

# Using design-and-build as an entry strategy to the Chinese construction market

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## **Abstract**

Design-and-build delivery has become a significant alternative to the more traditional design-bid-build, though the level of its use varies from country to country. This research investigates the entry strategies of foreign contractors in China and their use of design-and-build, set against the country's evolving construction project procurement regulations and practice. Entry strategies are analyzed in two dimensions - entry modes and market targeting – and based on this a conceptual model of foreign contractors' entry strategy is presented, which proposes a focus on foreign direct investment (FDI) projects, on design-and-build capacity, and on collaboration with Chinese design institutes.

*Keywords:* Implementing strategy, alliances, procurement, international projects

## **Introduction**

The management of construction projects involves the ability to access and understand a wide range of associated disciplines. The focus of this paper is on the commercial aspects of project procurement, and in particular how traditional approaches to procurement evolve in the face of a dynamic market. In this case, the dynamism of the Chinese construction market is characterized by a) immense growth, and b) (unsurprisingly, considering the last point) by the desire of foreign enterprises to enter the market. Many of these foreign enterprises can bring new ways of working, and it is in this context that *design-and-build* procurement is assessed as an entry strategy.

Many foreign contractors, eager to pursue new business opportunities, have entered the Chinese construction market either undertaking projects directly or by setting up representative offices. According to the National Statistics Bureau [1], there were 16 wholly-foreign-owned contractors registered in China in 2001 (excluding contractors from Hong Kong, Macao, Taiwan, and foreign funded joint ventures). Chinese regulations have allowed the qualification of foreign-owned contractors and design firms since December 2002 [2, 3].

Problems exist for enterprises operating in any foreign country [4]. For example, Haley [5] argues that the links of trading companies, the protected domestic market, and favourable interest rates are barriers to penetration of the Japanese construction industry. Badger and Mulligan [6] note that governments in the Middle East, Southeast Asia, and Australia often impose some form of local company involvement upon foreign contractors.

Foreign contractors' pre- and post-entry decisions have not been without problems in their expansion into China, and many consider the market a difficult one, with its governmental, market, and technical barriers to entry. There is a particular urgency for viable entry strategies for foreign contractors interested in the Chinese construction market. This paper examines the viability of using a design-and-build approach as one such strategy.

The use of design-and-build contracting has increased worldwide as a viable alternative to traditional project delivery methods [7, 8, 9] and many industry-standard forms of contract have a design-and-build version [10]. Under the method, the client selects a contractor to carry out and be responsible for not only construction but also the design of the works [11, 12, 13, 14, 15]. In the Chinese context, the term 'design-and-build' is consistent with the concept of *Gong Cheng Zong Cheng Bao* in Chinese construction law [16], though the delivery method has received little attention compared to build-operate-transfer, whose use has been studied extensively [17].

### **Traditional and emerging approaches to construction design in China**

In 2001 there were 11,297 design institutes in China with 732,215 employees [1], most of them State-Owned-Enterprises (SOEs). These have been the traditional service providers for feasibility studies, master planning, investigations, design, and surveying. Recently, in line with market demand, some have extended into project management, supervision (*Jian Li*) and design-and-build. For each activity a license is required from the Ministry of Construction, and these are graded A (the highest) to C [18].

Recent economic reforms (commencing in 1993) saw the reduction of government control over design institutes [1]. As shown in Figure 1, in 2002 there were 7,212 State-owned design institutes, 836 collective design institutes (towns and village enterprises), and 3,447 joint stock and privately-owned design institutes [19]. The 'Decree of Qualification Administration for Design Institutes' *Gong Cheng Zong Cheng Bao* was issued by the Ministry of Construction in November 1992 (see Table 1). Since then, 560 design institutes have obtained *Grade A Gong Cheng Zong Cheng Bao* licenses (Design-and-Build licenses), over 2,000 design institutes are entitled to *Grade B Gong Cheng Zong Cheng Bao* licenses [20]. The majority of design institutes have not been given opportunities to undertake design-and-build projects, though some of them have regularly collaborated with foreign contractors to work on foreign direct investments (FDI) design-and-build projects.

Under China's earlier planned economy, design and construction works were separately assigned to design institutes and construction enterprises by government [21]. Competitive tendering for design-bid-build was adopted in the 1980's and has increased in recent years. However, there remains a significant degree of inertia in respect of design-and-build, which is nowhere near as established as in western countries, such as the UK or the United States.

