

Research on Logistics Outsourcing Decision-making Model Based on Cost and Competence

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Abstract—How to scientifically choose logistics modes and outsourcing strategies is an important decision-making problem in the current enterprise operation. Based on Transaction Cost Theory and Core Competence Theory, this paper studies and constructs logistics outsourcing decision-making model. The model mainly includes four decision steps: strategic evaluation, specificity evaluation, logistics capability evaluation and cost-effectiveness evaluation. And in the decision process, all kinds of factors should be taken into account, including core competence, business specificity, capability similarity, complementarity, stability, asset specificity, uncertainty, and transaction frequency, etc. Using this model, enterprises can flexibly and correctly choose logistics operation strategies, including self-operation logistics, transaction logistics, contract logistics and strategic alliance.

Keywords—transaction cost; core competence; logistics outsourcing; decision-making model

I. INTRODUCTION

Outsourcing is a management strategy that transfers some non-core business performed by the organization to professional and efficient suppliers, which will make the most of professional resources outside the organization. Outsourcing can reduce costs, improve efficiency and enhance the competitiveness of the organization itself. At present, the service market of third-party logistics (3PL) in China has become mature, and logistics outsourcing is an important means for enterprises to integrate resource [1].

In current research, logistics outsourcing plays an important role in improving enterprise performance and relationship quality. Regarding the improvement of enterprise performance, the research shows that logistics outsourcing can reduce enterprise cost by 12-15% [2]. Good relationship of logistics outsourcing enables enterprises to achieve higher logistics flexibility, better inventory utilization and more timely picking and delivery [3]. Regarding the improvement of relationship quality, the study believes that logistics outsourcing enhances the relationship between both sides and strengthens their loyalty [4]: enterprises have improved their satisfaction with logistics services and expanded the scope of logistics outsourcing; service providers are also willing to take risks and build logistics networks to meet the needs of enterprises.

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At the same time, there are also risks in logistics outsourcing[5], which will be affected by objective risks (such as natural environment, political environment, market environment), management risks (such as decision-making, cooperative integrity, performance appraisal), and technical risks (such as information transmission, information management). Therefore, logistics outsourcing opportunities and risks coexist, and scientific consideration should be taken in outsourcing decision-making.

II. FORMS OF LOGISTICS OUTSOURCING

Generally, the forms of logistics outsourcing include: transaction logistics, contract logistics and strategic alliance.

- *Transaction logistics* is a mode of logistics outsourcing cooperation based on once or independent transaction. Generally, it is aimed at specific logistics operation activities, such as inadequate capacity in a logistics operation, to seek resources support from outside.
- *Contract logistics* obtains part or all of logistics services from outside for a long period of time, which is 3PL or 4PL. It can outsource one or more logistics functions, or it can outsource all logistics functions; it not only includes outsourcing specific logistics operation activities, but also includes outsourcing logistics management.
- *Logistics strategic alliance* refers to a loose network organization formed by agreements or contracts, in which there are advantages sharing, risk sharing and benefit sharing between organizations. It has a long-term and stable strategic cooperative relationship.

Different forms of outsourcing reflect different degrees of integration (figure 1).



Fig. 1. Relationship between Outsourcing Forms and Integration Degree

III. CONSIDERATION BASED ON COST AND COMPETENCE

In order to avoid the risk of logistics outsourcing and make the most of the value enhancement brought by outsourcing, it is necessary to consider various factors comprehensively and establish a scientific outsourcing decision-making model. When evaluating logistics activities, we usually consider the dual objectives of service and economical efficiency. Therefore, when making outsourcing decisions, we mainly consider two aspects: cost and competence.

