Governance Mechanisms and Transaction Costs in the Automotive Supply Networks: A Conceptual Framework Proposal

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Abstract

This study aims to develop a conceptual framework under which researchers will be able to explore the relations between governance mechanisms and transaction costs in the automotive supply networks. It attempts to fill the gap in the literature relating to the measurement of transaction costs exposed by governance mechanisms from supply side. In further studies, authors will attempt to develop a scale rooted on this framework and apply it to the component manufacturers (suppliers) in the automotive supply networks.

Key Words: Governance mechanisms, transaction costs, uncertainty, specific investments, global value chain, automotive supply networks.

JEL Codes: L14, L62

1. Introduction

The globalization of production and trade has enabled a range of industrial organization forms in the world economy. In this process, the effort of firms to focus on innovation and specialize in core-competencies has reduced the vertical integration and direct ownerships over non-core businesses (Gereffi et al., 2005). This evolution resulted in the growth of industrial capabilities in developing countries and gave rise to a variety of network forms of governance situated between markets and vertical integration. To explain the changing nature of international trade and industrial organization, Gereffi et al. (2005) build their reasoning on the notion of global value chain. Global value chain research examines the different ways in which global production and distribution systems are integrated and the possibilities for firms in developing countries. The term fragmentation is used to define the different stages of the production process that is segmented in a global production network where each stage can be realized in a different location for cost minimization (Arndt and Kierzkowski, 2001). Hence production exceeds the boundaries of firms and extends production networks among the firms. Arndt and Kierzkowski (2001) indicate that the global market concentration of the large multinational enterprises (MNEs) allows the formation of local clusters and cross-border production networks in developing countries as a consequence of the fragmentation of the production process in globally traded industries, such as automotive, electronics and information technology.

Transaction cost theory (TCT) explores the most efficient organization forms in coordinating economic transactions whereas global value chain (GVC) analysis investigates how global production and distribution systems are organized. Ronald Coase (1937), best known as the forefather of TCT, provided the traditional TC-explanations for the boundaries of the firm and in advanced studies, Williamson (1979, 1981, 1991) developed the theory and defined governance structures as organization forms mediating the exchange of goods or services within technologically separable entities or production stages. The theory focuses on aligning governance structures with transactions in attempt to provide firm efficiency. Commons (1932:4) formulated the problem of economic organization as: "the ultimate unit of activity must contain in itself the three principles of conflict, mutuality, and order. This unit is a transaction". Based on this definition, TCT adopts the transaction as the basic unit of analysis and views governance as the means by which order is infused, thereby conflict is mitigated and mutual gains are realized (Williamson, 2002a).

This study aims to propose a conceptual framework in reference to which researchers will be able to explore the relations between governance mechanisms and transaction costs in the automotive supply networks. Automotive industry has a multi-technology and multi-component nature. Since it is not an efficient way to make all components in-house, manufacturers have relied on suppliers' product design and manufacturing capabilities in many cases and operated in a network form of governance. In 1990s competition extended the boundaries of local networks by adopting a global perspective and gave rise to global supply networks. Leading manufacturers (Original Equipment Manufacturers – OEMs) have built assembly plants operating under their licenses in developing countries in order to find a solution to the problems of overcapacity, cost pressure and low profitability. Their global suppliers have adopted strategies of follow design and follow sourcing. The restructuring of the automotive industry has raised the question whether the governance of the relationships between manufacturers and suppliers differs according to the attributes of transactions. Many studies have explored the relationship typologies, but they employed TCT in a limited way as an explanatory basis to classify manufacturer-supplier relationships. The governance of exchange relations in terms of their capability to economize on transaction costs has remained quite untouched in literature. The present study aims to motivate further studies on the governance of the relationships in the automotive supply networks by proposing a more comprehensive conceptual framework of TCT. The first part of the paper presents a summary of the restructuring process of the automotive industry. In the second part a research framework is proposed in support of the theoretical background. The last part draws conclusions regarding the present study and suggests some further studies.

2. Restructuring of the Global Automotive Industry

The world automotive industry exhibited a labour intensive structure until the end of the 19th century (Bedir, 2002). In 1908 the first mass production realized was Henry Ford's T model auto production in the USA. In 1930s the European countries attempted to transform their system into mass production and in the late 1950s this new system was extensively implemented in the European countries. The second evolution of the automotive manufacturing system was the lean production system named as **T**oyota**P**roduction**S**ystem. It was first implemented in Japan in the late 1960s. The leading automotive firms not only in Japan but also in the USA and Europe started initiatives to transform their systems to lean production. Concurrently the development of Japanese keiretsu supply model in the 1980s brought an end to the traditional American supply model and became the formative model of manufacturer-supplier relationships in the world automotive industry until 1990s (Ro, 2003) (Figure 1).

