

# Risk Management and Control Measures Utilized during the Implementation of China's "Go Global" Railway Strategy

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**Abstract:** With China's "Go Global" railway risks as its research objective, this paper establishes down the risk structure of China's "Go Global" railway strategy, adopting a combination of literature research, investigation, and case study methods. The paper identifies specific critical risks of China's "Go Global" railway strategy and analyzes preventive as well as other common risk management and control measures, limiting its focus, for illustrative purposes, to the front end of overseas build-operate-transfer projects (BOTs). The research results are expected to provide reference for China's "Go Global" railway risk management and control measures.

**Keywords:** China's "Go Global" railway risks; risk breakdown structure; front end of overseas BOT projects; risk management and control measures

## 1 Introduction

To fully understand and effectively cope with the risks of overseas projects, including railway engineering projects, scholars have conducted extensive research in the field of risk identification, risk formation mechanisms, and risk assessment and control, yielding many valuable results [1–3]. However, research on Chinese railway enterprises' risk management and control practices at the front end of overseas BOT projects is scarce. This paper establishes the risk breakdown structure of China's "Go Global" railway strategy, identifies specific critical risks facing Chinese railway enterprises at the front end of overseas BOT projects, and analyzes measures for their prevention and control, as well as other common risk management practices.

## 2 The risk breakdown structure of China's "Go Global" railway strategy

Scholars have put forward different risk classification methods. Among them, classifying risks by their source is the most

common approach. For example, Bu-Qammar et al. [4] classified the risks of international construction projects into five categories: country risk, inter-country risk, project team risk, construction risk, and contract risk. We think that project team risk, construction risk, and contract risk do not have the same risk levels because construction risk and contract risk are mainly caused by the project team. For example, construction safety accidents are often caused by design or construction errors and omissions; contract risks such as unreasonable risk allocation and vague contract provisions can be mainly attributed to the owner, and the contractor should also bear some responsibility because although the contract is usually prepared by the owner, mainly, the contractor also agrees to and endorses the contract terms. Tserng et al. [5] classified the construction project risk into external risk, site risk, owner-contractor contract risk, owner risk, subcontractor risk, project preparation and planning risk, project implementation risk, and contracting and management procedure risk. We argue that this classification standard is not consistent because owner risk and subcontractor risk are classified based on the main stakeholders; project preparation and planning risk

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and project implementation risk are classified according to the phase of the project. Liu et al. [6] classified the international project-bidding stage risk into project environment risk, project-self risk, and project stakeholder risk. We believe that the project-self risk can be incorporated into the project stakeholder risks, such as the bidding documents risk, which in essence is an owner risk because the owner is responsible for the preparation of the tender documents and should be accountable for their errors and omissions. Since China's "Go Global" railway involves enterprises and projects such as design consulting, equipment, construction, and operation, it can adopt many different modes such as joint venture projects, wholly owned projects, and BOT projects. China's "Go Global" railway faces more complicated risks than China's "Go Global" Building. Combining research results according to the classification standards uniformity principle and considering domestic practices, we classify China's "Go Global" railway risks into three major categories: environmental risks, owner risks, and participant risks. Environmental risks are environment-induced risks, causing uncertainty to the Chinese railway's business performance, corporate reputation, and so on. They include political and legal risks, economic and business risks, and social and natural risks. Owner risks are risks induced by the project owner or its consultant, causing uncertainty to the railway's business performance, corporate reputation, and so on. One example is the owner's failure to pay the contractor on time. Participant risks refer to the project's participant-induced risks, causing uncertainty to the railway's business performance, corporate reputation, and so on. They include railway enterprise/joint venture partner/alliance partner risks, risks attributable to other project participants (subcontractors/suppliers, lenders, guarantors, insurers, agents, etc.), and bilateral and multi-party risks. Each risk subclass includes many specific risks, such as

political and legal risks, including civil war, rebellion, terrorist attacks, and other risks; railway enterprise, joint venture, and alliance partnership risks, including the bidding quotation mistakes and omission; and bilateral and multi-party risks, including contract or agreement defects. The risk breakdown structure of China's "Go Global" railway strategy is shown in Fig. 1. The top layer of the figure shows the risk of China's "Go Global" railway, the second layer is the main risk category, the third layer represents the risk subclass, and the fourth layer presents the specific risks. The quantity and the names are related to the specific project. For example, at least 67 risks should be considered at the front end of China railway enterprises' overseas BOT projects; the next section will introduce them in detail.

