Managing Strategic Alliances

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This study empirically analyzed the determinants of a strategic alliance’s stability based on the framework of game theory. We derived motivational cooperation (voluntary cooperation) and structural cooperation as management logics within strategic alliances and examined which approach is more effective. We analyzed the data from the questionnaires obtained from 55 international joint ventures that had gained ground in 9 advanced countries. The results suggested that motivational cooperation (voluntary cooperation) has a stronger influence on the stability between partners than structural cooperation. As a new discovery, the study suggested that motivational cooperation (voluntary cooperation) and structural cooperation have a trade-off relationship.

Keywords: prisoner’s dilemma; motivational cooperation; structural cooperation.

Introduction

Strategic alliances have been extensively used as an effective strategic method since the late 1980s. The survey by Booz, Allen & Hamilton, Inc. reported that incidents of strategic alliance among U.S. business enterprises have been growing at an annual rate of 25%, 15% of the total earnings of the top 1,000 U.S. enterprises comes from their strategic alliances, and the more aggressive the enterprise’s strategic alliance policy is, the more investment return it gets (Harbison & Pekar Jr., 1998).

Although M&A has been traditionally used as an efficient strategic method to gain market share and resources, it has become rather difficult to respond to the current drastic changes in the business environment that requires time-critical decisions. This is the reason why strategic alliances are increasingly becoming the center of focus. In the current rapidly-changing environment, today’s niche will not necessarily be tomorrow’s niche at all. Similarly, an important resource acquired today will not naturally remain important tomorrow. It is becoming essential for enterprises not only to internalize niches and important resources, but also to create new markets and management resources. Strategic alliances are replacing M&A’s position and attracting attention as an essential method of management strategy.

However, strategic alliances still have a large problem. That is the fact that the relationship between partners is unstable, and it is always accompanied by the threat of a partner’s defect. According to Bleeke & Ernst (1991), more than 50% of enterprises that have strategic alliances do not achieve the purpose of their partnership and failed to yield expected results. They also reported how vulnerable the alliances are. Moreover, Doz & Hamel (1998) stated that the majority of strategic alliances fail to learn and evolve, and are hit by a serious crisis within three years.

It can be pointed out (Kuwashima, 1996) that one of the reasons why strategic alliances remain unstable is the fact that the relationship between partners within a strategic alliance could be similar to the prisoner’s dilemma. Since the prisoner’s dilemma is the main focus of game theory, it is important to examine the management issues of strategic alliances with a game theory approach. However, there is very little research that analyzes strategic alliances using game theory except Takahashi (1996), Shimizu (1996), and Hasegawa (1998). In particular, there is virtually no empirical research on strategic alliances. Therefore, in this study, the determinants of a strategic alliance’s stability will be empirically analyzed based on the framework of game theory. First, we will derive motivational cooperation...
(voluntary cooperation) and structural cooperation as management logics within a strategic alliance as we follow the framework of Zeng and Chen (2003) based on game theory. We analyze the results of the questionnaires collected from 55 international joint venture corporations with strategic alliances that have gained ground in 9 developed countries and measure the influence of motivational (voluntary) and structural cooperation on the stability of the strategic alliances. Finally, in the conclusion of this study, practical and theoretical implications and challenges for the future will be discussed.

**Framework of the Analysis**

**The Fundamental Nature of the Prisoner’s Dilemma**

The fundamental nature of the prisoner’s dilemma is this: When they cooperate with each other, they can get both benefit. However, if only one of them defects the other, the defector will get more benefit. This is why both tend to end up betraying each other and get very little benefit. In other words, although the Nash Equilibrium is defect by both sides, they both can gain greater benefit when they cooperate with each other.

