Research on the Stability Structuring of Cooperation and Conflicts between main manufacturers and suppliers of the large airctaft project——analysis based on the game payoff structure matrix

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Abstract

The large aircraft project of China adopted the "main manufacturers – suppliers" mode for research and development (R&D), and the conflict that existed in the process of cooperation between the two sides will affect the results of the large aircraft project. This paper analyzed the cooperation and conflict between the main manufacturers and suppliers from the perspective of the expected return. Through the establishment of the game payoff structure matrix, the factors which affected the stable operation of the "main manufacturers – suppliers "mode were researched.

Keywords: the main manufacturers; suppliers; cooperation and conflict; payoff matrix

1. Introduction

Large aircraft can reflect a country's overall strength. In today's world, only the United States, Russia, the European Union can achieve completely independent manufacture of large aircraft [1]. China's large aircraft project adopts the "main manufacturers - suppliers "mode, focusing on creating six core competencies -the R & D design, assembly and manufacturing, marketing, customer service, airworthiness certification and supplier management. Compared with the traditional model, under the mode of "the main manufacturers – suppliers", main aircraft manufacturers gradually subcontracted their manufacturing production work to the next level suppliers on the basis of the continuous expansion of services and contents, the main manufacturers are only responsible for the relatively high value-added system integration and final assembly work, the cooperation modes between main manufacturers and suppliers became jointly developed other than mere contract trading. In the process of cooperation between Aircraft main manufacturers and suppliers, there are differences between the company's corporate culture, corporate strategy, and other factors, the main manufacturers and suppliers will inevitably conflict. Large aircraft project is a complex system engineering, in the the background of adopting the "main manufacturers – suppliers" mode, the cooperation and conflict between the main manufacturers and suppliers would affect its stability of operation, and became one of the key elements that affect the success of the large aircraft project. Therefore, this article is of great significance for the stability study of the main manufacturers and suppliers of large aircraft project cooperation and conflict. Therefore, this article is of great significance for the stability study of the main manufacturers and suppliers of large aircraft project cooperation and conflict.

2. Theoretical Review

The essence of the game theory is the rational transposition thinking based on the system thinking, speculate others' strategies with their gain, so as to select the most beneficial strategy. Manufacturers and suppliers, for both sides to participate in the large aircraft project for the purpose of obtaining maximum income, forming the cooperation mechanism of a "risk-sharing, benefit sharing", risks and benefits of coexistence embodies the contradictions of both antagonistic and unified, so we introduced of game theory in the study of the "main manufacturers - suppliers " mode of large aircraft project. For stability, scholars studied from different angles, Parkhe [2] researched the stability of the structure of the strategic alliance research cooperation through the payment structure of the game theory, Inkpen and Beamish [3] Yan and Zeng [4] studied opportunistic behavior of multinational companies, cross-cultural differences, the joint venture's equity control structure which affect the stability of the joint venture. Nakamura [5] studied the ability to learn of the parent company in the joint venture and the influence of the improvement of bargaining power on the instability of Union. Wu Shaobo [6] introduced the research of social background factors on the basis of the research of Parkhe [2], established the game pay structure model, synthesized the stability of the influencing factors of

knowledge chain cooperation and conflict analysis. This article will be on the basis of the above literature, introduced cooperation and conflict stability studies research methods of Wu Shaobo [6] in research of the mode of the main manufacturers - suppliers of large aircraft project ". This article will research through the game payment matrix, studied the main factors which affect the cooperation and conflict stability of both manufacturers and appliers. We modeled the cooperation gains for the two sides to adopt a cooperative strategy and betrayal incomes while adopting fraud strategy respectively on the basis of establishing the input-output function of both manufacturers and appliers. Through the comparison of the two gains, we studied the stability of the structure under different circumstances.

3. The establishment of the game model of cooperation and conflict between main manufacturers suppliers

Due to the tendency of individual self-interest, the inevitable expense of the interests of the Union as a whole and partners lead to opportunistic behavior [7], the conflict of interest between the main manufacturing and supplier lead "main manufacturer –applier" mode can not be stable operation. Through the payment structure of the game theory, this paper investigated the stability conditions of cooperation and conflict in the mode of the "main manufacturers – suppliers", according to the theory of game theory, combined with the characteristics of the large aircraft project, now make the following assumptions:

1.Involved in the main assumptions. The suppliers of large aircraft project can be divided into three levels: engine / airframe structure suppliers, airborne systems / finished suppliers and standard parts / raw material suppliers. Suppliers of each level cooperate with suppliers or sub-suppliers. As the first level, the engine / airframe structure suppliers is the main manufacturer of the most important suppliers, the most representative for the study of such supply. This article only consider the case of the main manufacturer of the first-level suppliers to participate in the game, and that only assume the main manufacturers A and vendor B.