### 3 Analysis of overseas BOT projects: risk management and control at the front end

#### 3.1 Overseas BOT projects' front-end risks

Risks at the front end of overseas BOT projects have been identified according to the principles of science, comprehensiveness, independence, risk control, measurability, and union of generality and individuality. The main processes are as follows: from October 2014 to January 2016, the "Go Global" strategy's preliminary list of 145 risks was established; from February to March 2016, 45 experts from the China Railway Group Limited, the China Railway Construction Corporation Limited, the China Railway Design Corporation, and the Sinohydro Corporation were invited to take part in a questionnaire investigation; of these, 36 experts returned valid questionnaires, and 54 risks faced by China's "Go Global" railway business were identified; in April 2016, the China Railway Corporation International's ex-

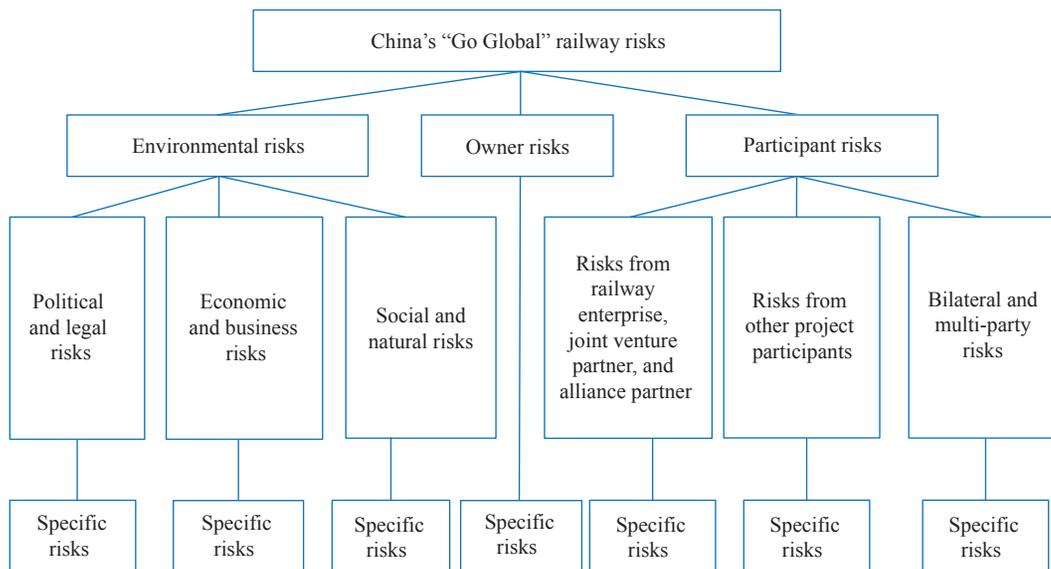


Fig. 1. The risk breakdown structure of China's "Go Global" railway strategy.

perts engaged in overseas BOT high-speed project management were interviewed, and 67 specific risks at the front end of overseas BOT projects were finally determined [7].

### 3.1.1 Environmental risks (thirty-six)

#### (1) Political and legal risks (thirteen)

They include the political stability in the host country, neighboring countries and regions; international sanctions on the host country; the host government's performance capacity and willingness; confiscation, expropriation, and nationalization of project assets by the host government; intervention by the host government in the construction and operation of the project; relationship between the host government and the Chinese government; fairness of the host country's laws; feasibility of legal relief in the host country; stability of the host country's legal system; complexity of the host country legal system; requirements of the host country's labor laws, environmental protection laws, and technical standards; double taxation by the governments of both the host country and China on Chinese enterprises involved in the project; and lastly, differences between the laws of China and the host country.

#### (2) Economic and business risks (eleven)

They include the host country's financial stability; the health of the host country economy; exchange rate stability; interest rate stability; stability of materials, equipment, and labor prices; availability of standard materials and equipment and skilled labor; host government's foreign exchange regulation policies; availability of the qualified subcontractors; host government's incorruptibility and work efficiency; compatibility of the surrounding infrastructure; and intensity of the bidding competition among the Chinese companies and their opponents.

#### (3) Social and natural risks (twelve)

They include the host country's social security situations; the host country's union strike policy; the host country's public and media's attitude towards China; the abundance of the local natural resources; the local medical conditions; the language differences between the migrant workers and local people; the religious differences between the migrant workers and local people; the life custom differences between the migrant workers and local people; the occurrence of natural disasters, such as earthquakes and tsunamis; the climate and weather conditions of the construction site; the sub-ground conditions of the construction site (the geological conditions, hydrological conditions, toxic substances, fossils and cultural relics, etc.); and the outbreak of the local epidemics.

