

Managing Coordination Costs of Interorganizational Relationships: An Analysis of Determinants

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Abstract: This paper presents a framework of the determinants analysis of the control of interorganizational relationships (IOR). While drawing on transaction cost analysis and resource-dependency theory, the authors analyze the effects of asset specificity, environmental uncertainty, level of dependence and trust on coordination costs of IOR. The explanatory power of the framework is assessed by a case study of buyer-supplier relationships from manufacturing industry in China. The findings from the case study suggest asset specificity, environmental uncertainty, and trust are the main determinants influencing coordination costs of buyer in IOR.

Keywords: Collaborative commerce, Interorganizational relationship, Coordination cost.

I. Introduction

Interorganizational relationships (IORs) are hybrid organizational forms which contain elements of both markets and hierarchies. Market exchanges are transactions between separate organizations, and hierarchical relationships are coordinated among organizations. IORs coordinate the activities of multiple organizations that are separate entities but cooperate with each other about their common concerns [15].

One important characteristic of IORs is cooperation, it refers to an agreement, relationship or exchange between two or more actors that is conducted by each of the participating parties. In past researches, many scholars highlighted the opportunities for mutual gains as the key motivation for IORs cooperation, including the gains as inter-learning, efficiency profitability, competent advantages, risk-resist ability and scale economic effect [15][10][8]. On the other hand, some authors have reported high failure rates of IORs. From a survey of year 1995 of Australia manufacturing organizations, Williams [15] find that approximately 38 percent of all respondent firms indicated that they had at some stage abandoned a cooperative arrangement, the main reasons being loss of control and lack of trust followed by the growing coordination cost of the arrangement. The wish to remain independent and remain control of their business operation was also the main reason of the failure.

A second characteristic of IORs can be described as the interdependence between partners. To create the transaction

value of common goals, partners should pool their resources together as well as determine the division of labor and the interface of activities between them. The resulting interdependence between the subtasks the partners agree to perform subsequently needs to be coordinated across organizational boundaries to ensure a fit between their points of contact [5].

Gulati and Singh [7] have stressed the importance of using coordination for managing task interdependence by arguing that "concerns about anticipated coordination costs are particularly salient in alliances, which can entail significant coordination of activities between partners". As the IOR's tasks become more interdependent and more uncertain, the need for coordination and decision making increases. Upon that, successful control of coordination costs becomes a key point on this cooperation relationship.

This paper develops a framework to analyze the determinants on the control of IORs in China, which is built on transaction cost analysis (TCA), resource-dependency theory (RDT) and notions of social control. We explain the framework from a case study of four buyer-supplier relationships on the manufacturing industry. Considering the availability of data, we will investigate the case from the buyer's perspective. In respect of the complexity and difficulty of measure on coordination costs, this paper does not try to examine the structure or measurement of coordination costs. Rather, we will focus on the inner relation between coordination costs and those influential factors.

This paper, in the next section, provides an analytic framework for measuring the determinants on interorganizational coordination costs from the TCA and RDT perspectives. Next, to explain the power of the framework, we employ a case study of buyer-supplier relationships from manufacturing industry in China. The paper ends with conclusions and directions for future researches.

II. Theory and Hypotheses

Detecting determinants on coordination costs of IOR can be studied from TCA perspective and RDT perspective respectively. The TCA has focused on the appropriation concerns in IORs, which originating from pervasive behavior uncertainty and contracting problems [3][11]. The basic assumption underlying the TCA perspective is that the specific governance form is based on an economizing on transaction costs. As asset specificity becomes substantial, interdependency is deepened and coordination is needed for

safeguarding the appropriation concerns.

RDT is a theory rooted in an open system framework, it focus on the ability that a firm must obtain necessary resources from external organization to survive prosper. The premise in RDT is that, firms confronted with an unpredictable environment will try to establish interorganizational relationships as a strategic response to uncertainty. The RDT perspective addresses the importance of the resources exchanged and the parties' ability to control the flow of input- and output resources [4].

When considering the management and control of IORs, we think the crucial concern is the magnitude of coordination cost. This paper considers both dimensions from TCA and RDT as potential detriments on coordination costs. Besides the common premise of uncertainty dimension, we focus on examination of asset specificity from TCA as well as other dimensions from RDT and social theory, including level of dependence and trust.