2. Individual rationality assumption. The main manufacturers and suppliers to participate in the large aircraft project is optimistic about the potential value of the large aircraft market, therefore, have to maximize the benefits of the common goal. Cooperation and betrayal behaviors expected revenue impact brought about by the large aircraft project, cooperation can bring more revenue to the cooperation strategy, otherwise it will adopt betrayal strategy.

3. Strategy space assumptions. There are two strategy choices for main manufacturers and suppliers to participate in the large aircraft project: a risk-sharing, benefit-sharing cooperation strategy; another take opportunistic behavior of uncooperative strategy, also be called deception strategy, in this kind of strategy, the participants only consider their own gain, not concerned about the success of the large aircraft project.

4. Assuming the business rules of the civil aircraft industry. The worldwide civil aircraft industry has formed a relatively mature business rules, including the formal legal system as well as the informal industry ethics industry associations to preserve the normal transaction protection factors. Business rules constraint the main manufacturers and suppliers, if one party has the breach, the defaulting party will be punished, including legal punishment, punishment of loss of business reputation, Industry Association and so on, to assume that these punitive punishment for breach of contract party losses caused as φ. In addition, due to the dissemination of information barriers, the breach was discovered for the probability of the event is assumed to be the probability μ, can be obtained breach punishment $\mu\varphi$.

5. Payment function assumptions. Assuming the main manufacturers A, supplier B for the large aircraft project resources invested a, b, both create synergistic value $R = f(a,b)$, which $(a \geq 0, b \geq 0)$. In accordance with the amount of investment of resources as well as the strength of the bargaining power, it is assumed that A, B gained revenue share ratio $\theta \& 1 - \theta$（$0 < \theta < 1$）. Due to the widespread spillover effects, large aircraft project participants, while absorbing technology or capital of the other participants overflow, on the other hand itself owns the overflow which will enhance the competitiveness of other project participants associated with overflows, the resources participants invested and when participates participate in the the project, it is assumed that the overflow of main manufacturer A and vendor B are $f(a,t)$, $f(b,t)$.

		supplier B	
		fraud strategy	cooperative strategy
main manufact-urer of A	fraud strategy	$f(a,0)-\mu\varphi,$ $f(0,b)-\mu\varphi$	$\theta f(0,b)+f(b,t)-\mu\varphi,$ $(1-\theta)f(0,b)-f(b,t)$
	cooperative strategy	$\theta f(a,0)-f(a,t),$ $(1-\theta)f(a,0)+f(a,t)-\mu\varphi$	$\theta f(a,b)+f(b,t)-f(a,t),$ $(1-\theta)f(a,b)+f(a,t)-f(b,t)$

Figure 1 payoff matrix of cooperation and conflict between manufacturers and suppliers

Figure 1 shows the main payoff matrix of cooperation and conflict between manufacturers and suppliers. When both sides adopt a non-cooperative strategy, each of the value created was $f(a,0)$ 、 $f(0,b)$ 、 respectively, and both parties have to bear some punishment of the breach of contract $\mu\varphi$, in this case, both betrayal gains were $f(a,0)-\mu\varphi$ $f(0,b)-\mu\varphi$. For A their contribution to the large aircraft project is 0 when the supplier B adopts a cooperative strategy and the main manufacturers A adopt fraud strategy，   in this case the betray income of A includes not only the output of resources invested in the project B $\theta f(0,b)$, but also includes overflow the $\theta f(0,b)$ technology or capital $f(b,t)$, at the same time will bear the penalty punishment $\mu\varphi$, vendor B's cooperation gains for the same case is $(1-\theta)f(0,b)-f(b,t)$. B can also be obtained when supplier B to fraud strategy, the main manufacturer of A unilateral cooperation deception income, as well as breach of punishment. When both sides to adopt a cooperative strategy, cooperation gains were：
$\theta f(a,b)+f(b,t)-f(a,t)$, $(1-\theta)f(a,b)+f(a,t)-f(b,t)$
respectively.