### 3.1.2 Owner risks (four)

They include the clarity of the owner's requirements for the project, integrity and accuracy of the information provided by the owner, performance conditions of the BOT agreement, and harsh clauses or exemptions in the BOT agreement.

### 3.1.3 Participant risks (twenty-seven)

#### (1) Rail enterprise/joint venture partner/alliance partner risks (twenty)

They include risks from the consortium of Chinese enterprises (Chinese consortium for short) participating in project feasibility study; technical ability; management ability; establishment of risk management system and operation status; experience in contracting railway projects in the BOT mode; experience in contracting the host country's railway projects in the BOT mode; financing ability; financing cost; comprehensiveness, profundity, and correctness of the understanding of project requirements; on-site reconnaissance depth; cost estimate accuracy; project overall solution competitiveness; traffic volume forecast accuracy; income forecast accuracy for adjacent land development; urgency to undertake the project; competence and experience of the consortium of host country enterprises (host country consortium for short); consortium cooperation mode; reasonableness of the distribution of responsibilities, rights, and interests among consortium partners; degree of trust and cooperation among consortium partners; and quality of the consortium agreement.

#### (2) Other project participant risks (four)

They include bank loan conditions and interest rate; guarantee conditions and commission; insurer underwriting conditions and rates; and capacity and credibility of agents.

#### (3) Bilateral/multi-party risks (three)

They include the smoothness and effectiveness of communication among the Chinese and host country consortiums, the owner, and the host government; the smoothness and effectiveness of communication among other project participants such as lending banks, guaranty parties, and insurance parties; and the quality of the BOT agreement.

## 3.2 Key risk identification and prevention and control measures

### 3.2.1 Key risk identification

During February to March 2016, 12 experts from the China Railway Group Limited, the China Railway Construction Corporation Limited, the China Railway Design Corporation, and the China Railway Corporation International Corporation Limited were invited to take part in the questionnaire investigation with respect to the importance, possibility, and impact of the risks at the front end of overseas BOT projects. Based on the questionnaire investigation results and our international railway project risk assessment model, the contribution of each risk to the total project risk was calculated [7]. According to the degree of risk contribution, synthetically considering the factors such as vulnerability, initial velocity, and confidence in the evaluation results and information obtained from other sources, six key risks at the front end of overseas BOT projects were obtained: ① communication risk among the consortiums of the Chinese

and host country enterprises, the owner, and the host government; ② the host government credit risk, which integrates three risks, namely, confiscation, expropriation, and nationalization of project assets by the host government, performance and willingness of the host government, and BOT agreement performance of the owner; ③ ability and experience of the host country consortium; ④ political stability of the host country and its neighboring countries and regions; ⑤ quality of the BOT agreement; ⑥ cost and traffic volume forecasts by the Chinese consortium, which integrates two risks, namely, accuracy of traffic volume forecasts and cost estimates of the Chinese consortium.

### 3.2.2 Key risk prevention and control measures

(1) Communication risk prevention and control among the Chinese and host country consortiums, the owner, and the host government.

Consultation and reporting mechanisms should be established to lobby for government support. Maintaining effective communication at any time among the Chinese and host country consortiums, the owner, and the host government is a necessary condition and a prerequisite for winning an overseas BOT project and for its orderly promotion after winning the bid. The Chinese consortium should communicate with the host country enterprises in a timely manner, following the principles of "co-discussion, co-building and co-sharing." Moreover, the consortium must engage in mutual visits, regular or irregular joint meetings, and other means, and proactively report the project's progress to the National Development and Reform Commission of the People's Republic of China, the relevant government departments of the host country, and the owner to convince them about the feasibility, rationality, and advanced nature of the overall solutions proposed by it. Doing so will help garner their dedicated support for the project and build a consensus, allowing the consortium to win the bid and effectively promote the project.