Insert Figure (1) about here

The keiretsu structuring defined as a group of interrelated organizations enables auto manufacturers to have a level of control over supply while the manufacturer-supplier relationships remain lean and flexible (Ahmadjan and Lincoln, 2001). The structuring is hierarchically organized in three tiers based on the type of products supplied by the leading automotive firms named as OEMs (Banerji and Sambharya, 1996:5). The first tier suppliers produce finished components and deal directly with the OEMs whereas the second and third tier suppliers transact with the level of suppliers above them. Some first tier suppliers may have close ties and even shareholding relationships with a particular automotive manufacturer.

Until the end of 1980s the OEMs mostly competed with regional brands in triad markets of USA, Europe and Japan (Veloso and Kumar, 2000). In 1990s liberalization of trade and investment policies changed the picture dramatically and the resultant effects of globalization began to be seen in the world automotive industry. To find a solution to the problems of overcapacity, cost pressure and low profitability the OEMs extended their scope of activities to developing countries that have relatively low production costs and lie close to the consumption markets. Eventually the competition in the industry acquired a global identity with auto transplants in every corner of the globe. First tier suppliers immediately reacted to this new formation with a strategy called follow policy and began to locate near the auto transplants. Some of them even located in the assembler's supply park defined as in-house outsourcing (Bonazzi and Antonelli, 2003).

Globalization also enhanced flexibility of manufacturing systems in order to build modular production network model. At the end of the 90s system integrator model became complementary for modular production. Module supplier provides coordination between the first tier suppliers and the OEM and has the responsibility to make up the details of product design layout and coordinate the design activities of the suppliers regarding manufacturing of the product. In the system integrator model suppliers are named as 0,5 tier suppliers (or global mega suppliers). Although they coordinate design activities of the OEMs in their supply bases, their emphasis on product development in this model is at system level (Figure 2).

Insert Figure (2) about here

3. Theoretical Background and a Research Framework Proposal

In this study, the notion of global value chain and the conceptual framework of TCT will be employed to explore the organization of global manufacturing and distribution systems and recurrent transactions between various firms in the automotive industry. TCT was first proposed by Ronald Coase (1937) and operationalized by Oliver Williamson (1979, 1985). This theory recognizes that exchange agreements must be governed and the governance structures are defined as comparative contractual constructions (Williamson, 2002a). Two extreme alternatives among the three basic modes of governance structures offered are market and hierarchy governance meaning that a firm either makes a component itself or buys it from an autonomous supplier (Williamson, 1981:556). Hybrids as mixed form of market and hierarchy include long term contracts, joint ventures, franchising, etc. This study suggests that the governance structure of the automotive networks as a macro phenomenon should be analyzed by explaining the interaction with the theoretical constructs of individual action as micro foundations (Figure 3).

Insert Figure (3) about here

The manufacturer-supplier relationships in the automotive supply networks belong to the leading automotive firms and large multinational suppliers. Relationships between local auto clusters and MNEs have been classified by scholars in various ways. TCT offers an important explanatory background to explore the relationship typologies resulting from different practices of MNEs. Arm's length and obligational contractual relations are suggested as two ideal types of relationships by Sako (1992) in his seminal work on trust in buyer-supplier relations. Humphrey and Schmitz (2002) distinguish between four types of relationships in value chains as, arm's length market relations, networks, quasi hierarchy and hierarchy. Verwaal and Hesseumans (2004) classify the relationships as dominated network and equal-partner network, and Gereffi et al. (2005) propose modular, relational and captive value chains between market and hierarchy as types of relationships. Bensaou (1999) developed a relationship typology comprising market exchange, captive buyer, strategic partnership and captive supplier in the automotive industry and his study became one of the most frequently referred sources. Wasti et al. (2006) assessed the suitability of this model to the Turkish context. Kaufman et al. (2000), Sturgeon (2002) and Svensson (2004) are some of the other contributing authors in the related literature.

The above mentioned studies employed TCT in a limited scope as an explanatory basis to classify manufacturer-supplier relationships. However no study was found that explained these manufacturer-supplier relationships within the conceptual framework of TCT, with special reference to the governance attributes. The present study aims to fill this gap by developing a TCT conceptual framework supported by some constructs of organization theory (Figure 4, Table 1).