II.1 Coordination costs

Many researchers argue that the coordination cost outweighs the benefits that an alliance can provide. How to control the costs is the key to allow a firm to realize the potential gains from alliance involvement [2][7]. The problem lies in the difficulty to measure it, as coordination costs can not be reflect from financial data. Considering business exchange is based on contract, Artz and Brush [2] suggest that coordination costs should be measured through contracting costs. They argue that IOR creates two types of contracting costs: the ex ante costs of initially establishing the contract, and perhaps more significantly, the ex post costs of periodically renegotiating and adjusting those contracts.

We also adopt the perspective of Artz and Brush and use the latter type of costs to measure coordination costs occurred in IOR. Therefore we use a similar approach as that suggested by Artz and Brush [2] and use the amount of time a buyer spends preparing for and actually negotiating supply contracts and the extent of conflict in the negotiation as indicators of coordination cost. In detail, we consider three aspects here: the amount of preparing time before negotiation, actually negotiating time and bargaining sessions, and the extent of conflict in the negotiations.

II.2 Independent variables and hypotheses

Asset Specificity. Asset specificity refers to physical assets, production facilities, tools and knowledge tailored to a specific relationship that cannot be re-deployed for other purposes without the sacrifice of productive value. When entering an IOR alliance, participants usually have to invest on assets with specific use only in this alliance. As regarding the manufacturing industry, a firm should, which is looking for appropriate supplier, make great effort on searching and evaluating the potential partners. This may consume a lot of capital, labor and time to establish and maintain the cooperation relationship. Besides, the participants should be locked in by special production equipment, computer technology and related interorganizational systems that link the buyer and supplier production and scheduling activities.

Substantial asset specificity creates bilateral dependence and may reduce the buyer's control over supplier. Therefore the buyer's coordination costs may rise. Accordingly we propose:

H1: In a buyer-supplier alliance, the association between buyer's asset specificity and buyer's coordination costs is positive.

Uncertainty. According to TCA, uncertainty refers to the condition of being able to predict relevant contingences surrounding the transaction. There are two types of uncertainties. One type is referred as environmental uncertainty which means circumstance surrounding an exchange cannot be specified ex ante. Artz and Brush [2] define environmental uncertainty as the inability to predict changes in relevant factors surrounding the buyer-supplier exchange, such as the changes in price of product input and the demand for end product. Therefore the environmental uncertainty makes it more difficult for the buyer and the supplier to negotiate contracts.

Another type of uncertainty is referred as behavioral uncertainty which means performance cannot be easily verified ex post. The effect of behavioral uncertainty is a performance evaluation problem, that is, difficulties in verifying whether compliance with established agreements has occurred [6][14].

When anticipated the supplier may have motivation to behave high behavioral uncertain, the buyer should consume more time and effort in negotiating contract for safeguard purpose. Accordingly we propose:

H2a: In a buyer-supplier alliance, the association between environmental uncertainty and buyer's coordination costs is positive.

H2b: In a buyer-supplier alliance, the association between supplier's behavioral uncertainty and buyer's coordination costs is positive.

Resource-dependency. As RDT provides a holistic approach with explicit recognition of economic and social-political dimensions of IOR [12], Ratnasingham and Kumar [13] argue that RDT is concerned with: (1) external forces such as e-commerce environment within which the dyad operates, (2) internal organizational dimensions that structure and shape written policies and procedures, and (3) trading partners' interactions in their general exchanges.

Similar to the descriptions above, this paper takes the suggest that these structure arrangement may be embedded whining socio-political characteristics of dyad, so we use level of dependency and trust as the dimensions of resource dependency.

Regarding the level of dependency reflects the extent that the buyer relying on suppliers for the resources they cannot produce themselves, so we suggest that:

H3a: The greater the level of buyer's dependency on supplier exists, the more coordination costs the buyer should use.

Sociologist viewed trust as an individual's confidence in the intentions and capabilities of a relationship partner and the belief that a relationship partner would behave as one hopes. In IOR's research, Ratnasingham and Kumar [13] indicate trust as a key factor for successful long term trading partner relationships, because high extent of trust between partners can increase cooperation, thus leading to communication openness and information sharing. Furthermore, they identified three types of trust existing in IOR: competence trust, predictability trust and goodwill trust.

Competence trust emphasizes the trust in trading partners' skills, technical knowledge. Predictability trust emphasizes the trust in trading partners' consistent behaviors that provide sufficient knowledge for other partners to make predictions and judgments due to past experiences. Goodwill trust emphasizes the trust in trading partners' care, concern and honesty that allow other partners to further invest in the cooperation relationships.