For instance, suppose that competitive enterprises A and B decided to have a collaborative product development. Given that there were two strategies; honestly providing research developments to the partner (cooperation) and keeping important information from the partner (defect) (Table 1), when both cooperated, both gained 3 points. If both defected each other, both gained 1 point. When one of them cooperated and the other defected, the cooperator got 0 point and the defector got 5 points. Assuming that both sides did not know which approach their counterpart would take, any risk-aversion-oriented enterprises would choose to defect because in that case, it could at least gain 1 point or if it went well, 5 points. As a result, both enterprises tended to defect each other and end up with the minimum benefit of 1 point. Although both enterprises knew that they could gain a greater benefit if they both cooperated, they were almost forced to choose to defect in this manner and remained with a lower benefit and drifted into a dilemma. In other words, although they could gain 3 points of benefit by cooperating with each other, they remained with 1 point of benefit in reality. This is the fundamental nature of the prisoner’s dilemma.

This fundamental nature of the prisoner’s dilemma closely resembles a fundamental characteristic of a partner relationship in strategic alliances. A partner relationship in strategic alliances is collaboration between rival companies that stand on an equality ground and try to realize their own competitive advantages. Therefore, there is an extremely high possibility that both partners will take opportunistic behavior such as deceiving. As a result, strategic alliances are terminated in a short time without producing mutual achievements.

Then, what can we do to solve the prisoner’s dilemma in strategic alliances? Prisoner’s dilemma is a main issue in game theory. In game theory, two approaches are set out. The first one is the “structural approach”, and the other is the “motivational approach” (Zeng, M and Chen, X.P., 2003) or “voluntary approach”.

**Table 1. Prisoners’ Dilemma Payoff Matrix**

<table>
<thead>
<tr>
<th></th>
<th>cooperate</th>
<th>defect</th>
</tr>
</thead>
<tbody>
<tr>
<td>cooperate</td>
<td>R = 3, R = 3</td>
<td>S = 0, T = 5</td>
</tr>
<tr>
<td>defect</td>
<td>T = 5, S = 0</td>
<td>P = 1, P = 1</td>
</tr>
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</table>

(注) R=reward, S=sucker, T=temptation, P=punishment

**Structural Cooperation and Motivational Cooperation (Voluntary Cooperation)**

The “structural approach” is an approach that intends to solve the dilemma by changing the structure of benefit gaining in the game. In short, it means giving the one who chooses to defect some sort of penalty. This approach tries to reward the one who chooses cooperation with an incentive by setting a penalty system. An approach that intends to change the structure of benefit such as this can be called “structural cooperation” because it tries to develop a cooperative relationship by implementing some sort of enforcement from the outside.

However, structural cooperation could generate a
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secondary dilemma (Yamamoto, 1997). In other words, even if some sort of penalty system against defect is instituted, there is no guarantee that all of the partners will comply with it. It is necessary to monitor compliance and put the penalty system into effect in case of noncompliance. These activities naturally incur some expense. If the amount of expense due to the implementation of the penalty system exceeds the amount of additional gain generated by cooperation, it becomes meaningless to erect the system and impose the regulations (monitoring and implementation of the penalty system). Thus, secondary dilemma issues should be resolved in order to make approaches using structural cooperation effective.

The “motivational cooperation” or “voluntary cooperation” is a method to solve the dilemma issue voluntarily without using any structural means. Motivational cooperation (voluntary cooperation) becomes effective when a game is repeated infinitely. When a game is finite, it does not matter if it is played once or 1000 times, defect is always chosen. Since players do not have to consider continuous cooperation for the sake of the future when a game is finite, they end up choosing to defect in the last game. It is obvious that players would choose to defect in the last game, as long as a game is finite. Continuing to defect from start to finish becomes the best strategy no matter how many times it is repeated. Therefore, as long as a game is finite, defect is always chosen, and cooperation will not emerge.

As just described, players gain more profit with defect in a finite game. However, players gain mutual benefit in an infinite game when they choose cooperative strategy, if certain conditions are fulfilled. This is generally known as the Folk Theorem. According to Folk Theorem, players gain more profit with cooperative strategy than with defective strategy when a discount rate that is obtained by discount future values from the current value is sufficiently high.