Insert figure (4) about here

Insert table (1) about here

TCT is based on two behavioral assumptions regarding human nature. The first is the cognitive assumption named bounded rationality by Simon (1955). This assumption proposes that although people may intend to make a rational decision, their capacity to evaluate accurately all possible decision alternatives is physically limited (Hobbs, 1996:17). Bounded rationality does not pose a problem unless environment is characterized by uncertainty and complexity. Williamson (2002b) asserted that under conditions of complexity and uncertainty, all complex contracts are inevitably incomplete and the original contract terms should be adapted to new conditions. In such unexpected situations, there is the risk that one of the parties can act opportunistically. This risk of opportunism was labeled by Williamson (1975) as "self interest seeking with guile". In a later work Williamson (1981) classified the transaction attributes as asset specificity, uncertainty and frequency.

Asset specificity refers to particular relation specific investments deployed by the manufacturer or supplier in physical assets, facilities, tools and knowledge that are difficult to be converted to alternative uses. Such investments give rise to bilateral dependency and small numbers bargaining situation. In connection to this, the risk of opportunism also increases and subsequently causes coordinated adaptation requirements and gives rise to the need of using safeguarding mechanisms (Buvik and Grounhaug, 2000). The two types of uncertainty comprise environmental and behavioral uncertainty. Environmental uncertainty refers to market/demand uncertainty and technological uncertainty emanating from the unexpected changes in the external environment, while behavioral uncertainty is related to the difficulty in measuring and evaluating the performance of the partner (Macher and Richman, 2008). Williamson (1991) identified governance attributes such as adaptation, administrative controls, incentives and contract law.

Autonomous adaptation and coordinated adaptation are types of adaptation mechanisms the requirement for which differs according to the degrees of fluctuations in demand, supply, technology, and strong interdependencies between parties.

This study aims to propose a conceptual framework in reference to which researchers will be able to explore the relations between governance mechanisms and transaction costs in the automotive supply networks. Depending on research objectives some probable important questions based on the proposed conceptual framework could be: (Q1) How do the OEMs shape the governance of local automotive networks through global market penetration strategies in developing countries? (Q2) Whether the OEMs use their strong bargaining power over the local first tier suppliers opportunistically? (Q3) How is the development of local suppliers affected by the technology and know-how dependence on the OEMs and their global suppliers? (Q4) How are coordination and cooperation achieved between the parties by using alternative governance mechanisms? (Q5) Which transaction costs are exposed by governing exchange of transactions? The hypotheses to be tested are as follows:

H_1: The governance of the relationships between automotive manufacturers and component suppliers effects transaction costs.

> H_{11}: As the decisions taken by the automotive manufacturer are more centralized (a) coordination costs of the relationships decrease and (b) the possibility of opportunistic behavior of the automotive manufacturer who has stronger decision rights increases.
> H_{12}: As the agreement between the automotive manufacturer and its supplier is more formalized, (a) writing, monitoring and enforcing costs arising from making complex contracts increase and (b) opportunistic risk costs decrease.
> H_{13}: As the relationship between the automotive manufacturer and its supplier is more flexible, (a) the operational risk costs and (b) inventory costs decrease.

H_2: Higher the environmental uncertainty and asset specific investments, the opportunistic risk costs increase.
H_3: Higher the usage of advanced technology in the components' manufacturing, the tendency towards relationship-specific investments increases.

4. Conclusions

This study attempted to develop a conceptual framework driven from the question on how the manufacturer-supplier relationships in the automotive supply networks should be explored based on the explanations of TCT, with special reference to the link between governance mechanisms and transaction costs. It stressed the importance of using three fundamental attributes of the theory in an effort to contribute to the literature with an integrative view of empirical models. We suggest links among transactional attributes, governance attributes and transaction costs to explore the relationships between parties. In this context, the measurement of transaction costs exposed by governance mechanisms has especially remained an area of research relatively untouched. Consequently, we attempt to provide an incentive for further research with the conceptual framework proposal in this study.