As a result of the 28<sup>th</sup> Meeting of the 8<sup>th</sup> National Congress, Clause 24, s. 2, Ch. 3 of the Construction Law of People's Republic of China<sup>1</sup> now encourages the procurement of construction projects through design-and-build (*Gong Cheng Zong Cheng Bao*), contracting with a single design-and-build contractor (*Gong Cheng Zong Bao Dan Wei*) and discourages the unnecessary breaking down of responsibilities [17]. Table 1 demonstrates the growing importance of design-and-build in China reflected in the relevant government regulations. Recently, the MOC issued Decree No. 30, which encourages design institutes, construction enterprises, and Jian Li to develop design-and-build delivery and project management services [22]. Evidently, design-and-build regulation in China is progressively catching-up with international practice. Despite this, any international construction practice faces the need for integration into the Chinese institutional environment.

In a typical design-and-build project, prequalified design-and-build contractors submit their tender documents (including preliminary designs and cost estimates) against the client's requirements. Finally, based on the evaluation of the tenderers' submissions, the project is awarded. This might not be the lowest tender. The detailed arrangements, such as the scope of client's requirement and variation order pricing, can vary from project to project. However, China does not yet have standard conditions of contract for design-and-build. Contracts for competitive (design-bid-build) tendering are dominated by the Conditions of Contract for Works of Building Construction 1999 (GF-99-0201). These conditions are recommended by the Ministry of Construction (MOC) and can be modified to suit individual projects. Alternatively, tailored international standard conditions (such as FIDIC) can be used. Chinese construction enterprises have a certain amount of experience using FIDIC overseas, and

some foreign-funded projects in China use FIDIC or its client-amended version. Consequently, the FIDIC design-and-build form (FIDIC, 1999) would be suitable for use in China after adaptation for the Chinese legal and operating environment.

## **Entry barriers to the Chinese construction market**

Before 1976, when *Kaifang Zhengce* (the “open door policy”) began to emerge, China had followed a ‘self-sustained’ policy with few external business contacts [23]. The economy is now neither a planned nor a Western-style market economy, but is in transition towards a ‘socialist market economy’. Foreign contractors may face various entry barriers in their expansions into China. There are three major types: government restrictions, market barriers, and technical barriers. Historically, government restrictions on the Chinese construction industry posed a critical obstacle for foreign contractors' entry. The situation is slowly changing due to the impact of China's World Trade Organization (WTO) membership, which was formally confirmed with effect from 11<sup>th</sup> December 2001. The underlying principle of the WTO is to encourage global trade liberalization with the core criteria of market access and fair national treatment. The construction market is one of the major targets of this trade liberalization, and therefore one of China's commitments.

Previously, foreign contractors were only allowed to tender for projects from the World Bank, Asian Development Bank, bi-lateral or multi-lateral agencies and for donor-specified projects. Although the current regulations allow foreign contractors and foreign design firms to register as wholly-foreign-owned 'construction enterprises' and 'construction engineering design enterprises' respectively [2, 3], the scope of work is restricted to foreign-invested projects or foreign-donated projects. For other foreign-funded projects as well as those domestically funded projects that require special technologies outside the expertise of China, Chinese-foreign joint venture (JV) contractors can tender, subject to the approval of the relevant local authorities. The new government procurement law, which took effect on 1 Jan 2003, states that the government should procure Chinese goods, engineering and services [24].

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<sup>1</sup> November 1<sup>st</sup>, 1997, ( effective from March 1<sup>st</sup>, 1998)

Thus the Chinese construction market and construction enterprises are still under government protection.

Market barriers include low prices from local competitors; relationships (*Guanxi*) with authorities, clients, subcontractors and suppliers; and linguistic proficiency (especially with Chinese written documents). Other barriers include the non-convertibility of Chinese currency (RMB) and the reliability of local subcontractors and suppliers.

Technical barriers include differences in technical standards, codes, and practice between China and the home countries of foreign contractors. Chinese design and construction standards and codes were established in the 1950's based on former Soviet Union construction system. After more than 50 years of modifications and improvements they are unique, and rather impenetrable for expatriates.