4The analysis of stability conditions of cooperation and conflict between main manufacturers, suppliers

Main contract is a hard condition to constrain both sides, but the continuation of cooperative behavior in the final analysis also depends on the comparison results of income of bilateral cooperation with betrayal revenue, so there will be the following two situations:

(1) Cooperation income is greater than the betrayal revenue. The corresponding condition is:

$\theta f(a,b)+f(b,t)-f(a,t)>\theta f(0,b)+f(b,t)-\mu\varphi$ &

$(1-\theta)f(a,b)+f(a,t)-f(b,t)>(1-\theta)f(0,b)-f(b,t)$,As can be seen, the main manufacturers and suppliers (cooperation, cooperation) is a Nash equilibrium.

(2) cooperation income is less than the betrayal revenue. The corresponding condition is:

$\theta f(a,b)+f(b,t)-f(a,t)<\theta f(0,b)+f(b,t)-\mu\varphi$ &

$(1-\theta)f(a,b)+f(a,t)-f(b,t)<(1-\theta)f(0,b)-f(b,t)$.

The result of a single game is usually called the "prisoner's dilemma". When the main manufacturers and suppliers are trapped in a "prisoner's dilemma", the best choice is the (non-cooperation, non-cooperation). Expected cooperation between large aircraft project can be sustained, it is possible for cooperative organizations to calculate the present value of the breach of contract revenue to see if it is greater than continuing cooperation income in the future [8] Therefore, in the context of multiple game, the two sides may achieve Pareto improvement balance.

1. The stability condition for cooperation income greater than the betrayal income

Although when cooperation gains greater than the betrayal of income, there exists Nash equilibrium (cooperation, cooperation) for two sides of main manufacturers and suppliers, as there are uncertainties between both parties to choose whether to cooperate in the future, Figure 1 shows the existence of equilibrium can not be achieved possibly. Set Supplier B, as an example, even if in the payment matrix, the cooperation strategy gains greater than the betrayal strategy in the game for B, but by political factors interfere or economic situation due to the strategic direction of change, B may still choose the large aircraft project take uncooperative strategy. This will result in a non-equilibrium situation, at this time, payment is

$\theta f(a,0) - f(a,t), (1-\theta)f(a,0) + f(a,t) - \mu\varphi$ .Obviously, due to the presence of technology or capital overflow

losses $f(a,t)$, also the risk of failure of large aircraft project, and therefore the main manufacturer A will not choose

cooperate with suppliers B. So, if the main manufacturers A judge future choice of manufacturer B at the beginning,

A will choose uncooperative. Therefore, the judgment of the likelihood of the other party to continue to cooperate

affects the stability of the "main manufacturer- supplier " mode.

Now suppose the probability of main manufacturers A in the large aircraft project cooperative strategy is p; B to select the cooperation with probability q. Under the premise of individual rationality assumptions, both partners can be expected to choose to cooperate with each other with the expected probability. First we analyzed the revenue of the main manufacturers A when select different strategies:

The main manufacturers choose cooperation strategies i.e. p = 1, the expected return is:

$$R_A = q[\theta f(a,b) + f(b,t) - f(a,t)] + (1-q)[\theta f(a,0) - f(a,t)]$$

The main manufacturers the A select uncooperative strategy i.e. p = 0, the expected return is:

$$R_A' = q[\theta f(0,b) + f(b,t) - \mu\varphi] + (1-q)[f(a,0) - \mu\varphi]$$

The necessary condition for the main manufacturers to select the cooperation strategy is:

$$\Delta R_A = R_A - R_A'$$
$$\Delta R_A = \{q[\theta f(a,b) + f(b,t) - f(a,t)] + (1-q)[\theta f(a,0) - f(a,t)]\} -$$
$$\{q[\theta f(0,b) + f(b,t) - \mu\varphi] + (1-q)[f(a,0) - \mu\varphi]\} > 0$$

Thereby can be deduced the conditions which need to satisfy:

$$q > \frac{f(a,t) + (1-\theta)f(a,0) - \mu\varphi}{\theta f(a,b) - \theta f(0,b) + (1-\theta)f(a,0)} [1]$$

