Research on the improvement of DB mode cooperation based on IPD concept

Xianhe Yang\textsuperscript{1,a}, Ziyu Deng\textsuperscript{2,b}

\textsuperscript{1} School of Management, Tianjin University of Technology, Tianjin 300384, China.
\textsuperscript{2} School of Management, Tianjin University of Technology, Tianjin 300384, China
\textsuperscript{a} 1343854200@qq.com, \textsuperscript{b} 381175312@qq.com

Abstract: In recent years, with the implementation of the general contracting mode of construction market engineering in China, the competition between the owner and the contractor for the control of the design of the trial diagram hasn't been uncommon. The reason is that China's low trust construction environment is not suitable for high trust market environment. On the one hand, the contractor considers that the characteristics of the general contracting of the project lead the owner to transfer the majority of control to the control of the contractor, which can utilize the design and construction to make the profit. On the other hand, the owner is concerned that the contractor will use the information asymmetry to generate moral hazard and harm the interests of the owner after obtaining the control of the project. In this paper, construction general contracting mode of project management performance improvement based on the concept of the IPD DB mode of cooperation is to improve research, improve the relationship between the owner and the contractor.

1. Introduction

Compared with the international market, China's construction value chain is fragmented, causing long-term design, procurement, construction of separated operation, the owner, design unit, construction unit mutual distrust, cannot cooperate., the owner cares about the cost of construction stage, ignore the cost of the engineering life cycle.; The design unit charges according to the cost ratio, and does not pay attention to the reasonable cost of the project; The construction unit should not play its due value. And cooperation in the field of construction contracts to improve, trying to do a large number of scholars both at home and abroad, the research’s hotspot in recent years has been the integrated project delivery (IPD) model, the IPD can effectively establish effective communication and cooperation and win-win attitude, not only help to establish good relations of cooperation, but also have direct effect on the improvement of the project performance. In this paper, the performance improvement of DB mode project management based on IPD concept is studied. In combination with China's existing non-trust project construction environment., the research based on the situation in our country public project owner and the DB contractor relations of cooperation to improve, improve the relationship between the owner and the contractor.

2. literature review

The concept of Project Management Performance has not yet formed a unified point of view, has a variety of expression, including Project Performance, Project Management Performance, Project Management Performance (Project Management Performance), Project Success (Project Success) and Project Management Success (Project Management Success), etc.
De Wit earlier to make a distinction between project success and project management success, he pointed out that the success of the project the key is to achieve all the goals of the project, and project management success is reflected in terms of cost, quality and schedule[1]. Cooke - Davies support the project success is different from project management, evaluation of project success should have been verified through the measure to achieve the goals of project level, and project management success criteria is traditional performance, as the construction period, cost, quality, etc[2].

Domestic project governance research has gradually formed the research paradigm of "project governance - project performance". In this basic research paradigm, governance structure and governance mechanism are important to improve project performance. Because the governance structure is limited by the capital structure and the institutional environment of the project, the project governance structure is relatively fixed. As a result, it is often used as a constant rather than a variable in project governance research; However, the governance mechanism is relatively flexible, which is an effective means to achieve the objectives of project governance, including contract governance and relationship governance, where the relationship governance is a supplementary contract governance. In the reference field organization of supply chain based on the study of the foreign project management research development for contract and formal rules of the importance of contract management and emphasize the importance of informal relationship relationship management, where the relationship governance is a supplementary contract governance. Lusch and Brown[3] found, the standard contract text easier than clear contract to improve project management performance, the reason for this is that between the owner and the contractor will have higher trust so as to improve the relationship quality. Schepker[4] concluded by literature that the contract is not the only factor to reduce transaction costs, performance, network structure and relationship ability can also improve project management performance to a certain extent.

Integrated Project Delivery (IPD) was formally proposed by the American institute of architects (AIA) in 2007, the integrated project delivery guide books in the integrated project delivery is defined as "a way of project delivery, it makes people, systems, integrated into a business structure and practice process, in the process, all participants will give full play to their wisdom and talent to realize in the design, achieving the goal of optimizing project results at various stages of design, assembly and construction, and improving the output of owners, reducing waste and maximizing efficiency."