Automotive supply market in developing countries is highly concentrated with a few global players. Assembly plants generally operate under the licenses of OEMs. Supply base includes the leading global suppliers which locate near assembly factories and local suppliers. The applied strategies of OEMs in operating countries differentiate between global and local suppliers according to the supplier's technology usage and component type. Local suppliers have relatively limited capabilities to develop products, mature technology and low bargaining power. In some cases these disadvantages result in opportunistic behavior of manufacturers under uncertainty. Parties can exploit some formal and informal safeguard mechanisms besides formal enforcement agreements in order to mitigate opportunism. However deterrence abilities of these mechanisms can be compared depending on high switching costs in this industry. Especially limited product developing capabilities of local suppliers enhance the opportunity cost of applying sanctions. Another important concern related to governance is coordination of complex and interdependent tasks. In the automotive industry, higher the degree of specialization and higher the level of product complexity, the requirement for coordinated adaptation increases. When selecting a governance mechanism the complexity of the component has to be considered depending on the reasons underlying the coordination concern.

Depending on the national context governance mechanisms differ in their capability for accomplishing the tasks of coordination and cooperation between the parties at the least costs of transaction. Therefore, making a comparative analysis between data sets collected from different countries will make a contribution to the literature.

On the other hand, exploring the relationships among different tiers of the automotive supply networks is equally important with the exploration of the dyadic relations between manufacturers and first tier suppliers. Thus investigating the governance of relationships through all tiers of the network is recommended. The authors plan to develop a scale based on this framework. Eventually, this scale will be used in a survey conducted on the suppliers in the automotive supply networks. And, in future studies authors aim to shed light on questions like which governance mechanisms are used with corresponding transaction costs in the automotive supply networks in comparative studies of different national contexts. Authors especially prefer to study the supply side which seems to be comparatively neglected in the literature. Following studies should also focus on transaction costs of suppliers and try to fill this gap collectively.

Acknowledgement

This study was supported by TUBITAK (The Scientific and Technological Research Council of Turkey).

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Figure 1. The evolution of supply chain management in the automotive industry, Ro, 2003.

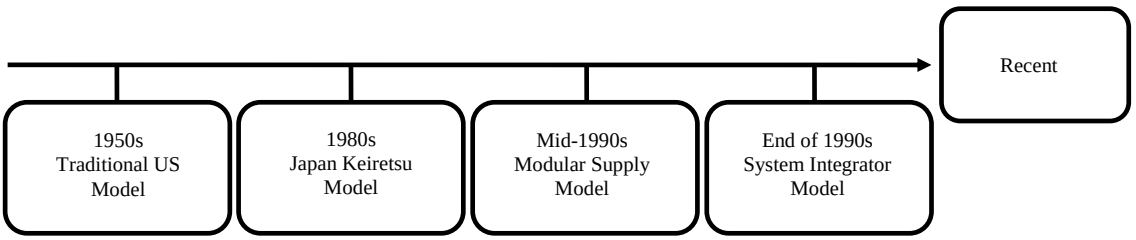

Figure 2. Restructuring the global automotive industry: American system integrator model.

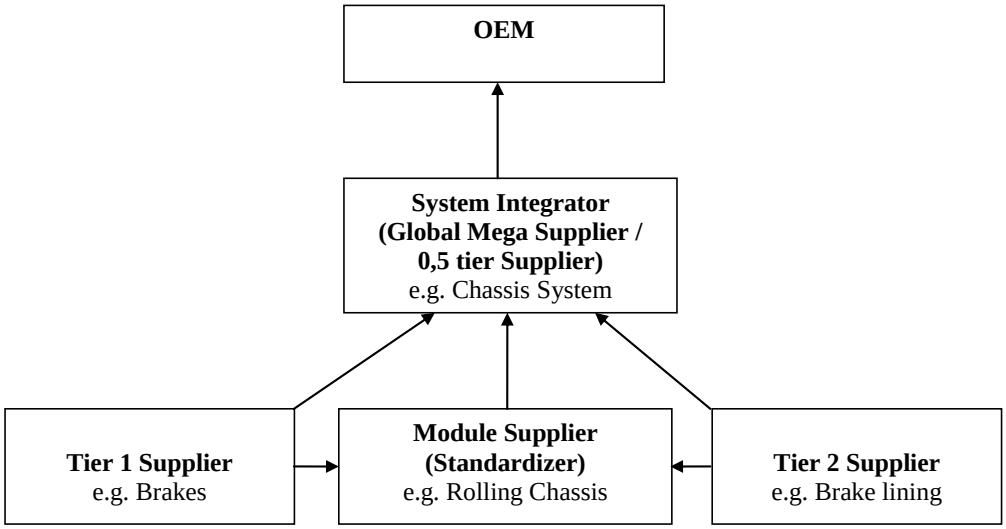

Figure 3. The explanatory structure of TCT, Foss et al., accessed on August 31, 2007.