Due to the symmetry of the main manufacturers A and supplier B, the same can be got to select the cooperation strategy of supplier B:

$$p > \frac{f(b,t) + \theta f(0,b) - \mu\varphi}{(1-\theta)f(a,b) - (1-\theta)f(a,0) + \theta f(0,b)} [2]$$

Can be found by the formula [1] and formula [2] for analysis:

(1) The bigger the possibility of the continuing cooperation of main manufacturers and suppliers (i.e., the value of p and q), the easier the formula [1] and [2] meet the conditions, the main manufacturer- applier" mode will run more stably. The judgment of the possibilities of partners the for future cooperation between the two sides is from the political environment, the historical basis for cooperation, reputation within the industry as well as other large aircraft project investment of resources and so on. Because the large aircraft project is complex, long cycle, long time required to breakeven, the proprietary asset investment the supplier to the large aircraft project can significantly improve judgment of the q value of the main manufacturers, and thus play a catalytic role cooperation strategies of the main manufacturers.

(2) In formula [1] and [2], the value to the right has a negative correlation with the synergies value two sides to create in the large aircraft project, so in the case of the same expected value, the greater the value of f (a, b), the more easily the conditions of formula [1] with the the formula [2] to be satisfied, the operation of the "main manufacturer-

supplier" mode is more stable. Because the greater the synergistic value, the higher the likelihood that the participants of large aircraft project assigned greater interests.

(3) Since in the formula [1] and formula [2], the larger the value of denominator $\theta f(a,b) - \theta f(0,b) \,\&\, (1-\theta)\,f(a,b) - (1-\theta)f(a,0)$, the condition is more easily met. The two said that the main difference for both revenue and deception income, meaning that if the two sides can cooperate in the large aircraft project to get more revenue than to deceive, participant would be inclined to take cooperation strategy.

(4) The smaller the losses caused by spillover effects, the formula [1] and [2] more likely to meet the conditions, the operation of the "main manufacturer – supplier" mode is the more stable. This is because the overflow of technology and capital related to the core competitiveness of both the main manufacturer and the supplier, also it is one of the important reasons for the two sides clashed, reduce spillovers loss, can reduce the pay of two sides involved in the process of cooperation.

(5) The greater the default punishment $\mu\varphi$, the greater corporate losses resulting from the breach, [1] and [2], the conditions are easier to meet.

2. The stability conditions when cooperation income is less than a betrayal income

When the cooperative income is less than betrayal income, the main manufacturer and supplier of single game is easy to make the two sides into a Prisoner's Dilemma (non-cooperation, non-cooperation). However, if the two sides have long-term willingness to cooperate, the chosen strategy will be different. Axelrod [9] found by computer simulation of the game strategy selection, when one party adopts a cooperative strategy in the game case, the other party will choose to cooperate with imitation behavior; while one party takes a non-cooperative strategy, the other party will be uncooperative in the next strategy selection. That is the "grim strategy" in game theory, the characteristics of this strategy are: the participants choose cooperation, at the beginning of the next game, if the other party choose cooperation, they will continue to cooperate; but if the other betrayed, then he will always choose betrayal and never cooperate. Therefore, when the number of game infinitely repeated, when the two sides make the choice of the game strategy, they are bound to consider the long-term income of cooperation in the large aircraft project.

In the payoff matrix of the game theory, the main manufacturer A and supplier B are symmetrical; therefore it is described using A as the study object. Assuming that the both manufacturers and suppliers will take ruthless strategy, the discount factor of the main manufacturer A is: σ_A, $\sigma_A \in (0,1)$

When both sides take a long-term cooperation strategy, A's income

$$R_A^{"} = \frac{\theta f(a,b) + f(b,t) - f(a,t)}{1 - \sigma_A}$$

Assumptions A adopts fraud strategy, then A will be able to earn money in the first stage, that is opportunistic gains, which will lead B to take ruthless strategy. Which led to the subsequent phases, only A continue to invest resources to the large aircraft project, and thus lost the opportunity to cooperate with B, so the total revenue of the main manufacturer A adopting deceptive strategy is:

$$R_A^T = f(0,b) + f(b,t) - \mu\varphi + \frac{\sigma_A \left[f(a,0) - \mu\varphi \right]}{1 - \sigma_A}$$