### **Foreign contractors' competitive advantages**

Porter's theory of the competitive advantage of nations forms the classic model of entry strategy. It suggests that some nations are internationally competitive in particular industries and others are not. A firm's international success is associated with four broad determinants of national advantage, namely, Factor Conditions, Demand Conditions, Related and Supporting Industries and Firm Strategy, Structure, and Rivalry [25]. In addition, Porter points out that extraneous factors (e.g. surges of world or regional demand) and governments' roles impact on firms' competitive advantages. However, a contractor from a construction-competitive nation may not necessarily be successful in China, whereas a contractor from a less construction-competitive nation may be very successful. For example, many contractors from Hong Kong and Singapore are successful in China, though only one contractor from either place (Paul Y. ITC Construction Holding Ltd of Hong Kong) was listed in year 2003 ENR top 225 international contractors.

Since international competition takes place at local level, this research focuses on foreign contractors' subsidiaries rather than their corporate parents. Porter [25] states that to gain competitive advantage, a firm must either provide comparable buyer value but perform activities more efficiently than its competitors (*i.e.* a *low cost* strategy), or perform activities in a unique way that creates greater buyer value and commands a premium price (*i.e.* a strategy of *differentiation*). Given construction costs in China, foreign contractors are unlikely to have cost advantages over their local rivals (though this may be a factor for competition among the foreign contractors). Differentiation, however, *is* feasible, as clients may be attracted by value-added services or even a 'brand-name' that local contractors are unable to provide.

The entry advantages of multinational corporations (MNCs) include distinctive production, technological, financial and marketing know-how, and resources. There are distinct costs and uncertainties faced by domestic firms in attempting to duplicate similar competitive strengths [25]. In the construction industry, the key sources of competitive advantage for international contractors include the ability to provide attractive financial packages; build winning alliances; accept and manage risk; invest in sales and R & D; identify client/user needs through market research; procure on a global basis; employ technical expertise and the right technology; integrate local and global knowledge; and enjoy political backing [26]. These factors are influential in providing the lead towards the implementation of a differentiation strategy.

## **Market entry strategies**

Entry strategies have been an interesting area of research in international business. However, orthodox theories of entry strategy have focused on entry modes: to enhance the usefulness of this research for foreign contractors' business practice in China, entry strategies are here analyzed in two dimensions, entry modes and market targeting.

### **Entry Modes**



Previous research tends to rely on Transaction Cost theory to explain decisions on international entry mode choice [27]. Transaction Cost Analysis compares the costs of integrating an operation *within* the firm with those of using an external party to act for the firm [28]. Transaction costs include the costs of concluding and policing contracts with agents, distributions, etc. [29]. By stating that different entry modes require different resource commitments, Anderson and Gatignon [30] developed a transaction cost model that considered the trade-off between the costs of mode control and the costs of mode resource commitment. Transaction Cost theory maintains that it is the cost of finding, negotiating and monitoring the actions of potential partners that influences the entry mode choice [27, 28].

However, pure Transaction Cost theory assumes institutional structures that support (or at least, do not hinder) firms' actions. Scott [31] categorizes potential institutional factors in three groups, namely: regulative, normative and cognitive. Regulative factors include state laws and regulations; normative factors include societal values and cultural norms; while cognitive factors are the frames or conceptions of reality by which meaning is made. Regulative factors have their roots in economics, while normative and cognitive factors are rooted in sociology.

Lu [32] criticizes Transaction Cost theory for its conceptual limitations because it has given little attention to the sociological approach and contends that institutional influences exert important effects on formulation and implementation of entry modes. Transaction Cost theory focuses on the technical environment of individual transactions, but institutional theory emphasizes broader institutional factors. According to Brothens, Transaction Cost theory should be extended to take account of both institutional and cultural contexts to enhance the entry mode selection [33]. Woodcock et al. [34] recommend the notion of Contingency Theory, which suggests that the selected entry mode must conform to the particular industry, firm, and country factors faced by the entering firm.

There are a number of ways to categorize entry modes. Pan and Tse [35] summarize the modes of entry as equity-based (i.e., equity joint ventures and wholly-owned subsidiaries) and non-equity-based (i.e. exporting; licensing; non-equity alliances). Dunning [36] states that non-equity modes are

essentially contractual modes, such as leasing, licensing, franchising, and management service contracts, while Erramilli [37] simply defines non-equity modes as those that do not entail equity investment by a foreign entrant.

While advocating institutional theory, Lu [32] concedes that theorists have emphasized that the entry mode choice stemmed from two asset-based influences. High-control modes (e.g. wholly-owned subsidiaries) are used when there is a need to control and safeguard a parent firm's contributed assets in its foreign subsidiaries. Low-control modes are used when a foreign firm requires access to complementary assets for international expansion.