(2) Preventing and control of host government credit risk

Events such as unilateral cancellation of international BOT project franchise rights by the host government, levying of project assets, and host government failure to fulfill related obligations in the BOT agreement have occasionally occurred. For instance, after the new president of Peru, Garcia, came to power, he unilaterally terminated the preferential tax policy that provided tax relief to foreign oil companies, resulting in an increase in the tax rate from the original 41% to 68%; he also asked foreign oil companies to increase their investment in oil exploration, cancelled the product-sharing contracts with the three largest foreign oil companies (including Belco), and carried out a 90-day renegotiation on the contents of the contracts. The Belco oil company rejected the requests of the new Peruvian government. This caused the company's assets in Peru to be levied and taken over by the Peruvian state oil company. Fortunately, Belco had bought political risk insurance from the American International Group (AIG), so the company received insurance compensation

of USD 230 million from AIG after its assets were levied. Most countries implement the multi-party system, and rotation of the ruling party is a common phenomenon. The overseas BOT project construction period is long, and the franchise period is even longer, extending up to 30–50 years. Replacement of the ruling party during such a long time is highly probable.

The consortium of Chinese enterprises should seek a sovereign guarantee from the host government and obtain a "shareholding-but-not-share-controlling" policy (in which the Chinese consortium holds a small proportion—no more than 50%—of the project company's share capital). This helps to reduce the host government's credit risk.

Based on a comprehensive comparison, the consortium of Chinese enterprises should select an appropriate insurer (such as China Export & Credit Insurance Corporation) and buy international investment political risk insurance (which includes four basic insurances, i.e., nationalization levy insurance, exchange prohibition insurance, war insurance, and business interruption insurance) to guard against political risk through insurance policies.

(3) Risk prevention and control for ability and experience of host country consortium

The consortiums of the Chinese and host enterprises should conduct a rational task division and clearly specify their responsibilities, rights, and obligations. The host country consortium generally lacks the capacity and experience of the high-speed rail construction and operation, and is unfamiliar with China's high-speed rail standards, but is familiar with the host country's politics and laws, economics and commerce, and social environments. Therefore, both sides have advantages and disadvantages and could truly realize their complementary advantages through a reasonable task division and clear specification of responsibilities, rights, and obligations.

The Chinese consortium should strengthen the training of the host country consortium's personnel. To ensure the smooth implementation of overseas BOT projects and adapt to the requirements of new technologies and standards, according to the project progress speed and project requirements, the Chinese consortium should rely on relevant domestic units, adopt a combined approach to theoretical study and field practice as well as academic and non-academic education, conduct professional training and internship in train operations, maintenance work, electrical services, vehicle repair, power supply engineering, and information technology, among others, for the host country consortium's management, technical, and operational personnel by stages and in batches. After attending the internship and practical training programs, they should be able to conduct practical operations and work independently in the related fields.

(4) Prevention and control of political stability risk in the host country and neighboring countries and regions

The political situation in some host countries is easily affected by ethnic conflicts and terrorist attacks. The terrorist attacks

in Bali Island in 2002 killed 202 people. Separatism and terrorism within the host country may threaten the security of the personnel and property of the participants and the operations of the overseas BOT project during the construction and operation phases. The Chinese consortium and the BOT project company should prevent and control the political stability risks of the host country and neighboring countries by purchasing overseas investment insurance and strengthening the railway security measures.

#### (5) Risk prevention and control for BOT agreement quality

The quality of the BOT agreement has a great influence on the success of the project. If the BOT agreement contains incomplete contents, unclear clauses, contradictory parts, unfair risk allocation, or other major defects, the implementation of the project will encounter great difficulties, easily leading to contract disputes and arbitration, and even possibly leading to project failure. For example, under the domestic economic downturn in 1992, the Zambia government decided to vigorously develop the private sector, and some railway lines operated originally by the Zambia Railway Corporation (ZRL) were privatized through the franchising route. However, after the Zambia railways were franchised for a period of time, the parties interpreted the agreements differently because the initial contract responsibility was not clearly specified. The ongoing controversies over the interpretation of the agreement led to a deterioration of the public-private cooperation relationship, and the project had difficulty in producing the desired effects. In September 2012, the Zambian government withdrew its franchise for the reason that the agreement lacked maturity and declared the franchise a failure.

The owner and the BOT project company should pay careful attention in preparing the contracts and terms of the BOT agreement. It should be fair, rigorous, and comprehensive. They should preferably employ a legal adviser to review the BOT agreement in advance to find and correct defects or take other remedial measures in a timely manner before it is finalized by the parties.

#### (6) Forecast risk prevention and control for Chinese consortium costs and traffic volume

The cost compositions, the cost ratios of each part, and the comprehensive unit price of international projects are very different from those of domestic projects of the same type and the same quality requirements. The domestic project's experiences should not be simply applied to estimate international project costs. International projects are generally riskier than domestic projects. For the Saudi Mecca light rail project, the Chinese contractor experienced huge losses; for the Poland A2 expressway project, the Chinese enterprises were forced to give up the contract midway, the performance guaranty was confiscated by the owner, and the owner filed a lawsuit. There are many reasons for this outcome, but they are directly related to the serious underestimation of the project cost by the Chinese enterprises.