Only when taking a long-term cooperation strategy, the benefits outweigh the revenue of fraud strategy, that is $R_A^{"} - R_A^T > 0$, the main manufacturer A will choose cooperation strategies, the conditions of participation of the main manufacturers A can be deduced as follows:

$$\sigma_A > \frac{\left[\theta f(0,b) + f(b,t) - \mu\varphi \right] - \left[\theta f(a,b) + f(b,t) - f(a,t) \right]}{\left[\theta f(0,b) + f(b,t) \right] - f(a,0)} \quad [3]$$

For the same analysis conditions for suppliers B to be in cooperation can be drawn:

$$\sigma_B > \frac{\left[(1-\theta)f(a,0)+f(a,t)-\mu\varphi\right]-\left[(1-\theta)f(a,b)+f(a,t)-f(b,t)\right]}{\left[(1-\theta)f(a,0)+f(a,t)\right]-f(0,b)} \quad [4]$$

Since the discount factor shows the performance of the patience of the participants therefore it can be seen from the conditions of formula [3] and [4] above, when both sides are patient (i.e. discount factor is large), the two sides will inevitably take cooperation strategy. The expectation for long-term cooperation of both sides is a necessary condition for a large enough discount factor in the above formula. Because short-term cooperation introduces finitely repeated game, the two sides to participate in it still have opportunistic behavior. The finitely repeated Game theorem shows that, when single game only is a Nash equilibrium, finitely repeated game is only a refined Nash equilibrium, it is the essence of single game equilibrium repetition. Assuming, supplier B can be expected to cooperate with manufacturers A for k phases, in the k-1 phase, B will take deception strategy, which makes the k phase with (non-cooperative, non-cooperative) equilibrium result, thus pushing down to the first phase, both sides will take deception strategy, making the two sides into a prisoner's dilemma.

Therefore, it is necessary to take measures to improve willingness to cooperate for the medium-and long-term in the large aircraft project between the two sides. For example, the release of favorable information about the large aircraft project, to increase project professional asset investment, to establish and maintain good communication channels and so on.

Manufacturer A and vendor B are symmetrical in the payoff matrix in, we analyze using A as a research object, and through the analysis formula [3] the following conclusions can be drawn:

(1) The smaller the difference between the entries of the molecule

$\theta f(0,b)+f(b,t)-\mu\varphi \& \theta f(a,b)+f(b,t)-f(a,t)$, the more easily the conditions of the formula [3] is obtained.

This difference is expressed the difference between the deceive revenue and cooperation gains, so by narrowing this difference we can effectively reduce the conflict triggered by both opportunistic behavior. Formula [3] can be analyzed to narrow the difference in two ways: by increasing the income of cooperation between the two sides in the large aircraft project, as well as to increase the degree of punishment for treachery, thus contributing to the main manufacturers and manufacturers of large aircraft long-term cooperation in the project.

(2) $f(a,b)$ is the synergistic value created by both sides in the large aircraft project. The larger the value, the more easily the conditions of the formula [3] can be met. Because the value of reaction represents the potential benefits of the project participants brought about by the large aircraft project, the greater the potential gains, the higher the opportunity cost of the main manufacturers A to terminate the cooperation in the large aircraft project. Therefore, to improve the synergy value can effectively promote the long-term cooperation between the two sides.

(3) The greater the difference of the denominator $\theta f(0,b)+f(b,t) \& f(a,0)$, the conditions of the formula [3] is more easily to meet. The increase of this difference is expressed as the increase of the income gap between the deceive income and uncooperative separate production. As a result of the deception strategy, the main manufacturers A will lose cooperation opportunities with supplier B forever, so the smaller the value the main manufacturer A can create, and the greater the price paid by the main manufacturer A in the termination of cooperation with vendor B in the project. It also verifies from the side of the inevitability of large aircraft project to take the "main manufacturers - suppliers "mode: the complexity of the large aircraft project making increasingly high degree of integration of the various sub-systems, therefore, the main manufacturers outsource the relatively low value-added subsystems to system integration suppliers.

(4) The formula [3] can be simplified and rewritten as $\sigma_A > \dfrac{\theta f(0,b)-\mu\varphi-\theta f(a,b)+f(a,t)}{\left[\theta f(0,b)+f(b,t)\right]-f(a,0)}$, from this formula, it

can be observed, the smaller the value of the overflow loss, the more easily the conditions of the formula [3] can be satisfied.