A. Consideration based on cost

According to Transaction Cost Economics theory, three dimensions can be used to distinguish transaction forms [6]:

- **Asset specificity:** Specialized investment for the completion of a specific business activity cannot be used for other work or other users unless a loss of value is incurred. Specific assets include sites, materials, human resources, special/contribution, brand and temporary special assets, which can bring huge benefits in the future, and also lead to the formation of bilateral dependence, resulting in complex ex post governance structure.
- **Uncertainty:** Due to the existence of bounded rationality, when one party intentionally does not disclose, disguise or distort information, the other party's decision makers cannot know their decisions and plans.
- **Transaction frequency:** Costs associated with specific governance structures are easier to recover in large-scale transactions that occur repeatedly.

In view of the above three dimensions, different governance modes are given (Table I):

TABLE I. EFFECTIVE GOVERNANCE MODE

		Investment characteristics		
		Generality	Mixed specificity	High specificity
Frequency of transactions	Occasional transactions	Market governance	Trilateral governance ^a	
	Repeated transactions		Bilateral governance	Integrated governance

Note ^a: A neutral third party is responsible for arbitrating disputes that may arise between the two parties in the course of the transaction.

In the above governance mode, market governance, bilateral governance and trilateral governance all emphasize obtaining resources support from outside while integrated governance emphasizes obtaining resources from the inside.

When uncertainties increase, the standard transaction of general assets investment still follows the market governance mode. There may be two kinds of changes in transactions with mixed-specific asset investments: one is to evolve to two extremes, either to adopt fully integrated governance or to return to pure market governance; the other is to make "credible commitments" to strengthen bilateral dependence. For highly specific and uncertain transactions, the situation is very complex, and the current research cannot confirm which

governance mode is applicable. But it is certain that other conditions are certain:

- The more dedicated assets, the higher the cost of outsourcing.
- The greater the uncertainty, the more unsuitable for outsourcing.
- Uncertainty will increase the transaction cost of specific assets.

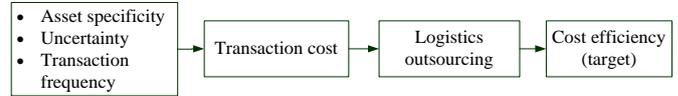


Fig. 2. Logistics Outsourcing Decision Based on Transaction Cost

B. Consideration based on competence

Based on Dynamic Capability Theory, three dimensions are proposed to measure the relationship between capabilities and governance patterns [7]:

- **Similarity:** it represents the consistency or utilization of existing resources/capabilities;
- **Complementarity:** it represents the complementary or developmental role of the activity to existing resources/capabilities;
- **Stability:** it represents whether the activity needs dynamic adjustment or not.

In the process, activities with high similarity are conducive to making full use of existing resources, requiring static coordination and integration; activities with strong complementarity are conducive to improving the existing situation, requiring dynamic development and learning; and new activities require re-optimizing the combination of existing resources/capabilities. (Table II)

TABLE II. GOVERNANCE MODE AND NEW ABILITY CREATION

Similarity	Complementarity	Stability/ novelty	Applicable Governance Mode
high	high	stable	internal governance
high	high	novel	internal governance, alliance or joint investment
high	low	stable	internal governance or market governance
high	low	novel	internal governance
low	high	stable	internal governance or outsourcing
low	high	novel	alliance or joint investment
low	low	stable	market governance
low	low	novel	market governance

Based on institutional economics, combining transaction costs and core competencies, a general model of outsourcing decision-making is proposed, which brings out three questions to answer when deciding whether to outsource:

- Firstly, is the activity highly specific? If it is, then the market transaction costs are usually high, and outsourcing is not a good choice.
- Secondly, is the activity strategically important? If so, even if the specificity of assets is very low, you can't

choose to outsource because they are critical to survival.

- Lastly, is the activity a core competency, or is it a central part of the competitive advantage? Does it help to enhance competitiveness or has no impact on competitiveness? The activities that do not contribute to competitiveness are typical outsourcing objects. As the contribution level increases, they gradually go from external outsourcing to internal outsourcing and at last to self-construction.



