

## Study on Trust Countermeasures of SMEs RJVs Based on Reputation Angle of View

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### Abstract

Research Joint Ventures (RJVs) is an effective way for SMEs (small and medium enterprises) independent innovation. In order to realize cooperation across the organization and border-crossing, SMEs RJVs must consider how to reduce cost, improve cooperative effect cooperation, and meanwhile guarantee the flexibility of SMEs. The essence of SMEs RJVs is cooperation, and cooperation is closely linked with trust. Trust is the basis for the cooperation. In order to maintain the stable cooperation relationship and good operation, SMEs RJVs require establishing incentive mechanism for the members' cooperation. The reputation of organizational members' cooperation is undoubtedly an effective incentive. By using the KMPW reputation model of complete information dynamic game, we can analyze the trust problems of SMEs RJVs under the condition with information asymmetry. Moreover, the KMPW reputation model can also disclose and transmit the trust information about the enterprises effectively.

**Key words:** SMEs; Research Joint Ventures; Reputation model

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### INTRODUCTION

SMEs do not have their own core technology so that they cannot continue their development. If they rely solely on the outside world technological innovation, there are many obvious limitations for them. In China, more than 90% of SMEs lack permanent research and development institutions and they also lack scientific research personnel. Because SMEs lack some things, such as the lack of independent intellectual property rights of the technology and products, innovative capital insufficiency, the level of equipment backwardness, the lack of talented, weak technical ability, the lack of technology innovation potential, low approval of social credibility, therefore these questions cause SMEs technology “hollow”. Due to the lack of core technology and their own brands, although these enterprises are young but products have been ageing. It is so difficult to get a sustainable development. SMEs independent innovation is also difficult to realize. To solve this problem, this paper proposes a thought of SMEs RJVs to innovate independently.

RJVs is originated from the research practice among Japan, the United States and other large enterprise cooperation. Since 1980s, the theoretical research has been carried out gradually in developed countries. RJVs is the cooperation innovation configuration of organization with many enterprises, which forms in the R&D stage joint control, and after completing R&D, the enterprises carry on the competition in delivering the stage. RJVs is one kind of cooperation innovation configuration of organization, which esteems for the antimonopoly law. Moreover, the innovation enterprises are engaged in the research development, which may also reduce the innovation investment risk, and raise the innovation efficiency, and reduce the innovation capital pay-off cycle and so on. RJVs theory may provide the feasible development mentality and the direction particularly for the China SMEs.

SMEs have the aim to realize RJVs across the organization and border-crossing cooperation. We must consider how to reduce cost, improve cooperative effect cooperation, and meanwhile guarantee the flexibility of SMEs. The essence of SMEs RJVs is cooperation, and cooperation is closely linked with trust. Trust is the basis for the cooperation. According to the empirical study estimation, the league failure rate is commonly 50% ~ 60% (Bleeke and Ernst, 1993, etc.). Kogut found that 20% of cooperation will disintegrate when it is the fifth or sixth year since the enterprise development cooperation formed. Harrigan found that only 45% of R&D cooperation is successful and the cooperation average duration is 3.5 years. Among many factors which influence enterprise cooperation relationship, cooperation between members of mutual trust plays a key role. It is not only the premise for cooperation, but also an important impetus of successful cooperation. And the main reason which leads failure of cooperation is often the lack of trust. In order to maintain the stable cooperation relationship and good operation, SMEs RJVs require establishing incentive mechanism for the members' cooperation. The reputation of organizational members' cooperation is undoubtedly an effective incentive. Reputation mechanism can reduce the uncertainty of behavior by providing information about the members of confidence, in order to enhance the effectiveness of members' interaction.

## 1. THE ANALYSIS OF SMEs RJVs TRUST REPUTATION MODEL

In order to analyze the trust behavior between the enterprises who authorize the credit to their partners and the enterprises who get the credit from their partners within SMEs RJVs, and distinguish the latter enterprises under what conditions will choose trustworthy behavior, and under what conditions the enterprises with poor credit will also have power not to breach, and constantly improve themselves, this paper introduced KMRW reputation model for the analysis under the condition of incomplete information.

