not develop alone, at least not in near future. This choice could also avoid the damaging results arising from the antagonism with operator B.

MEASUREMENTS

Result of data coding and resorting is four measurements being extracted from the case materials. Table 1, 2, 3 and 4 provides an overview of some of the primary findings by using the initial variables derived in theoretical review, linked to four main measurements.

Measurement 1: Perceived Transaction Cost of Partnership

Although a number of constructs are introduced by TCT, its key dependent construct is governance structure (Rindfleisch and Heide, 1997). Transactional characteristics such as asset specificity and uncertainty affect transactional cost, which in turn determines whether market or hierarchy is more efficient. In principle, lower transaction costs favour markets, while higher transaction costs favour hierarchies.

There are several kinds of cost associated with the partnership both before and after its establishment. Efforts are required to search for potential partners and build the relationship, and thereafter monitor the performance of the counterpart operator. Moreover, problems arising in the relationship are to be resolved and costs may also originate from opportunistic behaviours of partners. The measurement of transaction cost associated with partnership encompasses several variables measuring transaction cost: effort, monitor, problems and advantages. These four variables are based on the measure recommended by Grover et al. (2003) for direct types of transaction costs (see the section of "comparing TCT and INA"). These transaction cost variables were present in the decision making process of the focal company. For example, the focal company sample examines wagon and load received from operator B in order to monitor the technical inspection performance of operator B. Table 1 summarizes how the key transaction cost variables linked to the transaction cost associated with partnership were present in the operating mode decision making.

Table 1: Perceived transaction cost associated with partnership

TC variable 1: Effort	1. Pre-selection of potential partners, and defining the range of issues of the collaboration and individual responsibilities not difficult. 2. The short trial cooperation period on limited lines and limited number of trains was positive
TC variable 2: Monitor	1. Agree upon the international agreements to abide by in addition to their bi-lateral agreement. 2.Conduct sampling wagon/load inspection
TC variable 3: Problem	No dispute has occurred
TC variable 4: Advantage	1. Mutual interest in collaboration with low risk of opportunistic behaviour. 2. Previous collaboration of operator B with other operators assessed positive.

Measurement 2: Perceived Gains of Foreign Market Entry

The benefits of expanding freight service into foreign rail market originate from two factors. The first is efficiency enhancement. Economy of scale improves the productivity of freight wagon fleet, thus reduces costs. Efficiency can also be gained in the sense that the origin-destination service quality may be improved by simple interface with clients and some handover procedures can be abolished. One of the efficiency gains comes from reduced railway control procedures. Under the successive carriage mode, at least one and a half hours is needed to fulfil railway handover procedures, where the single procedure of exchanging locomotives including necessary shunting takes approximately one hour. If the single carrier mode is implemented, the locomotive exchange will still remain, while other procedures abolished. This suggests limited efficiency gains from reduced control procedures. Even when the efficiency level remains unchanged, revenue can be increased by expanding the geographical coverage of business. However, profit level from such expansion was estimated to be lower than domestic service provisions due to additional costs and risks associated with foreign market entry. The two kinds of benefits are integrated in the perceived benefits of market entry measurement as elaborated in table 2.

Table 2: Perceived gains associated with market entry

Efficiency gains	1. Modestly improved productivity of freight wagon fleet due to marginal increasing of hauling distance. 2. Handover procedures cut down being limited, since locomotive exchange remains. 3. Transit time saving may be seriously constraint/curbed by problems of getting preferable time slots and access service facilities. 4. Origin-destination service quality to clients may be improved.
Revenue gains	Opportunity of expanding geographical coverage of business but profit is less than domestic service provision