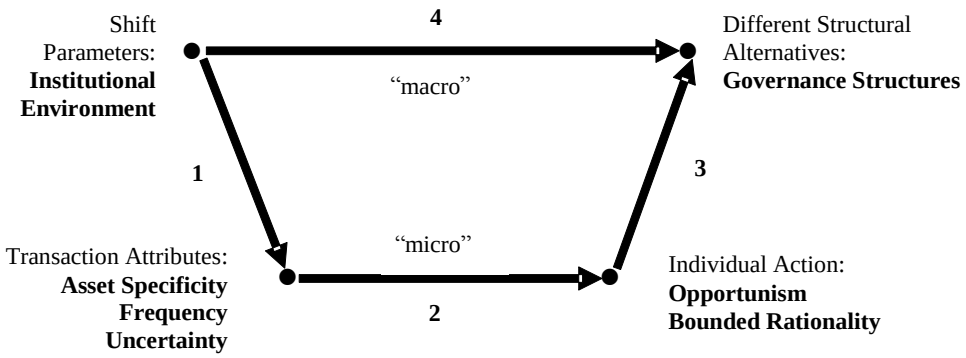

Figure 4. The proposed conceptual framework for manufacturer-supplier relationships in the automotive supply networks.

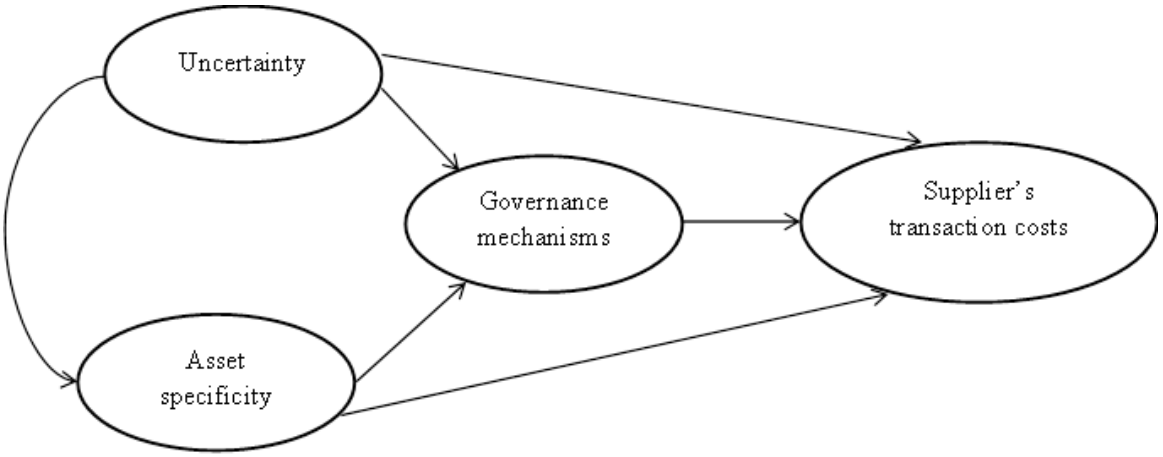

Table 1. The measurement constructs of the proposed research framework.

Dimensions	Transaction Cost Theory	Organization Theory
Uncertainty		
Environmental uncertainty	Demand/market uncertainty Technological uncertainty (Walker and Weber, 1984)	Environmental complexity (Child, 1972; Thompson, 1967) Environmental dynamism (Pfeffer and Salancik, 1978) Environmental capacity (Aldrich, 1979)
Behavioral uncertainty	Opportunism (Williamson, 1975)	
Task uncertainty		Task interdependency (Thompson, 1967)
Asset specificity		
	Physical asset specificity Site specificity Human asset specificity (Williamson, 1981)	
Governance mechanisms		
Structural mechanisms		
Formalization	Formal contracts (Williamson, 1976, 1991)	Van de Ven and Ferry (1978)
Centralization		Van de Ven and Ferry (1978)
Process mechanisms		
Trust	Rational trust (Williamson, 1993)	Relational trust (Rousseau et al., 1998)
Joint action		Heide and John (1990)
Flexibility		Wang and Lan Wei (2007)
Supplier's transaction costs		
Switching costs	Willimson (1975, 1981)	
Opportunistic risk costs	Xu and Beamon (2006)	
Operational risk costs		
Coordination costs		
Inventory costs		