It is very difficult to predict railway project traffic volume ac-

curately. Empirical studies by foreign scholars show that 72% of railway projects predict more than 67% of the passenger traffic volume. The causes of passenger traffic forecast errors include defective prediction models and methods, inaccurate input data, design change, failure to start operations on time, and deliberate overestimation of passenger volume by forecasters.

The Chinese consortium should attach great importance to site visits and inspect, collect cost and traffic volume data of the foreign BOT project, and predict the cost and traffic volume using a variety of methods and models and ensuring the quality of the forecast models and input data. They should apply the prudence principle by conservatively estimating the project cost and traffic volume, do their best to obtain the host government's commitment in the BOT agreement that during the project franchise duration and within a certain distance around the stations and tracks (e.g., 25–50 km), that the host government will not plan and build new transport corridors (such as the high-speed railways and expressways that compete customers with the railway), and that the project company will have land development rights freely or with preferential pricing within a certain distance (such as 500–1000 m) around the stations.

## 4 Other common risk management and control measures for China's "Go Global" railway strategy

### 4.1 Developing and sharing China's "Go Global" railway risk base, risk management information system, and decision support system

The National Railway Administration of the People's Republic of China and China Railway should collaborate with the enterprises, scientific research institutions, universities, and colleges associated with the "Go Global" strategy in investigating, developing, and popularizing the China's "Go Global" railway risk base, risk management information system, and decision support system to support the project feasibility study, bidding quotation, pre-contract negotiation, claim, and dispute resolution and reduce the risk of major policy-making mistakes.

### 4.2 Carrying out China's "Go Global" railway country risk study

Country risks are one of the key factors that affect the success of China's "Go Global" railway. Although country risks consist of political and legal risks, economic and business risks, social and natural risks, the importance of various risks differ by country; the probability of occurrence and degree of influence of these risks also differ. In the future, China's railway industry will need to combine the overall layout of its "Go Global" strategy, focus on host countries, and carry out in-depth risk research for each country to provide more practical and specific risk man-

agement and control suggestions for Chinese railway companies contracting railway projects in the relevant countries.

#### 4.3 Emphasizing China's "Go Global" railway risk planning

Risk planning refers to the process of deciding how to conduct risk management and control activities. The contents include ① defining the relevant organizations and risk management and control responsibilities; ② identifying risk management and control methods, tools, and resources; ③ defining the duties and roles of personnel involved in risk management and control; ④ defining the operation stages and frequencies of risk management process evaluation, control, and change in the project life cycle; ⑤ carrying out risk assessment and quantification; ⑥ defining risk response strategies, the persons responsible, and implementation times; ⑦ specifying the contents, scope, channels, and methods of risk reporting; ⑧ clarifying the risk-monitoring and tracking pathways; and ⑨ establishing the content and scope of the project risk post-evaluation report.

#### 4.4 Fulfilling corporate social responsibilities

China's railway enterprises that have went to the world should conscientiously fulfill their local corporate social responsibilities, including: ① establishing a good faith-based business philosophy, and incorporating this concept into the day-to-day operations; ② emphasizing environmental protection, responding positively to potential environmental crises, and positively utilizing the services of international non-governmental environmental organizations; ③ abiding by the labor laws and regulations of the host country, respecting and protecting the rights and interests of the local employees, and implementing the strategy of localization of talents; ④ managing the local staff with humanity, achieving harmony and win-win results, and exerting influence on trade unions; ⑤ establishing a community of interests with local competitors or suppliers to reduce the costs and risks of China railway enterprises operating locally; and ⑥ sharing development results with local residents to enable them to support the investment projects [8].

In addition, when Chinese enterprises contract with overseas railway projects, they should strengthen cooperation and self-discipline among domestic enterprises, avoid vicious

competition and over reliance on certain parties, and getting involved in non-commercial affairs.

## 5 Conclusions

This paper establishes China's "Go Global" railway risk breakdown structure, provides a risk checklist, and identifies the critical risks at the front end of overseas railway BOT projects. The critical risk prevention and control measures and other common risk management and control practices presented in this paper will provide reference for improving China's "Go Global" railway risk management and control abilities.

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