A network wide transaction cost theory approach in subcontracting industry: An agenda for empirical research

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Abstract
The paper presents a model to estimate transaction costs in a network of subcontractors and their customers, and their level of TC. The research questions are 1) what factors have a significant effect on TC in a network and 2) can the TC be divided into positive and negative costs.

Keywords: Transaction cost theory, supply chain management, subcontracting

Introduction and motivation
This paper focuses on potential of transaction cost theory approach in buyer-supplier relationships in subcontracting metal industry. It presents a method to calculate actual transaction costs (TC) in a metal industry network, and their division into TC activities. The method includes an estimation of how different factors affect the level of TC. The paper also aims to start a discussion whether the TC can be divided into positive, neutral and negative transaction costs.

We first present a literature review that identifies the stream of literature which has discussed transaction costs, focusing on literature referring to TC in networks. Then we describe our research method and conclude with discussion about the subject.

The importance of managing suppliers has long been recognized among business academics. There is a vast amount of literature dealing with supplier management both from demand and supply chain management viewpoint. One stream of this literature has focused on transaction cost theory.

A supply chain wide transaction cost view has been handled very little in the TC discussion, let alone a network wide viewpoint. However, the ever increasing subcontracting increases also the transaction costs in supply chains and networks, and emphasizes the importance of their management. Subcontracting is increasingly global, and this sets new demands on resources allocated to supplier management. The subcontracting might sometimes be time consuming. There can be a vast need for communication, starting from the negotiation process, and continuing with coordination during the cooperation including communication about specifications, changes, delivery details etc. Almost in every company the problem has been recognized.

In this research we want to investigate *first* of all the actual level of transaction

costs in our case companies. The case companies are part of a real network. Actual TC have been studied quite a little in the TC research. *Second*, we develop a measurement concept to estimate the factors that have an effect on the TC. *Third,* we start a preliminary discussion about whether the TC can be divided into positive, neutral and negative costs. By this we mean that some transaction costs are actually necessary in order to keep the cooperation fluent between the subcontractor and its customer. Examples of positive TC could be trust building activities, or annual meetings where certain important issues are handled proactively between the parties. The positive TC could be seen as an investment to the relationship. The neutral TC cover the normal routines which are necessary for the business to run smoothly. The negative TC consist of inefficiencies, actions due to mistakes and bad management of the relationship. As a *fourth* phase we intend to develop tools and mechanisms to help improve the relationship management and also to optimize the transaction costs. In this paper we do not get into this fourth subject.

The framework in this study is contract manufacturing.

Literature review on transaction costs

According to Rao (2003), transaction costs are "costs of undertaking a transaction, including search and information costs, bargaining costs and monitoring-enforcement costs of implementing a transaction; and the opportunity costs of non-fulfilment of an efficient transaction". Transaction costs can be divided into *ex ante* costs and *ex post* costs. Ex ante costs comprise the costs of actions before making the actual contract, e.g. negotiating and forming a contract or agreement. Ex post costs include monitoring and enforcing a contract or agreement (Rao 2003). One common classification for transaction costs is 1) negotiation 2) coordination and 3) monitoring costs. We use this classification in our research. Another classification often used is 1) information costs 2) negotiation costs 3) monitoring (or enforcement) costs (e.g. Hobbs 1996).

The reason why transactions cause certain costs, and why they vary from one situation to another, can be explained by dimensions, features and some main factors. The *main dimensions* may be identified as complexity, frequency of occurrence, duration or continuity, uncertainty, measurement and monitoring features, and implications on interlinked transactions. *The features*, which run in parallel to the dimensions, can be identified as asymmetric information and incomplete specifications of transactions and their commitment implications, and imperfect commitment or strategic behaviour. (Rao 2003). *The main factors* are bounded rationality, opportunism and asset specificity (Williamson 1985). Bounded rationality is "the assumption that human behaviour is intentionally rational, but constrained by the capacity to process and communicate information (Simon 1957)". Opportunism can be described as "self-interest seeking with a guile" (Williamson 1985). Asset specificity refers to the extent to which non-fungible assets are tied to particular transactions specified by contracts or other commitments (Rao 2003). We have gathered these definitions in the figure below.