Summarily, we can view trust as a very lubricant that can help mitigate risk and coordinate interactions in business relationships. Hence, we argue trust may be an important mechanism to reduce the coordination costs, and suggest:

H3b: The greater the trust between the buyer and the supplier exists, the less coordination costs the buyer should use.

The hypotheses are summarized as figure 1.

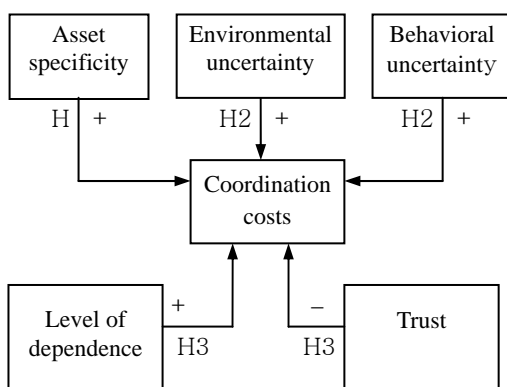


FIGURE 1: Determinants on coordination costs

III. A Case Study

On purpose of comparative, we select two electronic firms and two machine-making firms located at Xiamen city for in-depth study. These four firms are all stated owned firms listed on China Stock Exchange.

At first stage, we designed a survey based on buyers' perspectives of asset specificity, environmental and behavioral uncertainty, level of dependence on supplier and trust between the trading partners. Each dimension includes several items recorded on 1 (strongly disagree) to 5 (strongly agree) Likert scale. Next, we chose the interviewees as the managers of purchasing department or managers being responsible for R&D. Then we sent the surveys to interviewees beforehand and asked them to choose a supplier for certain product. Latter we arranged the interview with them separately for detailed discussion. The summary data in this case study is provided in table 1.

The electronic firms are Amoi Electronic Corporation and ABC Electronic Corporation. AMOI is a multinational electronic enterprise, which highly focuses on developing and manufacturing products from telecommunication, digital video & audio to IT industry. Nowadays Amoi has been an internationally well-known leading manufacturer and supplier of mobile phones in China. In 2003, this firm has employed about 20,000 persons and the total sales reached 850 millions US dollar. The interviewees chose the supplier producing screens used in mobile telephones.

The other investigated electronic firm is ABC which is an anonym. ABC is the leading professional manufacturer of Plastic Film Capacitors in China. Its current total annual capacity has reached 2.5 billions pieces, which can be ranked first in China and sixth in the world. The total employee is less than 2000, and the total sales are about 36 millions US dollar. The interviewees chose the supplier producing metal materials used in capacitors.

The machine-making firms are Xiamen King Long United Automotive Industry Corporation (XMKL) and Xiamen Engineering Machinery Corporation (XMEC). XMKL has taken up a leading position among domestic coach manufacturers and has hired 3500 employees with the total sales reached 542 millions US dollar. The interviewees chose the supplier producing engines used in coaches.

XMEC is the key enterprise of large scale for producing wheel loaders of the state. The company had been the birthplace of the first loader of China. The total employee is 2000, and the sales in 2003 reached 313 millions US dollar. The interviewees chose the supplier producing diesel engines used in wheel loaders.

We firstly compare the negotiate session with their own supplier between the two electronic firms. On average, both of them respond some extent of complexity in negotiation with their suppliers. To reach an agreement with suppliers on contract items, it often requires extensive preparation time and numerous separate bargaining sessions. This should belong to drastic competence and homogeneity of products existing in electronic industry. Therefore, electronic firms are always tried to strictly control the costs and quality of their product to gain competitive advantage in the market. This results tough negotiation with suppliers and increase the coordination costs of buyers. Investigated data shows that the two electronic firms received a same mean value of 3.6 on coordination costs. Rather, the average value of coordination costs for the two machine-making firms is much less, which is respectively 1.8 and 2.2. Both of the two firms attribute the relative easy bargaining process with suppliers to mature market of machinery industry.

Asset specificity. Amoi has gotten a greater value of 3.4 on asset specificity, and the value for ABC is 2.2, which is separately the max value and min value among the values of the four firms. The reason is that the supply of screen for mobile phone demands high customization, while the material for capacitors is high standardization. The engine and diesel engine used by two machine-making firms must comply with national standard, which make the asset specificity lower. As a whole, higher levels of asset specificity increase the difficulty the electronic firms experience in negotiation supply contracts. Although the coordination costs of ABC do not seem positive to asset specificity, this may be influenced by environmental uncertainty which increase the coordination. However, from the analytical perspective of industrial difference, this result can support the positive relationship between asset specificity and coordination costs.