Fig. 3. Logistics Outsourcing Decision Based on Core Competence

IV. CONSTRUCTION OF LOGISTICS OUTSOURCING DECISION MODEL

Decision-making model mainly solves how to make a comprehensive evaluation based on cost and competence, and scientifically select the appropriate logistics operation form and outsourcing strategy.

As mentioned above, based on competence, three aspects are considered:

- *Strategic evaluation*: Judging the strategic level of logistics function business itself and whether it is the core competence of the enterprise.
- *Specific evaluation*: Judging the level of business activity specificity, whether it involves special materials, special business, whether it needs special logistics equipment, logistics technology, whether it has special requirements for security and confidentiality, etc.
- *Capability evaluation*: Examining whether the enterprise has the equipment, capital and human resources to complete the logistics business? If not, how about the similarity, complementarity and stability between the required resources/capabilities and the existing resources/capabilities? How about the logistics operation ability, experience and service level of external logistics forces?

Based on the cost, it mainly focuses on asset specificity, uncertainty and transaction frequency, and then evaluates the level of logistics self-operation cost and outsourcing operation cost.

Thus, a decision-making model of logistics function outsourcing can be formed (Fig.4).

Strategy A: self-management.

Through strategic evaluation, if logistics business is the core competence of enterprises and the main source of their market competitiveness, then it is mainly self-construction and self-operation.

Strategy B: Self-operation or alliance strategy.

- Through specificity and cost-effectiveness evaluation, it mainly focuses on self-construction and self-operation.

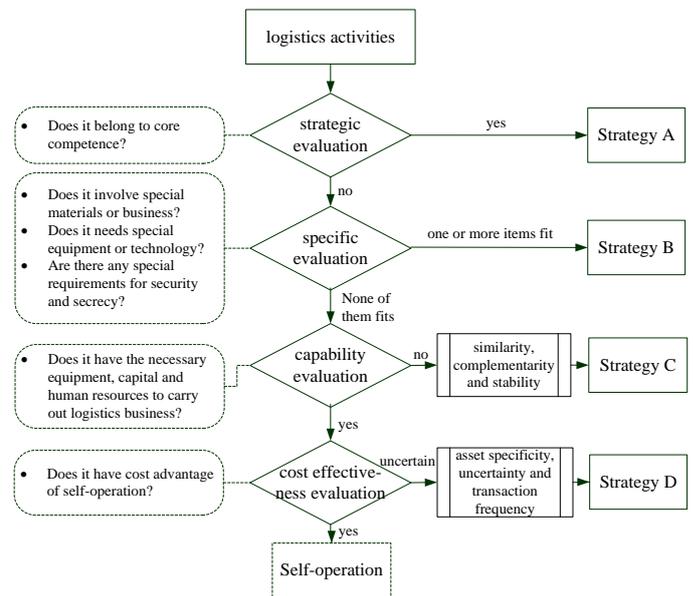


Fig. 4. Decision-making Model of Logistics Outsourcing Based on Cost and Competence

- At the same time, some 3PLs, which are reliable and have operational capabilities, can take part in logistics tasks as strategic partners.

The strategy selection is shown in Figure 5.

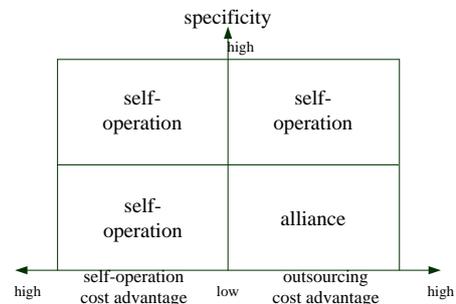


Fig. 5. Strategy Selection Based on Specificity and Cost-effectiveness Evaluation

Strategy C: According to the similarity, complementarity and stability between business activities and existing resources/capabilities, appropriate strategies are selected.

Reference Table II, follow opinions are generally supported:

- Activities with high similarity to existing resources/capabilities of enterprises tend to be self-building and self-operation, while activities with low similarity tend to be completed by external resources.