The result of the simulation study by Axelrod (1984) showed that a cooperative strategy called “Tit for Tat” eventually makes a group most stable. The players who employed the Tit for Tat strategy became the most dominant in the group by cooperating and enhancing their benefit to each other. This Axelrod study confirmed that it is possible to form a cooperative relationship among selfish players without any enforcement from the outside such as a penalty system.

As described above, there are essential conditions such as an infinite term of alliance and a sufficiently high discount rate. Since many alliances in the real world do not have a certain term, the key issue is how to elevate discount rate.

The structural and motivational approaches to stabilizing strategic alliances were discussed above. Now, we examine which approach is more effective.

Figure 1. Framework of the Analysis

Methods

The samples and their characteristics

The questionnaires were internationally sent to the 154 Japanese joint venture companies which have gained ground in the U.S.A., Canada, the United Kingdom, Germany, France, Italy, Holland, Portugal, and Spain and whose presidents’ nationality is Japanese. They were addressed to the presidents. The joint venture company should have been formed within the same category of industry. After confirming that point with their head quarters in Japan, the ones that had been judged to be proper for a strategic alliance were included in the survey. We also limited the subjects to joint ventures that were co-funded by one Japanese and either one U.S. or European company. The questionnaires were collected by international mail paid by the recipient. The collection rate was 35.7% with 55 companies replying.

Structural Cooperation

Motivational cooperation

Stability of Strategic Alliances

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The survey period was between June, 2000 and September, 2000. Although the deadline for replying was September, the data from the 55 companies was as of the end of August.

The venture period of the 55 companies that replied were between 2 and 39 years with the average of 12.2 years. The majority of the companies (27 companies) had a period of between 10 and 15 years. The number of companies with a venture period of 15 years or less was 43, which accounted for about 80% of the total. The number of employees was between 5 and 2637 with the average being 324.3. However, 35 companies (about 60%) had 400 or fewer employees, and the distribution was not even. Incidentally, the average of Japanese employees per company was 5.7.

In terms of category of industry, 20 joint venture companies (36%) were in the car or car parts industry.

The investment ratios of the local partners were between 10% and 83% with the average of 39.9%. However, 21 companies had an investment ratio of between 50% and 60%. Then 29 companies had an investment ratio of 50% or less, and the distribution was not even.

In terms of country, they had gained ground. The top of the list (45 companies) was the U.S.A., accounted for about 80% of the total. The fact that 80 of the 154 companies which were picked to send the questionnaires were based in the U.S. could explain this. Regarding the relationship between the headquarters, 22 companies had either a capital alliance or a business alliance counting about 40% of the total. And 37 companies (about 70% of the total) had a competitive relationship between the partners, and it suggested that the majority were horizontal joint ventures.

These results showed that the overall picture of international joint ventures that had gained ground in the U.S. and Europe is: 1) They have about 10 years of venture period; 2) They are medium sized companies; 3) They are in the industry of car or car parts; 4) The investment ratio of Japanese partners is 50% or more; and 5) They are horizontal joint ventures.

Measures

In this study, three measurement scales were adopted: stability of strategic alliances, motivational cooperation (voluntary cooperation), and structural cooperation. The 7 point Likert Scale was used with "Not at all" = -3 points, "Neither" = 0 point, and "Absolutely, yes" = 3 points.

1) Stability: The scale described below was originally developed mainly to measure the possibility that one of the partners would withdraw from the venture business.

   "There is currently no possibility that one of the partners would withdraw from the venture business." (STAB1)

   "The partner relationship is stable and is expected to be maintained in the future." (STAB2)

   "There are no incidents such as an intensive conflict of opinion between partners." (STAB3)

2) Motivational cooperation (voluntary cooperation): It was created based on the scale developed by Anderson and Narus (1990).

   "The cooperative system between partners is mutually-beneficial and meets the company objectives." (INTRIN1)

   "The partners are cooperating with each other in order to enhance mutual benefit." (INTRIN2)

3) Structural cooperation: The scale described below was originally developed to measure the amplitude of the penalty against a partner’s defect and the intensity of pressure from the partners in order to maintain the cooperative relationship.