KMRW model pointed out that it is irrational (e.g. choose "cold strategy") if each prisoner has  $P > 0$  probability in the stage of repeated prisoners game. If  $T$  is big enough, then  $T_0 < T$  makes the following strategic constitute a refined Bayesian equilibrium: all rational prisoners choose to cooperate in phase of  $t < T_0$ , while they choose not to cooperate in stage of  $t > T_0$ , and the number in cooperative stage is only relevant to  $P$  and irrelevant to  $T$ . The core idea of KMRW reputation model is that the enterprises insist on cooperative strategy in order to obtain long-term benefit maximization and drop short-term benefit maximization. This article applies this theorem to analyze the trust mechanism stability of SMEs RJVs.

Assumption precondition 1: the enterprises who

authorize the credit to their partners thought they have two possible types, namely credit condition is good and credit condition is poor. The enterprises with good credit never breach the contract with the enterprises which authorize the credit to them, contrary, the enterprises with poor credit often breach the contract with the enterprises which authorize the credit to them.

Assumption precondition 2: Between the enterprises which authorize the credit to their partners and the enterprises which get the credit from their partners exists information asymmetry. The latter enterprises know their own credit condition, and former ones don't know it. Therefore, the latter ones may disguise credit enterprises, but the former ones are not always in a passive position, and they can judge their credit conditions by observing the fiduciary enterprise "trust record". As long as a fiduciary enterprise adopts the breach and credit enterprises will judge the enterprise credit condition is poor, they will authorize their credits to them no longer.

Assuming the breach of contract rate of the trusted enterprises is  $r$ , and the expected beach of contract rate from the credit enterprises is  $r^e$ , the type of the trusted enterprises thought by the credit enterprises is  $a$ , then we can establish utility function for the trusted function:

$$M = -\frac{1}{2}r^2 + a(r - r^e) \quad (1)$$

Here, when  $a=0$ , it means that the trusted enterprises have good reputation; when  $a=1$  means that the trusted enterprises have bad reputation. Amusing that the credit enterprises expect the possibility of the good reputation condition for the trusted enterprises is  $p_0$  and the possibility of the bad reputation condition is  $1-p_0$ .

First of all, we derivate for (1), then can get  $-r+a=0$ , that is  $r=a$ , which represents that the best breach of contract rate for the trusted enterprises with the poor reputation condition is  $r^*=a=1$ , and the utility level is  $M = -\frac{1}{2}$ .

Then assume that the trusted enterprises and the credit enterprises will game to the period of  $T$  directly, so we make  $x_t$  as the bad trusted enterprises breach of contract possibility in this period and make  $y_t$  as the bad trusted enterprises not breach of contract possibility; in the equilibrium conditions,  $x_t=y_t$ . So, credit companies can not observe the trusted enterprises reputation condition in the period of  $t$ . In the  $t+1$  period, the credit enterprises state that a good reputation condition probability of the trusted enterprises is:

$$p_{t+1}(a=0/r_t=0) = p_{t+1}(a=0, r_t=1) = p_{t+1} \times 0 / p_t + (1-p_t)x_t \geq p_t \quad (2)$$

That is, if credit enterprises observed the fiduciary breach, in the next phase of the credit enterprises will know that it is a bad reputation enterprise.

In the following we only concern about the game between the period of  $T-1$  and  $T$ , and we look at the solution of the reputation model.

Firstly, we look at the period of  $T$ , it is meaningless not to breach the contract for the trusted enterprises. The trusted enterprises with bad reputation condition optimal choice is  $r=a=1$ , the credit enterprises expect the breach rate of the trusted enterprises is  $x_T^e = 1 - p_T$ , and  $p_T$  is the possibility for the trusted enterprises with good reputation, the utility level for the trusted enterprises with bad reputation condition is:

$$M_T = -\frac{1}{2}r_T^2 + (r_T - r_T^e) = -\frac{1}{2} + (1 - (1 - p_T)) = p_T - \frac{1}{2} \quad (3)$$

Look at the period of  $T-1$ , suppose the trusted enterprises don't breach the contract in this period, that is  $p_{T+1} > 0$ , the credit enterprises expect the breach rate of the trusted enterprises is  $r_{T-1}^e = 1 \times (1 - p_{T-1})(1 - x_{T-1})$ .

In this equation, the best breach rate for the trusted enterprises with bad reputation condition is 1, and the possibility for the trusted enterprises with bad reputation condition is  $(1 - p_{T-1})$ , and the credit enterprises expect the breach rate of the trusted enterprises is  $(1 - x_{T-1})$ .