Environmental uncertainty. As expected, the levels of environmental uncertainty of electronic firms are obviously higher than those of machine-making firms. ABC gets the greatest value of environmental uncertainty, which is not only two times than those of machinery firms but is also much greater than the value of another electronic firm. There are two causes can explain: first, the market price for

capacitors usually fluctuate violently. Second, the investigated component procured by ABC is metal material, which has been floated frequently in recent years suffered from international supply. In general, electronic industry confronted with drastic competence as well as fast technology innovation. Consequently the product prices and purchasing costs change frequently, along with the life cycle of product shorten. Suffering greater environmental uncertainty than machine-making firms, hence, electronic firms need more deliberately negotiate a contract. As a result, it suggests that higher levels of environmental uncertainty increase the coordination costs of buyer.

Behavioral uncertainty. Except for the lower value of Amoi, the levels of behavioral uncertainty of other three firms are almost the same. On account of the tiny distinction of these values which is nearly medial value, from this investigation we cannot get any conclusion on the relationship between behavioral uncertainty and coordination costs.

Level of dependency. Our data reflect that all of the firm present high levels of resource dependence on their suppliers for investigate. The primary reason is that the interviewees of the four firms have happened to choose the focal suppliers of their core products as investigating object. Among the firm, the level of dependency of ABC is lesser. Because there exist many manufacturers can supply metal material, in the other hand, ABC may find some other substitute if possible. In general, the distinctions among the levels of dependency of the four firms are not obviously. As all the values are distributed between 3 and 4, so the results suggest that the negative between level of dependency and coordination costs is not significant.

Trust. From table 1 we can see, the trust between buyers and their focal suppliers is reached a high level in the range of 4.29 and 4.57. Considering the greater value of trust dimension in the case study, we can conclude that all the four firms have tried to establish strong trusty cooperation relationships with their focal suppliers. Hence, to some extent of degree they have reduced the behavioral uncertainty of their trading partners and make the negotiation proceeding smoothly. As result, this finding support for Hypotheses 3b.

IV. Discussion and Conclusion

This paper contributes to focus on the determinants of coordination costs in IORs by considering the dimensions of TCA and RDT. Our model indicates that when studying the control of IOR, the economic dimensions and relational norms should be putted into consider simultaneously. There is little empirical study on such topic based on relationships of Chinese organizations, and this study also makes a valuable contribution by filling up this gap.

In this study, we investigate four manufacturing firms located in China belonging to different industry. The result shows that the Hypotheses 1 and Hypotheses 2a in our model have been significantly supported by the empirical data. That means in the context of China, the traditional TCA research is also useful in study of interorganizational relationships. We find that both asset specificity and environmental uncertainty directly increases the coordination cost of interorganization exchanges. And this finding is clearly consistent with previous TCA research [2]

[1] [9].

As the dimensions of RDT, this study supports Hypotheses 3b significantly. Therefore this finding indicates that trust can reduce buyer's coordination costs by mitigating behavioral uncertainty. Besides, trust between trading partners also plays a direct role in reducing buyer's coordination costs. On considering the effect of dependency level, distinction of the investigated data is quite tiny, and our study does not significantly support Hypotheses 3a. One possible explanation for this non-significant finding may be that the dependency level between trading partners in this study are too similar to manifest the different influential level.

While the findings of this study provide valuable insights, several future studies need research into the selection of determinants of IORs. For instance, our study has provided insight from the buyer's perspective, lacking of supplier's choice. Since the IORs are bilateral relationships, the successful control of IOR rely not only the action of the focal firm, but on actions of all the participants. Therefore, future research would analyze the determinants from the supplier's perspective. Finally, considering the shortage of case study method, it requires quantitatively methods using a number of IORs from a wide extent. This also remains an important challenge for future research into the management of IORs.

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TABLE.1 Summary data in case study

Firms	Coordination costs	Asset specificity	Environmental uncertainty	Behavioral uncertainty	Level of resource dependence	Trust
Amoi	3.6	3.4	2.4	2	3.75	4.29
ABC	3.6	2.2	3	2.75	3	4.43
XMKL	1.8	2.6	1.2	2.75	3.5	4.29
XMEC	2.2	2.4	1.6	2.5	3.25	4.57