   "If one of the partners takes a non-cooperative action, some sort of penalty will be applied." (PENAL1)

   "There is strong pressure by the partners to maintain the partner relationship." (PENAL2).

Results

Covariance structure analysis was used to measure the influence of motivational cooperation (voluntary cooperation) and structural cooperation on the stability of strategic alliances.

First, the appropriateness of the model was examined. According to Table 1, \(x^2\) was 11.69, and it was not statistically significant. Thus, the null hypothesis of "This model is adequate." was adopted. RMR was 0.06 and smaller than 0.1. GFI was 0.91 and larger than 0.9. AGFI was 0.76. And the difference between GFI and AGFI was as little as 0.15. These results suggested that this structure model has a high fit index.

Secondly, the relationship among the unobserved
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variables based on Table 2 was examined. Motivational cooperation (voluntary cooperation) had a positive influence on stability ($\beta=0.91, p<0.001$). Structural cooperation also had a positive influence on stability ($\beta=0.46, p<0.001$). These results showed that both motivational cooperation (voluntary cooperation) and structural cooperation have a positive influence on the stability of international joint ventures.

Then, which one has a stronger influence on the stability of international joint ventures? When the degree of influence was examined using a standardized path coefficient ($\beta$), Motivational cooperation (voluntary cooperation) was 0.91 and structural cooperation was 0.46. Therefore, it showed that the influence of motivational cooperation (voluntary cooperation) is twice as strong as structural cooperation. This result shows that motivational cooperation (voluntary cooperation) is more effective in stabilizing a strategic alliance than structural cooperation.

Next, the relation between motivational cooperation (voluntary cooperation) and structural cooperation was examined. Table 2 showed that they had significant negative correlation ($r=-0.32, p<0.05$). This means that motivational cooperation (voluntary cooperation) and structural cooperation have a trade-off relation with each other.

This trade-off relation between motivational cooperation (voluntary cooperation) and structural cooperation is correspondent to the proposition in intrinsic motivation theory (Deci, 1975), and a new discovery in this study.

<table>
<thead>
<tr>
<th>Path</th>
<th>Beta</th>
<th>Path coefficient</th>
<th>C. R.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOTIVATIONAL $\rightarrow$ STABILITY</td>
<td>0.91</td>
<td>0.87</td>
<td>9.55***</td>
</tr>
<tr>
<td>STRUCTURAL $\rightarrow$ STABILITY</td>
<td>0.46</td>
<td>0.45</td>
<td>7.13***</td>
</tr>
<tr>
<td>Correlation(Motivational/Structural)</td>
<td>-0.32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STABILITY $\rightarrow$ STAB1</td>
<td>0.94</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>STABILITY $\rightarrow$ STAB2</td>
<td>0.93</td>
<td>1.06</td>
<td>14.02***</td>
</tr>
<tr>
<td>STABILITY $\rightarrow$ STAB3</td>
<td>0.95</td>
<td>1.24</td>
<td>14.82***</td>
</tr>
<tr>
<td>STRUCTURAL $\rightarrow$ PENAL1</td>
<td>0.97</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>STRUCTURAL $\rightarrow$ PENAL2</td>
<td>0.93</td>
<td>0.97</td>
<td>6.48***</td>
</tr>
<tr>
<td>STRUCTURAL $\rightarrow$ INTRIN1</td>
<td>0.89</td>
<td>0.99</td>
<td>10.75***</td>
</tr>
<tr>
<td>STRUCTURAL $\rightarrow$ INTRIN2</td>
<td>0.91</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Note. ***$p<0.001$, **$p<0.01$, *$p<0.05$
Conclusion

Strategic alliances have been increasing used as an effective method to create new markets and new products. A characteristic of strategic alliances is that the relationship between partners becomes a prisoner's dilemma. Prisoner's dilemma is a main issue in game theory. This suggests that there are two approaches, structural cooperation and motivational cooperation (voluntary cooperation), used in order to generate a stable partnership.