Measurement 3: Risks Associated with Foreign Market Entry

There are still substantial difficulties of practicing cabotage in current EU rail freight market. The focus of this measurement is the risks perceived by operator A when penetrating into the neighbouring rail market and confronting operator B. The risks emerge from two sources. The first source is the TCT variable of asset specificity. To operate trains on a foreign rail network, a valid safety certificate and/or license are required. Such approval requirement has been extremely onerous and costly, partly owing to the tendency of national governments to protect national operators from foreign competition. Necessary investments also involve the purchase/ rent of locomotives operable on the network in question and the training of personnel for carrying out different tasks. These investments in physical, human and other assets dedicated to the new market entry create opportunity cost, since the asset is country-specific and the resources consumed cannot be readily transferred to other critical business activities or alternative operating mode of international transport. An additional risk arises from the uncertainty associated with the neighbouring rail market conditions and behaviour of important market players. These factors are present in operator A's decision making process. Although infrastructure management and rail operation of national railways is namely separated, there is still a lack of independence of infrastructure managers in many EU countries which threatens equal access to infrastructures. One of the main anxieties of operator A concerning market penetration is the unpredictable accessibility to infrastructure and facilities controlled by the neighbouring infrastructure manager. TCT provides a powerful theoretical lens for understanding how risks associated with market entry arise from asset specificity and uncertainty. Table 3 summarizes the variables that are present in the operating mode decision.

Table 3: Risks associated with foreign market entry

Asset specificity	1. Locomotives operable on the network in question and personnel training costly. 2. License and safety certificate application costly and onerous.
Uncertainty	1. Legal and institutional conditions of the neighbouring rail market hard to manage. 2. High behavioural uncertainty of operator B (and its infrastructure manager), when its dominant position is challenged.

Measurement 4: Perceived Value of Partnership

INA understands firms' inter-organizational strategy by focusing on the value maximization logic (see the section "comparing TCT and INA"). A rationale for entering into a relationship concerns thus a firm's ability to exploit network access and offers access to third parties who may have resources that are valuable to its survival and growth. A company's actions in each relationship impact, positively or negatively, not only its direct relationship, but also indirect network relationships and business success. When analyzing value of the inter-organizational partnership, it is necessary to examine both the transactional value derived within the relationship and the relational value of the dyad and third relationships. Operator A

recognizes that a partnership with operator B is essential because of not only the latter's internal resources or attributes, but also to its network relations, which provide means to create opportunities, to mobilize third parties and utilize others' abilities for solving problems. The transactional value within the partnership as evaluated by operator A (the 1st row, Table 4) was further augmented by the relational effects (the 2nd row, Table 4). The relational effect was also highlighted by the fact that operator A did not have any alternative partners. The measurement of perceived value of partnership encompasses both the transactional and relational types of effects derived from INA literature. How the different effects associated with the measurement are present in operator A's mode assessment, is summarized in table 4.

Table 4: Perceived value of partnership

Direct effects in the dyad	1. Utilize operator B's knowledge and capability for service provision. 2. Duplication of activities and redundancy of resources reduced by integrating activities and process innovation.
Effects on network relationships	1. Increased interdependency and commitment to a close relationship. 2. Eschewing hostile measures by operator B and damaging effects. 3. Operator B as a conduit to access resources controlled by its infrastructure manager.

FINDINGS: OPERATING MODE ASSESSMENT MATRIX

The above listed four measurements are built in a mode decision matrix (see Table 5) based on which a final mode decision was made. The actual operating mode was determined by how the focal company makes sense of the possible effects (positive and negative) of each choice and attaches value to such effects. The above developed four measurements are allocated to four different cells of the matrix. The two cells in the first row: transaction cost associated with partnership and risks associated with market entry are cost element of the transactions. The other two cells in the second row: perceived gains of market entry and perceived value associated with partnership are instead value elements of the transactions.

A negative effect of successive carriage mode is the 'transaction costs associated with partnership'. Based on the assumption that negative effects of one mode is in fact the positive effects of the alternative mode. 'Transaction costs associated with partnership' is instead placed under the single carrier mode in the first column as positive effects of this mode, since the single carrier mode enables the operator to stay off such transaction cost. Likewise, 'risks associated with market entry' is placed in the second column under the successive carriage mode as positive effects of this mode. Therefore, the two cells in the first column indicate the positive effects of single carrier mode. Whereas the two cells in the second column indicate the positive effects of successive carriage mode. In this way, straightforward comparison can be made on only one dimension: the positive effects of each mode, instead of comparing simultaneously both positive and negative effects. In this case,

the successive carriage mode is preferred with its perceived high positive effects in comparison with the low positive effects of single carrier mode.