Regardless of how individual entry modes are grouped, a fundamental issue is whether the entering firm needs a local collaborating partner. Therefore, entry modes could be categorized using the concept of collaboration. In this research, foreign contractors' entry modes are distinguished as *entry without collaboration* (i.e. wholly-foreign-owned enterprise) and *collaboration-based entry* (i.e. wholly-foreign-owned enterprise with local strategic alliances, project based collaboration, joint ventures or mergers and acquisitions) [33].

Foreign contractors may lack information about Chinese institutional issues, culture and practices, although some of them have been operating there for many years. They must also face subcontractors/suppliers who may not be able to provide performance bonds and offer reliable service quality. Other institutional hurdles include unclear regulatory frameworks, inefficient bureaucracies, underdeveloped judiciary systems, and even corruption.

In other industries it has been argued that the Wholly-Foreign-Owned Enterprise (WFOE) is a better way to enter the Chinese market [38], whereas in construction Xu et al. [39] have shown that a WFOE collaborating with a local design institute proved to be successful strategy. Such collaborations facilitate foreign contractors' adaptation to the local environment. A better adaptation to a construction environment that is itself in flux should enhance the survival chances of foreign contractors in the long

run. Among other advantages of such collaborations, local design institutes are capable of providing access to licenses, human resources, and local design-and-build technical support for foreign contractors, which other types of partnership might be unable to offer.

Although some foreign contractors have attempted mergers and acquisitions, the ambiguous ownership situations of local design institutes and construction enterprises (being formerly SOEs) can hinder negotiations. Foreign contractors, in order to overcome entry barriers, have largely adopted international joint ventures, though conflicts might result in failures to realize their initial goals, and their strict legality and substantial capital commitment allow little room for negotiation or rearrangement when disputes occur.

Project-based collaborations provide flexibility for foreign contractors and their local partners, but they suffer the disadvantage of uncertainty and speculation. Given the unique nature of the business environment in Chinese construction, the collaborative form of strategic alliance between foreign contractors and local partners promotes long-term commitment and offers the opportunity of sustainable growth for both parties [40]. This form - the strategic alliance between foreign contractors and local partners - is therefore postulated as the most appropriate entry mode for foreign contractors.

### **Market targeting of foreign contractors**

One of the most crucial decisions faced by foreign contractors is market targeting, of which the three major steps are: segmentation, targeting, and positioning.

#### *Segmentation*

Market segmentation is usually defined as the process of dividing potential customers into distinct groups for the purpose of targeting and designing segment-specific marketing strategies [41]. Although academics stress the need to identify the most suitable and statistically valid segmentation schemes, the priority of the practitioner is to identify segments for which an effective marketing program can be

developed, and evidence from construction markets suggests that the ease of implementing a segmentation solution significantly impacts on its success [42].

Given the nature of the Chinese construction market faced by foreign contractors, the authors believe that for foreign contractors, a useful means of segmenting the Chinese construction industry is by procurement system (*i.e.* by project delivery method). This form of segmentation is beneficial in helping foreign contractors to understand the market and apply their resources accordingly.

Conventionally, construction procurement, or project delivery methods are categorized as *design-bid-build*, *design-and-build*, *concessionary delivery* (e.g. BOT, PFI) and *construction management*. In the context of international construction management, Xu and Chew [4] extend the concept of project delivery method to include real estate development and specialist subcontracting. Thus, the Chinese construction market can be segmented (as shown in Table 2) into *design*, *construction*, *design-and-build*, *concessionary delivery* (e.g. BOT, PFI), *construction management*, *real estate development*, and *specialist subcontracting*. Some of these segments may have sub-segments in terms of categories of clients, for example design-and-build delivery for FDI clients, or construction management delivery for domestic clients.

### *Targeting*

Since contractors' success is largely dependent on the success of their individual projects, the selection of project delivery method is one of the core elements of an organization's entry strategy [4]. The major factors in foreign contractors' segment evaluation would be their competitiveness, local rivals' competitiveness, profitability, and entry barriers. The premise of this segment evaluation is that the Chinese construction market is likely to be attractive for foreign contractors in terms of market volume and growth rate. Porter suggests two strategies for penetrating foreign markets: to select 'modest or emerging' segments in foreign nations and to follow home-based multinationals [25]. The implementation of the first element needs not only to exploit the firm's competitive advantages but also to identify the modest or emerging segments in the target market. As demonstrated in Table 2, in the

current Chinese construction market, the 'modest and emerging' segments are design-and-build, concessionary delivery (e.g. BOT, PFI), and specialist subcontracting (e.g. the design and/or construction of intelligent buildings) [4].