NASFA [5] believe that standard, enhanced and necessary are the three levels of project collaboration. According to this division, IPD can be divided into two categories: IPD as a concept (standard or enhanced), or IPD as a delivery method (essential). If IPD is used in traditional delivery mode (such as CM, DB or DBB), IPD should exist as a concept. It is characterized by traditional transaction contract, limited risk sharing and IPD application. If IPD is used as a method of procurement, it should be a multi-party contract between the owner and the designer and the construction party. In addition to multi-party contracts, IPD is a delivery mode characterized by incentives for collaborative behavior, team risk sharing, and other IPD principles and practices.

3. Research design
This study is based on the improvement of the DB model based on IPD. According to the contract factors affecting the cooperative relationship obtained from the problem, a detailed analysis is made of the differences between the same types of contract terms, and the applicability of IPD contract terms in the context of our country is analyzed feasibility. Based on the above analysis results, we finally propose an improved strategy set for the bilateral cooperation model based on the IPD concept in China's DB model.

4. The research process
In the comparison process of the contract model in this chapter, the AIA-C191 contract model mainly refers to the C191 document commentary and the main contractual conditions (hereinafter referred to as the IPD contract conditions) for detailed analysis.
4.1 Comparison of core terms based on different contract texts.

1) Introduction of payment mechanism of IPD mode.

The essence of IPD remuneration mechanism is cost plus incentive fee contract. The target cost is similar to the cost plus incentive fee contract in a cost plus fee contract. The calculation method is based on the difference between the actual cost and the target cost to obtain the contractor's profit, and the amount of such profit increases with the decrease of the project cost. This kind of contract can stimulate the contractor to improve the project management performance, reduce the project cost and reduce the project duration, which is also more common in the project. In the remuneration mechanism of IPD, the contracting parties do not directly obtain profits, the parties directly provide direct cost services, and the profits are obtained in two ways. Goal achievement compensation and Incentive compensation are directly related to the realization of project milestones.

2) Analysis of the difference between IPD payment mechanism and traditional cost and reward model.

Target cost determination is different. Under the traditional model, projects constructed using cost plus compensation methods often adopt the form of negotiation. The target cost is based on the time of intervention, the estimated or estimated basis and then based on the floating ratio of unforeseen expenses agreed by both parties. In the compensation mechanism of IPD, the determination time of target cost is completed after the standard design, and the detailed design has not been determined before. Compared with the target cost of the traditional model project at the beginning of the project, the project cost can be more accurately determined. In the later stage of the project, if the non-owner causes the project cost to increase, the parties should try their best to implement the recovery plan to promote the project according to the agreed target cost.

(2) Environmental analysis of compensation mechanism.

When the project is signed, the contract compensation mechanism must be determined according to the actual situation of the project and the characteristics of the contract type. The key to the selection is the project characteristics and the owner's risk preference.

(3) Summarize the research on the comparison of compensation mechanism.

The cost-plus model has many benefits. Although the owners are often willing to adopt the fixed price contract to reduce the risk of the owner, but, once the technical scheme meets the engineering change, due to the lack of the corresponding allocation method, it is easy to produce project disputes for the price and project adjustment. Therefore, the fixed total price contract often requires the owner to have accurate and sufficient design information, and requires the contractor to accurately calculate
the project quotation. Relatively speaking, the cost plus remuneration solves the principal-agent problem between the owner and the contractor to some extent.

4) Comparative study of risk sharing clause.

No matter how the risk sharing model is different, we can find out the allocation idea of risk sharing. For example, the principle of reciprocity of risk and control; the principle of reciprocity of risk and benefit; risk appetite and risk preference principle and so on. The reason is that the risk sharing is a relatively stable condition that the contractor obtains after the price of the contractor. The research and practice of engineering project management have proved that the rational risk-sharing scheme is an important motivating factor in the project principal-agent relationship. Therefore, it is necessary to promote the improvement of project management performance based on the actual situation and the reasonable risk sharing. In addition to the risks stipulated in the contract, the contract signing party shall jointly establish a risk sharing matrix to identify the major risk points in the different stages of project planning, design, construction and trial operation. At the same time, the risk matrix will also be an important reference for the unforeseeable cost of the target cost.