The matrix is a descriptive model which depicts or describes how things actually work. It describes the different elements of operating mode assessing process where established theory is inadequate. However it does not give any suggestions of how things should work as in the case of normative models.

Table 5: Operating mode assessment matrix

	Single carrier mode	**Successive carriage mode**
Cost element	Transaction cost associated with partnership: low	Risks associated with market entry: high
Value element	Perceived gains of market entry: low	Perceived value associated with partnership: high

The matrix can be used for two different purposes. Firstly, the assessment matrix decomposes the operating mode decision into measurable elements (measurements), extracted from empirical data. It can help understand how certain operating mode decision is made. Secondly, the matrix shows that a policy initiative may change the value of some or all the measurements, hereby affect the actual mode choice. The ultimate choice depends on the relative size of changes in opposite directions as a result of certain actions. For example, relieving the difficulties related to applying for license/certificate for multiple national networks along a long enough international corridor will influence two measurements: increasing the efficiency gains of market entry, and reducing the risks of market entry, thus pushing the single carrier mode in a more favourable direction. This indicates that progress of rail liberalisation influences decisions of rail operators through the four cells of the operating mode decision matrix. It should be mentioned that the above matrix applies to only situations involving frequent international goods transfer. When the demand for international goods transfer is scarce and occasional, "buying" hauling service on foreign network from other operators may become a natural option.

IMPLICATIONS AND FURTHER RESEARCH

Responding to the lack of explanation on European rail operators' actual operating mode choice in international rail goods transport, the present paper has revealed the rationale of such decision-making process. It discloses that the actual decision is made not solely for cost minimization or for benefit maximization, but instead taking both factors into consideration as visualised by the operating mode assessment matrix. The logic is that a firm may engage in a partnership when superior value can be harvest from the relationship and,

in the meantime, transaction cost of the relationship is not so high as to counteract the advantages of the partnership.

The above findings could help transport policy-makers find out how a given policy could influence different elements of the operating mode assessment matrix. And by comparing the extent of positive effects to the single carrier mode and the successive carriage mode, the operating mode assessment matrix could assist policy-makers to predict possible effects of their policies on rail operators' operating mode preference. Thus the operating mode assessment matrix is a useful tool for relevant transport policy makers to evaluate their policy impact.

On the surface, it seems that rail operators will be tempted to haul trains directly to the destination station by avoiding the intermediate operator so as to grab revenue generated on foreign network. However bypassing an intermediary operator requires individual operator carry new responsibilities and accompanying negative effects. The national rail markets of operator A and B are characterized by high risks associated with market entry, and relatively modest transaction costs associated with partnership. The findings suggest a future move towards seamless international through services would probably take the form of mergers or acquisitions among different nations' rail operators due to these factors.

This is a single case study. Further research in a wider number of case settings is required to detect any divergence from the concluded operating mode decision process, and enhance our representation and theoretical interpretation of operating mode decision process. TCT and INA may yield contradictory advices, when, for instance, transaction cost associated with a partnership is high and perceived value associated with the relationship is also high. Although it is concluded from the case study that TCT and INA should be combined to inform rail operating mode choices, there are possibilities that under certain circumstances the decision is determined by only one single theory. Second, the case study investigated only goods operators' strategies. In spite of the fact that international passenger trains in EU run more smooth than international goods trains, rail passenger operators in general adopt the successive carriage mode as well. It is reasonable to presume that the operating mode matrix principally can be extrapolated to passenger rail transport with certain alterations. However, the matrix needs to be modified and validated in future research. Third, quantitative studies can help verify the operating mode decision matrix and the four measurements.

The choice of single carrier mode may bring certain benefits to shippers/consigners (see table 2). However, such gains to clients did not seem to signify much in the decision-making of rail operators. After all, these gains to clients could be realised only if the single carrier mode already becomes a viable business choice for rail operators.