- Activities with high complementarity to existing resources/capabilities of enterprises should adopt self-building and self-operation mode, or pay more attention to establishing stable relationships with service providers, while activities with low complementarity focus more on free market competition to obtain resources/capabilities.

c) If there are strong dynamic changes in activities, then the better choice is to obtain strength support from the outside.

As shown in Figure 6.

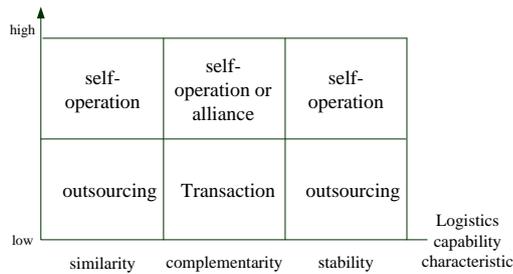


Fig. 6. Strategy Selection Based on Logistics Capability Characteristic Evaluation

Strategy D: Based on asset specificity, uncertainty and transaction frequency, we evaluate the cost of self-operation or outsourcing, and select appropriate strategies.

If self-operation cost is lower, it chooses self-construction and self-operation. On the contrary, it chooses outsourcing. Referring to the conclusion in Table I, this paper thinks that:

a) For logistics services with strong generality, it can usually obtain support directly through the market.

b) For logistics services with certain specificity (such as some special materials, while there is no obvious difference in logistics operation), it can obtain service relying on 3PL (applicable to frequent transactions), or entrust 4PL (applicable to occasional transactions).

c) For highly specialized logistics services, it usually adopt self-building and self-operation mode to implement internal integration operation. While in occasional peaks and emergencies, it can appropriately seek support from the outside.

d) For logistics services with strong uncertainty, i.e. some activities with security impact and unsuitable to disclose information, it tends to adopt internal integration operation, and can also be selected among logistics service providers who have passed security certification and are highly credible.

As shown in Figure 7.

V. CONCLUSION

Based on existing literatures on Transaction Cost Theory and Core Competence Theory, this paper establishes a logistics outsourcing decision-making model, which mainly includes four decision-making steps: strategic evaluation, specificity evaluation, logistics capability evaluation and cost-effectiveness evaluation.

Through the evaluation, the paper thinks that:

1) Logistics functions and business activities related to the core competence of enterprises are completed by enterprises themselves.

2) For non-core logistics business, logistics activities with stronger specificity tend to be completed by themselves, and the rest can be outsourced optionally.

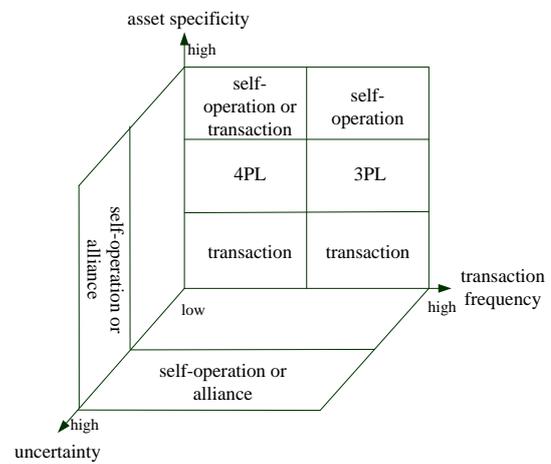


Fig. 7. Strategy Selection Based on Cost-effectiveness Evaluation

3) For different logistics resources/capacity bases, different construction modes and outsourcing strategies should be selected.

4) From the cost point of view, except for some highly specialized logistics services, other general logistics services can be outsourced. Logistics services with higher demand frequency (transaction frequency) should adopt self-operation mode to reduce the overall cost, while logistics services with lower demand frequency can be obtained from outside by outsourcing mode.

This decision-making model not only applies to the general enterprise logistics outsourcing operation, but also has good application value for military logistics, emergency logistics, cold chain logistics and other special logistics activities.

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