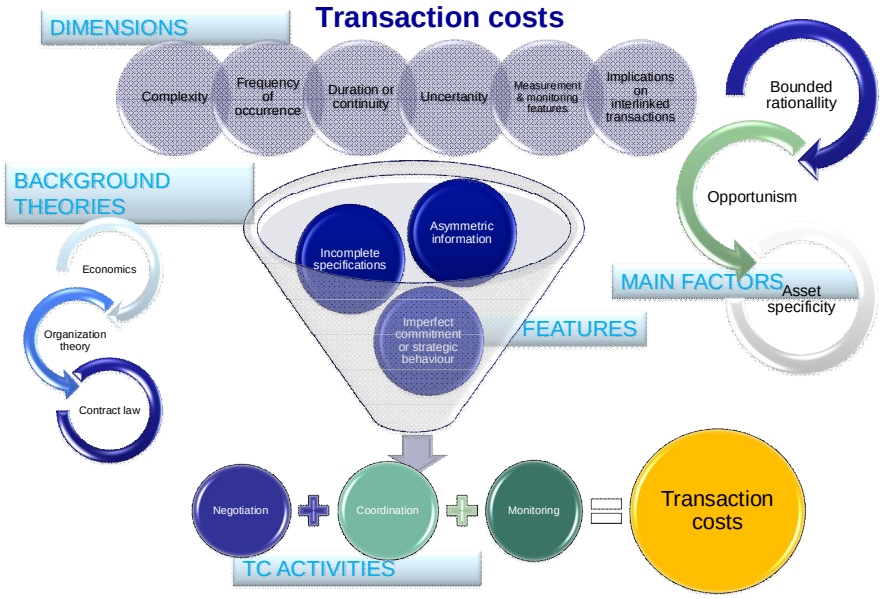

Figure 1 – Transaction costs (based on Rao 2003 and Williamson 2007).

Transaction costs have been studied diversely and crossing disciplinary boundaries, including e.g. economics, organization theory and contract law (Williamson 2007). The TC theory can be a versatile tool for subcontractor management. It includes economical, behavioural and organizational aspects. There are some gaps, however, in TC theory, including lack of supply chain wide viewpoint. TC studies often examine bilateral exchanges (Wever et al. 2012). However, as subcontracting is becoming more and more an essential part of the business in manufacturing industry, there is a need to get into a supply chain wide, or network wide, research. In subcontracting industry the transaction costs can vary significantly from case to case (Häkkinen 2011). In this research we intend to dig into these reasons taking account various parties of the subcontractor network.

Another viewpoint that is missing from TC theory is a profound study about the different nature of different transaction costs. There is a need to find out a) which transaction costs act as an investment into good and profitable relationships b) which costs are essential in order to things run smoothly and c) which costs are caused by inefficient processes and poor management. Coase brought this up already in 1988 by writing: ”Another consequence of the assumption of zero transaction costs, not usually noted, is that when there are no costs of making transactions, it costs nothing to speed them up, so that eternity can be experienced in a split of a second. It would not seem worthwhile to spend much time investigating the properties of such a world. What my argument does suggest is the need to introduce positive transaction costs explicitly into economic analysis so that we can study the world that exists.” (Coase 1988). In this research we have an intention to start discovering, using empirical data, whether the

transaction costs can be divided into positive, neutral and negative costs. The case companies are asked to estimate how much do the above mentioned dimensions, features and main factors affect the time spent on transaction cost activities.

Method and the research instrument

The research is conducted as a multiple in-depth case study. Unit of analysis is buyer – supplier dyad in contract manufacturing so that the case companies are one subcontractor and three of its clients. They are part of the same real-life network. Our intention is to build a model to calculate transaction costs in a subcontractor network. The research questions are:

1. What are the actual transaction costs in the case companies, divided into activities?
2. How strong affect do different dimensions, main factors and circumstances have on the transaction cost activities?
3. Based on above, can the TC be divided into positive, neutral and negative costs? Or further, which cost activities can be seen mainly positive, which neutral and which negative, and to what extent?