4.2 Set up contract terms based on cooperative relationship.

When the project is signed, the contract method shall be determined according to the actual situation of the project and the characteristics of the contract type. The incentive factors for contractors are different in different valuation ways. It is related to risk sharing and profit space. The IPD concept is used in the DB mode to adopt the compensation mechanism of cost and remuneration, so as to change the risk sharing way to obtain higher trust value. On the setting of target cost takes the form of secondary adjustment in detail design phase, and can give the contractor complete target fixed profit incentives, thus helping the contractor will not because the profit is too low and the opportunism behavior. In addition, since Chinese government investment projects are usually not allowed to exceed the budget estimates, the corresponding red lines must be set for the project target cost, and all parties cannot break the red line.

The reasonable risk sharing method can help reduce the mutual distrust and mutual suspicion, and encourage the two parties to jointly complete the project construction. Both IPD and DB mode adopt reasonable and universal risk sharing method. So this article suggested on the basis of risk sharing is suitable for China's national conditions, after completion of the collective decision-making of relevant changes in the form of risk sharing and considering risk allocation matrix. The responsibilities of the parties responsible for execution, coordination and assistance shall be clearly defined and shall be considered in the remuneration mechanism.

① The method of risk sharing is suitable for national conditions. In the content of risk sharing, some regulations in China are often different from international practice, such as the way of risk distribution caused by force majeure and administrative examination and approval. This is closely related to the construction environment and the owner role of our country. so, it is necessary to formulate the risk sharing method that is in line with the situation in our country.

② It is suitable for the risk sharing of decision-making mechanism. In addition to the risk sharing method applicable to China's national conditions, the different risk sources and decision-making mechanisms should be applied. In the case of IPD, the coordination risk of the project management team should not be borne by the contractor alone, but the reasonable risk sharing method should be adopted.

③ Risk sharing matrix sets detailed tasks. This article is based on the overall service scope of the IPD mode (AIA-C191-Exhibit-D Exhibit-DD-2009). In addition to the division of each service contents of the contract to specific persons responsible, it should also provide for the coordination of the content of each service and the non-contracting parties (such as subcontracting, suppliers, etc.) that need to be complemented.

5. Conclusion

By analyzing the contract text, we have determined the improvement of DB contract terms based on
IPD concept. On the basis of improving the research focus of the previous contract terms, this paper compares the contract terms of the AIA-C191 contract model with the Chinese DB bidding documents, explores the difference between IPD and DB mode and analyze the feasibility of its improvement through theory and practice. This paper puts forward the improvement principle of DB mode contract terms based on IPD concept. Therefore, this paper establishes the contract terms setting principle for the improvement of the DB mode cooperative relationship based on IPD concept, and provides Suggestions and references for the formulation of the contract terms of the developer.

Reference
[1] De Wit . Measurement of project success [J]. International Journal of Project Management, 1988, 6(3): 164-170.
[2] Cooke-Davies, T. 2002. The “real” success factors on projects. International Journal of Project Management, 20, 185–90.
[3] Lusch R F, Brown J R. Interdependency, Contracting, and Relational Behavior in Marketing Channels[J]. Journal of Marketing, 1996, 60(4):19-38.
[4] Schepker D J, Oh W Y, Martynov A, et al. The many futures of contracts: moving beyond structure and safeguarding to coordination and adaptation[J]. Journal of Management, 2014, 40(1):págs. 123-225.
[5] NASFAA , COAA, APPA, AGC. Integrated Project Delivery for Public and Private Owners.http://www.agc.org/galleries/projectd/IPD07o20for07o20Public07o20and07o20Private07o20owners.pdf