The second strategy for foreign market entry concurs with Strassmann and Wells' findings on world construction activity [40]: entry begins with types of activities for which the firm has the most complete set of resources and with familiar types of projects. Firms from advanced countries generally begin overseas operations by accepting works from their own government or from a compatriot multinational enterprise investing abroad. The natural extension of this strategy (particularly in the context of entry into the Chinese market) is then towards other foreign nationality enterprises (i.e. FDIIs). This is consistent with current Chinese regulations that foreign contractors are often confined to working on foreign direct investment (FDI) projects and other foreign-funded projects (e.g. World Bank, Asia Development Bank etc.). Indeed, as China has attracted foreign business interest the inflow foreign direct investment (FDI) is enormous<sup>2</sup>, resulting in a new construction segment with vast market volume.

In the light of above, foreign contractors may target one or more segments of design-and-build, concessionary delivery (e.g. BOT, PFI), construction management, real estate development, and specialist subcontracting. While concessionary delivery (e.g. BOT, PFI) and real estate development require considerable capital commitments, design-and-build, construction management, and specialist subcontracting need solid managerial and technological know-how.

### *Positioning*

It is beyond the scope of this paper to discuss all the delivery methods that foreign contractors might select, and, as outlined in the introduction, it concentrates on the design-and-build option.

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<sup>2</sup> 52.7 Billion USD in 2002, which is 12.5% higher than that of 2001 (NBS, 2003).

The combination of the two aforementioned strategies - a design-and-build delivery method with a focus on FDI - may not, in itself, bring success for foreign contractors, given the status quo of the construction market in China. Institutional and cultural differences and project uncertainties may impede their prospects significantly. In this connection, the two strategies could be extended to encompass a third one - that of collaboration with a local partner. A capable local alliance may help the foreign contractor to reduce or overcome existing entry barriers and provide other complementary competitive advantages.

In the context of the *design-and-build* strategy, design institutes may offer synergistic complementarities to foreign contractors. Collaborating with design institutes could benefit foreign contractors by offering the opportunity to utilize the resources of the institutes at a reasonable price and solve the problem of obtaining licenses. Although an alternative target for such collaboration *could* be local contractors, Chinese design institutes have more qualified professionals and enjoy better financial standing [43].

### **Market entry – a summary**

By extending Porter's entry strategy theories, a conceptual model has emerged for facilitating foreign contractors' entry into the Chinese construction market and this has been illustrated in Figure 2. As shown in this figure, the model offers foreign contractors three 'modules' for exploiting sustainable growth opportunities in China. The three modules are: collaboration (with local design institutes), (targeting) FDI projects, and adopting a design-and-build (differentiation) strategy. The last two modules were derived by considering, in context, Porter's two suggested 'penetration strategies', while the first was chosen as the most promising way to deal with many of the entry barriers (identified earlier) that attend attempts to do business in China.

Module 1 is to form collaboration with design institutes for new opportunities. The prime motive for this collaboration is to achieve synergistic competitiveness. While other types of collaboration are possible, effectively maintaining strategic alliances with Chinese design institutes is recommended.

Module 2 is to focus on foreign direct investment (FDI) projects: not only is this supported by theory [40] but is the most practical approach in view of present Chinese regulations. It has further been argued that foreign contractors should seek to differentiate themselves in the service they offer clients; that this differentiation might relate to the project delivery strategy, and that in the context of its current status in China the design-and-build procurement route offers most potential. Thus, whilst all FDI projects may be seen as potential targets, the greatest potential lies in those whose clients may be amenable to a design-and-build approach. Thus Module 3 is to strengthen foreign contractors' design-and-build capacity in China. This objective can be best approached by effectively cooperating with local design institutes in each phase of the design-and-build process, namely: preparation of the contractor's proposals, joint submissions to relevant authorities (e.g. Local City Planning Bureau), using design institutes' licenses, producing detailed design (primarily by design institute personnel), engaging subcontractors, all the way through to hand-over of the projects to clients.