(5) By increasing the punishment of non-compliance $\mu\varphi$ can make both sides to pay a higher price for the betrayal,

and the conditions of formula [3] are more likely to be met. This is due to the mode of the "main manufacturers – suppliers" of large aircraft project not only means that the supporting for the two sides on the products and the business but put greater emphasis on the business contract of the two sides.

5. The revelation of the stability of the structure of cooperation and conflict between the main manufacturers and suppliers to large aircraft project

Through the above game payment structure analysis of the stability of the structure of cooperation and conflict between the main manufacturer and supplier, we can facilitate the ways shows as follows to improve the cooperation of both sides in the large aircraft project and reduce conflict, and treachery in cooperation.

1. Improve the synergistic value created by the main manufacturers and suppliers of large aircraft project. The synergistic value is the common interests in an organization, the increase of common interests can help to prevent the possibility of conflict of interest organizations, and to enhance the degree of interdependence between organizations. [10, 11] The collaborative value creation of the large aircraft project can't be separated from the strong support of the government policies, due to the civil aircraft industry has large investment, large risk and long development cycle, a number of major projects, even very large civil aircraft manufacturing companies can't independently undertake the civil aircraft industry and it has a very great strategic significance, so often need strong government support. The set up and development of Airbus is best embody of strong support of European governments to the civil aircraft industry. Similarly, when we look at the overall strategy of the U.S. in the civil aircraft development course, it is not difficult to find that, its course of development can't be separated from the government support. It is government policy to provide a large number of funds and technical support to increase the synergistic value of the cooperation between Boeing, Airbus and suppliers, and then optimize the supply chain, make the main manufacturers and suppliers to establish a risk sharing benefit-sharing partnership and improve the stability for cooperation.

2. Improve the expectation value of long-term cooperation between the main manufacturers and suppliers that is, increase the value of p and q, which are the basic conditions for both sides to obtain Pareto optimal equilibrium improvement in the course of the game. One of the important reasons for suppliers to participate in the large aircraft project is optimistic about market prospects of China's large flightless, external positive information will consolidate and improve the confidence of suppliers to participate in the cooperation, increase the expected value of its long-term cooperation. In addition, the proprietary assets of the large aircraft project investment can raise the expectations of long-term cooperation, due to these proprietary assets designed for other purposes show a relatively low value, this makes partners transfer cooperation participants or exit cooperation with a higher cost. For long-term cooperation expectations of both manufacturers and suppliers will make the discount factor $\delta_A \& \delta_B$ large enough, these two values is the main reaction of patience on the prospects for cooperation between the two sides. Because of the relatively long payback period of the large aircraft project, having enough patience can ensure the smooth implementation of the project objectives.

3. Reduce the spillover effects of the process of cooperation $f(a,t) \& f(b,t)$ Because of the large aircraft project process is along with many other innovations, new technologies, new materials and new technology, once other collaborators benefit from the overflow of these innovations, it is possible for them to separate from the large aircraft project, and will invest overflow effective benefits to other fields to obtain greater benefits. Therefore, the process of the large aircraft project needs to strengthen security work, in order to maintain the master for the stable cooperation.

4. Increase the punishment of breach of contract, increase the cost of deception of partners, namely to improve the value $\mu\varphi$ in two aspects, on the one hand, to increase the probability of discovery of the breach μ, on the other hand increase the default loss φ. Improved supervision mechanism, as well as good communication channels enables the early detection, recognition and treatment of violations. Degree of perfection and enforcement of the contract can directly increase the losses of the defaulting part's breach of contract, and the part which is familiarity with the commercial rules of the civil aircraft industry can be initiative in the negotiation phase, increase the contract binding on the other; sound legal environment can ensure the effective implementation of the contract. The industry ethical constraints indirectly increase the default loss; the behavior of the illegal party to breach corporate will distribute in the whole industry due to the existence of the industry ethical constraints, and finally affect the reputation of companies. The reputation is the intangible benefits of a company. A good reputation can lead to more cooperation [12], while poor reputation will make it difficult to continue to find partners for the defaulting enterprises. Therefore, in the context of a sound legal system with mature rules it is needed to achieve effective monitoring of the breach

through the improvement of the interface of the main manufacturers and suppliers in the large aircraft project, to build a common information platform and so on.

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