Here we divide two kinds of case to illustrate:

For the first condition, if the trusted enterprises with bad reputation condition choose to breach the contract, that is  $y_{T-1} = 0$ ,  $r_{T-1} = 1$  and then  $p_T = 0$ . When we were given the breach rate of the trusted enterprises expected by the credit enterprises as  $r_{T-1}^e = 1$ ,  $a = 0$ , and make the discount factor of the credit enterprises is  $\delta$ , the total utility of the trusted enterprises with bad reputation condition in the two periods is:

$$\begin{aligned} M_{T-1}(1) + \delta M_T(1) &= -\frac{1}{2}r_{T-1}^2 + a(r_{T-1} - r_{T-1}^e) + \delta(p_T - \frac{1}{2}) \\ &= -\frac{1}{2}r_{T-1}^e - \frac{1}{2}\delta \end{aligned} \quad (4)$$

For the second condition, if the trusted enterprises with bad reputation condition choose not to breach the contract, that is  $y_{T-1} = 1$ ,  $r_{T-1} = 0$ , the total utility of the trusted enterprises with bad reputation condition in the two periods is:

$$\begin{aligned} M_{T-1}(0) + \delta M_T(1) &= -\frac{1}{2}r_{T-1}^2 + a(r_{T-1} - r_{T-1}^e) + \delta(p_T - \frac{1}{2}) \\ &= -r_{T-1}^e + \delta(p_T - \frac{1}{2}) \end{aligned} \quad (5)$$

So, if the trusted enterprises with bad reputation condition choose not to breach the contract is better than they choose to breach, then  $(5) \geq (4)$ ,

$$\text{that is } -r_{T-1}^e + \delta(p_T - \frac{1}{2}) \geq \frac{1}{2} - r_{T-1}^e - \frac{1}{2}\delta \Rightarrow p_T \geq \frac{1}{2}\delta \quad (6)$$

Since under the equilibrium condition, the expected possibility  $x_{T-1}$  for the trusted enterprises not to breach is equal to the possibility for the trusted enterprises choose not to breach  $y_{T-1} = 1$  and it is the optimal choice for them.  $x_{T-1} = 1$ , then  $p_T = p_{T-1}$ , so equation (6) can be shown as the following:

$$p_{T-1} \geq \frac{1}{2}\delta \quad (7)$$

Equation (7) shows that as long as the expected possibility for the trusted enterprises with good reputation is no less than  $\frac{1}{2}\delta$ , then the trusted enterprises with bad reputation condition choose not to breach the contract with their efforts and improve their own reputation condition.

So we can see that the motivation for the trusted enterprises to obey their contract depends on whether the credit enterprises can justify the possibility of the small and medium-sized enterprises to obey their promises is no less than  $\frac{1}{2}\delta$ , ( $\delta$  is the discount factor of the credit enterprises and it is a constant).

After further analysis, we can get the conclusion that whether the trusted enterprises can obey the contract lies in whether their good reputation possibility which is judged by the credit enterprises is big enough. It concludes an important conclusion: under certain conditions, whether the trusted enterprises' own reputation condition can be effectively transmitted to the credit enterprises, let the credit enterprises figure out the trusted enterprises' reputation is in good condition is very important. So, in order to establish trustworthiness image, the trusted enterprises must disclose their reputation information to improve the credit enterprise judgment that their reputation is in good condition. We should establish the enterprises trust system to help the enterprise within RJVs disclose their information of reputation, reduce the information asymmetry between the credit enterprises and the trusted enterprises, make the credit enterprises gain more information, improve the credit enterprises' judgment for the trusted enterprises with good reputation probability.

Look equation (3),  $M_T = p_T - \frac{1}{2}$ , derivate  $p_T$ ,  $dM_T/dp_T = > 0$ .

Visibly, even if for the trusted enterprises with bad reputation condition, the utility is the increasing function of their reputation of. Combining equation (6) we can see, the better the trusted enterprises' reputation is, the larger their gain utility is, and the higher their enthusiasm to maintain the reputation is. Thus, if we establish enterprises trust system among small and medium-sized enterprises within RJVs, the trust information can be effectively disclose and transmitted among small and medium-sized enterprises within RJVs, so that the medium and small-sized enterprises within RJVs will obtain better reputation. The small and medium-sized enterprises within RJVs enterprises will adopt trustworthy behavior actively in order to get the benefit.