REFERENCES

Easton, G. (1992). Industrial networks: A review, In: Industrial networks, A new view of reality. (ed. by Axelsson, B and Easton, G.) Routledge, London

EC (2004). Proposal for a Regulation of the European Parliament and of the Council: on compensation in cases of non-compliance with contractual quality requirements for rail freight services, COM (2004) 144 final

Ford, D. and R. McDowell (1999). Managing business relationships by analyzing the effects and value of different actions, Industrial marketing management, 28, 429-442

Frankel, R., D. Näslund, and Y. Bolumole (2005). The "white space" of logistics research: a look at the role of methods usage, J. business logistics, Vol. 26, No. 2, pp.185

Gadde, L.-E. and H. Håkansson (1994). The changing role of purchasing: reconsidering three strategic issues. European J. of Purchasing & Supply Management, Vol1, Issue 1, pp. 27-35

Grover, V. et al (2003). Transaction cost framework in operations and supply chain management research: theory and measurement, J. operations managem, 21, 457-473

Håkansson, H. and J. Johanson (1992). A model of industrial networks. In: Industrial networks: A new view of reality (B. Axelsson and G. Easton edt.). pp. 28-34. Routledge, London

Håkansson, H. and I. Snehota (2006). No business is an island: the network concept of business strategy. Scandinavian J. of Management, Vol. 22, Issue 3, pp. 256-270.

Jarillo, J. C., (1988). On strategic networks, Strategic Management J., Vol. 9, pp. 31-41

Johanson, J. and Mattsson, L-G (1987). Interorganizational relations in industrial systems: A network approach compared with a transaction cost approach, International studies of management organization. Vol. 17:1, 33-48

Mattson, L.G. (1988). Management of Strategic Change in a "market-as-network" perspective, The Management of Strategic Change. Pettigrew, A.M. New York, Basil Blackwell.

Miles, M. and A. Huberman (1994). Qualitative data analysis: an expanded source book, 2nd edition. Sage Publications, Beverly Hills, CA.

Noorderhaven, N. G. (1995). Transaction, interaction, institutionalization: Toward a dynamic theory of hybrid governance, Scandinavian J. of Management, Vol. 11, Iss.1, pp. 43-55

Rindfleisch, A. and J. B. Heide (1997). Transaction cost economics: past, present, and future applications. J of marketing 61 (4), 30-54

Stuart et al. (2002). Effective case research in operations management: a process perspective, J. operations management, Vol. 20, issue 5, pp. 419-433

Uzzi, B. (1997). Social structure and competition in interfirm networks: the paradox of embeddedness, Administrative Science Quarterly, Vol. 42, pp. 35-67

Williamson, O. E. (1985). The economic institutions of capitalism: firms, markets, relational contracting. The Free Press, London

Williamson, O. E. (1981). The economics of organization: the transaction cost approach, American Journal of Sociology, Vol. 87, pp. 548-577

Williamson, O. E., (1979). Transaction cost economics: the governance of contractual relations, Journal of Law and Economics, Vol. 22, pp. 233-261

Williamson, O. E. (1975). Markets and Hierarchies: analysis and antitrust implications, New York: Free Press

Wilson, D.T., S. Jantrania (1994). Understanding the value of a relationship, Asia-Australia marketing J., 2, 55-66

Yin, R.K. (2003). Case study research: design and methods, 3rd edition, Sage Publications

Zaheer, A. and N. Venhatraman (1995). Relational governance as an interorganisational strategy: An empirical test of the role of trust in economic exchange, Strategic Mgm. J., Vol. 16, No. 5, pp. 373-392

Zaheer, A., B. McEvily, and V. Perrone (1998). Does trust matter? Exploring the effects of interorganisational and interpersonal trust on performance, Organiz. Studies, Vol. 9, No.2, pp. 141-159

Zajac, E.J. and C. P. Olsen (1993). From transaction cost to transactional value analysis: Implications for the study of interorganisational strategies, J. of Mgm. Studies, Vol. 30, No. 1, pp. 131-145