In each focal case company the matter is first discussed in a preliminary meeting, where typically take part the managing director, purchasing or sales director and other purchasing or sales personnel. We determine together the persons who will be included in the study. The intention is that all persons, who have a role in the relationship with the supplier or the customer, would take part in the study. These persons include sales, purchasing, R&D and some production people. Later on in the study we will broaden the aspect into warehouse operations. After that, the involved persons are informed about the study. Then they fill out a working time chart where they distribute the working times during one week into various transaction cost activities. They also estimate how much certain dimensions, factors and circumstances affect the time consumed in each activity. The research instrument is described in Figure 2.

In addition to the data received through the chart, information like turnover of the relationship and total purchases or sales of the case company are asked.

The cost of each TC activity are calculated using the data from the case companies and using cost data based on our previous research on activity based costing (Aminoff et al. 2002). In our previous research we have done activity based costing in about 200 companies.

The case companies are Finnish small and medium size metal industry companies which produce high technology and high quality products. The branches participating in the study are situated in Finland, but the customer companies operate globally.

The analysis based on the data includes also analysis of the effect of dimensions, features and factors on the time consumed in each TC activity. Through this analysis we also hope to be able to make conclusions about which TC activities can be seen as positive TC costs, which neutral and which negative. We also hope to be able to estimate the portion of each of these three, as well as some conditions and explaining factors for this. We hope to be able to give some answers to a question “What is the right level and content of transaction costs in certain situations?”

Customer relationship

	Hour / day (all customers)						Estimate in scale 0-5 the effect of above matters into work load concerning the certain customer. 0=no effect, 5=increases the work load significantly.												
							Dimensions						Features			Main factors			
Activity	Mon	Tue	Wed	Thu	Fri	Customer A's portion of the hours (%)	Complexity	Frequency of occurence	Duration or continuity	Uncertainty	Measurement and monitoring features	Implications on interlinked transactions	Asymmetric information	Incomplete specifications	Imperfect commitment	Bounded rationality	Opportunism	Asset specifity	Other?
TC1 Negotiation																			
PR and marketing																			
Customer search and information gathering																			
Tendering																			
Negotiations and contracting																			
Cooperation with R&D (own, supplier's and customer's)																			
Estimate the portion (%) of the above work NOT leading into a contract																			
TC2 Coordination																			
Order handling and billing																			
Taking care of running matters (other than problem solving and corrective actions)																			
Communication with the partner																			
- epäselvyydet (esim. piirrustuksissa, lähetyksissä)																			
- maintaining and updating the contracts (e.g.																			
- meetings aiming at improving the cooperation																			
- other communication																			
Corrective actions (e.g. due to mistakes)																			
TC3 Monitoring																			
Customer satisfaction and delivery monitoring																			
Reclamation handling																			
Reporting and monitoring																			
Documentation (e.g. documents for the customers)																			
Participation in purchasing (please fill in also the table "Supplier relationship")																			
Total hours/day	0,0	0,0	0,0	0,0	0,0														

Figure 2 – Working time data collection chart.

Discussion and conclusions

With the help of the literature review, important research needs in the issue of transaction costs have been identified, and the research has been directed to cover a slice of this gap. This study aims to give answers to questions about some practical issues, like how time consuming really is subcontracting? What is the actual level of transaction costs compared to the turnover of the relationship? What part of the TC can be seen as an investment into the relationship? Which factors affect the level of TC concerning the rest of the transaction costs, which we have named here neutral and negative TC? How significant role do e.g. poor information, poor specifications, short term relationships or complexity play?

We will continue from this with the actual analysis based on the data. We already have in mind some further research issues based on discussions made so far with the case companies and the literature review. The research needs include an extension of this model outside contract manufacturing, of which behavior differs from contract manufacturing. Another important issue seems to be to investigate the relationship between transaction costs and warehousing costs. Research of interaction of coordination costs, which occur after making the contract, with warehousing costs, according to us,

does not exist. In industrial companies the purchasing personnel have woken up to realize that managing the suppliers especially after making the contracts is very time consuming. Would it sometimes to be effective to e.g. order larger quantities in order to reduce the time spent on coordinating small orders? How do current KPI's direct the operations? Is there a need to introduce some new KPI's? Do the current KPI's perhaps lead into only short term optimization? We intend to address these issues in our future research.

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