## 2. THE SPECIFIC MEASURES TO ESTABLISH TRUST OF SMEs RJVs

The production and maintenance of trust mainly have three ways: first is the personal industry trust, it relies on institutional arrangement. The trust from the formal

system arrangement can be produced through the association which the enterprise belongs to, and the trust from informal institutional arrangement is through intermediate mechanism, cooperative parties can lock themselves through some activities or ways, showing the other party their cooperative sincerity. Secondly, it comes from the whole process of economic activities, the longer they cooperate, the more the stable cooperation relationship of personal relationship will help enterprises establish the trust for both sides. Finally, it is based on the characteristic of their social culture, the two traders which have the same culture and system can collaborate more easily.

### **2.1 Establish the Shared Vision Through Strengthening Communication And Interaction**

Continuous long-term and reliable relationship and the continuity of their behaviors will further strengthen the mutual trust and dependence for small and medium-sized enterprises. But once RJVs parties' further development of the expected relationship can bring greater reciprocity, the mutual trust relationship will be strengthened over RJVs continuous development. Accordingly, SMEs' RJVs shall establish the partner-type shared vision and we need to emphasize the importance of cooperating with long-term vision to deal with the relationship among RJVs members. Instead, if RJVs cannot establish shared vision, no coordination consistent aim, they can produce conflicts, form contrasts and can't form effective trust mechanism.

### **2.2 Improve the Social Cost of Transactions Through Building the Trust Evaluation System**

The trading activities among enterprises should be under the restriction of trade associations, intermediary organs evaluation and consumers' association and other social organizations' supervision. These institutions should formulate strict standards and scientific evaluation methods and standard supervision mechanism to improve enterprises trading activities' social costs, namely, to establish procedural system to provide transaction social cost, curtailing enterprises' "dishonest performance". If an enterprise appeared dishonest behaviors in previous trading activities, then it will pay a huge social cost, image will be destroyed disastrously, transaction cost will be also unusually high, The more dishonest behaviors it has, the higher cost is. Industry associations can even regard a trust principle as market access and exit criteria.

### **2.3 Establish the Third-Party Trust Service Agency**

In the market economy of the developed countries, when the enterprises make the transaction and the investment decision, they widely adopt the trust service intermediaries' reports. For the enterprises, adopting professional trust service intermediaries' trust reports can make up the information asymmetry problem in a certain extent when they trade. However, so far our country has

not got influential trust intermediary agencies to disclose various economic subject trust situation effectively. In such circumstances, RJVs can consider establishing a regional third-party trust service agency. But here we must emphasize the trust service intermediaries' standardizing development, and gradually establish and develop non-governmental third-party trust intermediary organizations. Trust intermediary institutions provide customers trust reports to help customers decrease the trust risk of information asymmetry through a collection of the trust subjects' information. On the other hand we can enhance the enterprise discreditable costs through trust intermediaries' peculiar trust information transmission mechanism, promoting social punishment mechanism of formation.

### **2.4 Establish Perfect Trust Information Database**

Professional credit database is an important source of trust information, providing information service for trading enterprises and individuals. Disclosure and sharing effectively to market transactions information and personal trust can minimize the circumstances under which it will damage the interests of the principal transactions because of information asymmetry. Meanwhile, trust database' opening-up, transparent, network is necessary to build a powerful consensus guidance and supervision system. In the whole society we need to build a kind of faithful atmosphere, improve discreditable moral costs, and use the public power to restrict enterprises' behavior.

### **2.5 Set Up the Good Social Trust Culture Through Advocating Trust Ideas**

Lack of trust, trust crisis first rooted in the decline of trust culture; In order to establish trust system, firstly, we should emphasize the importance of the trust culture construction. We need to carry forward honesty as a virtue, breaching the contract should be condemned generally, we need also to make trust become one kind of value idea and then produce moral restraint. In this way, we can improve public trust consciousness, specify personal trust behaviors and make good social trust environment

### **2.6 Promote Social Trust Mechanism Establishment Through Strengthening the Legal System Construction**

The key of the legal construction is to establish a set of administrative restriction mechanism which can make trustworthy persons benefit and those who lose the trust pay for the costs in order to maintain normal market order. Above all, we should modify existing relevant laws and regulations, make the opening up and use of credit investigation data can enter into legal procedures more rapidly. Secondly, we should use the European and American developed countries such as current related legislation for reference, as soon as possible to come up with "trust disclosure of information law", "commercial trust report law etc. Thirdly, we should build further legal

enforcement agencies and perfect the punishment form and intensify law enforcement, etc.

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