The three modules should be implemented in an integrated manner because they are interrelated and self-supporting. Foreign contractors enjoy advantages in securing FDI projects, and the design-and-build route offers them opportunities to be innovative. But to be successful, these projects need the complementary collaboration of local design institutes to overcome government restrictions, market barriers, and technical barriers.

## **Conclusions**

The Chinese construction market is attractive to many foreign contractors and these contractors have important decisions to make concerning their entry strategies. A strategic model has been proposed which emphasizes the strengthening of design-and-build capacity, effectively maintaining strategic alliances with Chinese design institutes, and focusing on foreign direct investment (FDI) projects. It is clear that in China the use of design-and-build is slowly catching-up with international practice: a recent review has found it to be a 'modest and emerging' segment of the construction market. It appears that the Chinese institutional environment remains a barrier to its more wholesale adoption,

and that Chinese design institutes may have an important facilitative role to play in modifying design-and-build to suit this environment. It has also been argued that design-and-build is a feasible entry strategy that allows foreign contractors to realize synergistic complementarities from collaborating with appropriate design institutes. Indeed, given the particular barriers involved, entry through a strategic alliance with a Chinese design institutes appears to be critical for a foreign contractors sustainable growth in China.



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## **Captions to tables and illustrations**

**Table 1** The evolution of design-and-build related regulations

**Table 2** Profiles of various project delivery methods using by foreign contractors

**Figure 1** Types of design institutes 2002 ( Source: Department of Quality and Safety Supervision and Sector Development 2003)

**Figure 2** An entry model using design-and-build

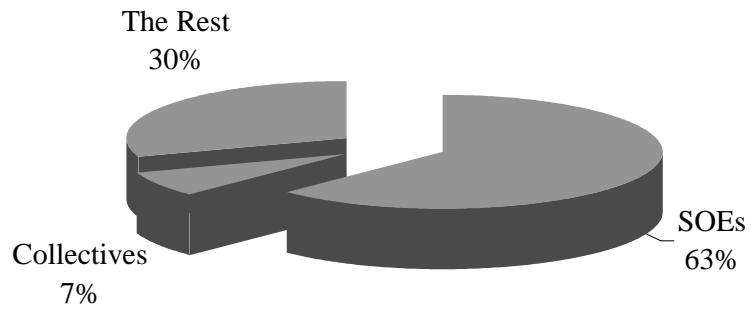
**Table 1** The evolution of design-and-build related regulations

Title of the Regulation	Guidance related to design-and-build	Dates of the regulations released
'Provisional Decree for Several Issues About Reforming of Construction Industry and Capital Construction Administration Regime'	The scope of the work of engineering construction companies should cover part or all of following process: feasibility studies, soil investigation, land survey, design, equipment and material purchasing, construction, preparation of production and hand over.	September 1984 by The State Council
'Decree of Qualification Administration for Design Institutes' <i>Gong Cheng Zong Cheng Bao</i> '	The MOC started to grant Grade A and Grade B <i>Gong Chen Zong Chen Bao</i> licenses (Design-and-Build Licenses) to qualified Design Institutes.	November 1992 by the Ministry of Construction
Construction Law	Clients are encouraged to procure construction projects through design-and-build ( <i>Gong Chen Zong Cheng Bao</i> ) route, while ban for procuring construction projects by breaking down project unnecessarily.	1997 by the National Congress
'Guidance for Large Design Institutes Moving Towards International Mode Engineering Companies'	Enable design-and-build capacities of large Design Institutes.	August 1999 by the Ministry of Construction
'Several Suggestions on Reforming of Design Institutes'	Design Institutes should form a technological and managerial engineering consulting and design service system for the whole process of fixed asset investment.	September 1999 by the State Council
'The Guidance of About Breeding and Developing <i>Gong Cheng Zong Cheng Bao</i> and Project Management Enterprises'	To waive No. 805 (1992) ordinance. The MOC is encouraging Design Institutes and Construction Enterprises to develop design-and-build and project management capacities. The services of Design Institutes and Construction Enterprises should to be more linking up with international practice.	February 2003 by the Ministry of Construction