In this study, the data from the questionnaires obtained from 55 international joint ventures that had gained ground in 9 advanced countries was analyzed. The results suggested that motivational cooperation (voluntary cooperation) has a stronger influence on the stability between partners than structural cooperation. As a new discovery, the study suggested that motivational cooperation (voluntary cooperation) and structural cooperation have a trade-off relationship.

The theoretical and practical implications of this study can be summarized as follows. First of all, the study empirically showed that approaches based on game theory can be effective in the management of strategic alliances. This can be pointed out as a theoretical implication. There are various explanatory theories which exist in interorganizational theory that intend to analyze strategic alliances. Transactions cost theory analyzes strategic alliances from the standpoint that a form of transaction that minimizes transaction cost should be chosen. Resource dependence theory looks at them from the viewpoint that a form of transaction that eliminates a resource dependence on other organizations should be chosen. And sociological new structural theory analyzes from the perspective that a form of transaction that acquires the legitimacy of the organization should be chosen. However, none of these theories derive a theoretical framework to stabilize a strategic alliance such as game theory has presented. Game theory specifically shows that there are two approaches, motivational cooperation (voluntary cooperation) and structural cooperation, for managing strategic alliances. This suggests that approaches based on game theory are useful in the study of strategic alliances.

Secondly, the study pointed out that generating motivational cooperation (voluntary cooperation) between partners is the most effective measure for the management of a strategic alliance. This is the practical implication of this study. Past studies dealt with only motivational cooperation (voluntary cooperation) or structural cooperation, and never discussed the relationship between these two at the same time. By empirically analyzing their relationship, this study revealed that motivational cooperation (voluntary cooperation) is more important in stabilizing a strategic alliance than structural cooperation. Furthermore, the discovery of the trade-off relation between motivational cooperation (voluntary cooperation) and structural cooperation supports Deci's proposition that it becomes difficult to generate intrinsic motivation once someone was motivated by an extrinsic factor (Deci, 1975) and notes the importance of maintaining and developing motivational cooperation (voluntary cooperation). It also reinforces the hypothesis that motivational cooperation (voluntary cooperation) is more effective in stabilizing a strategic alliance, and it presents an important suggestion for practical implication.

Finally, at least three shortcomings can be pointed out in this study. The first point is that the uncertainty of the environment was not integrated into the analyzing model. Some ecological simulation experiments with prisoner's dilemma incorporated uncertainty of the environment (noise) (Kollock,1993; Wu and Axelrod,1995). These experiments showed that a partnership becomes less stable and is dominated by non-cooperative relations when noise is extremely high. In other words, strategic alliances become unstable in an environment with high uncertainty because one can not accurately comprehend the strategy its opponent took or adopt its best strategy well. In this study, the influence of the environment was not considered, and its uncertainty was not simulated. In the future, it is necessary to investigate if motivational cooperation (voluntary cooperation) is also effective in an environmental uncertainty. In addition, a trust between partners can be considered as an important effect factor under uncertain environment. An analysis with this point of view will be needed in the future as well.

Secondly, analyses suggesting how motivational cooperation (voluntary cooperation) can be enhanced were not included in this study. Only amplitude of motivational cooperation (voluntary cooperation) and
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structural cooperation were measured here. Factors that might influence motivational cooperation (voluntary cooperation) such as “discount rate” that implies future expectation and perspective between partners and length of alliance period were not considered. Neither organizational factors that have an influence on these factors were taken into account. They are also issues to be examined in the future.

Thirdly, the validity of the measurement scales and the number of samples can be pointed out. This study was a pilot study, and repetitive examinations will be needed to validate the scales used in the analyses. There was also a limitation in the multivariable analysis in this study because the number of samples was 55, which is rather small. Analyses with a larger number of samples should be conducted in the future.

Acknowledgement

Referees suggested that the optimal mix of both motivational (voluntary) and structural cooperation is one of the most important factors for the stability of strategic alliances. We appreciate this comment and will consider it for our future research.

References


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