Source: MOC regulations

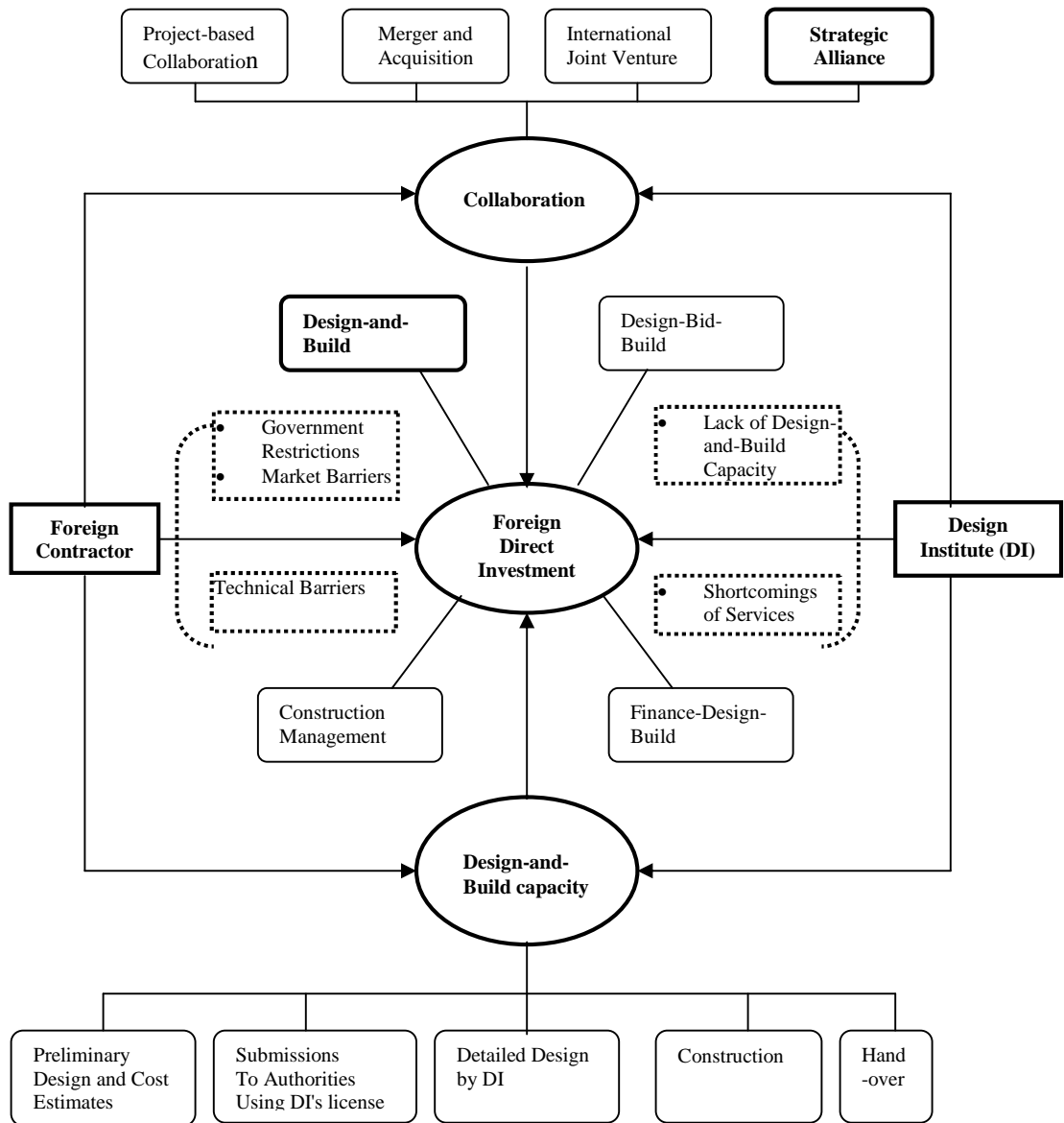
**Table 2** Profiles of various project delivery methods using by foreign contractors

Foreign contractors' project delivery methods	Competitiveness	Competitiveness of local rivals	Profitability	Entry Barriers
Design	Low to Medium	High	Low	High
Construction	Low	High	Low	High
Design-and-build	High	Low	High	Medium
Concessionary delivery (e.g. BOT, PFI)	High	Low	High	Medium to High
Construction Management	High	Low	Medium to High	Low
Real estate development	Medium to High	Medium	High	Medium
Specialist subcontracting	High	Medium	Medium to High	Low



**Figure 1** Types of design institutes 2002 ( Source: Department of Quality and Safety Supervision and Sector Development 2003)





**Figure 2** An entry model using design-and-build