

Construction Market and Construction Firms in China: Strengths, Weaknesses and Development Trajectory

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About the Author

Vishnu Sridharan is a third year student at Stanford Law School. After graduating from Magna Cum Laude from Columbia College in 2004, he spent two years as a Peace Corps Volunteer in El Salvador, focusing his efforts on increasing municipal transparency and facilitating citizen participation in their government. Vishnu's current work and research interests center on legal reform strategies in China. Vishnu worked in Shenzhen for a labor rights NGO in the summer of 2007, and he spent the summer and fall of 2008 working with GTZ Legal Advisory Services and the ABA Rule of Law Initiative in Beijing. After graduating in May 2009, Vishnu plans to continue working in and writing about legal, political and economic developments in China.

Introduction:

With China's quick and massive recent economic development, it is no surprise that many people consider it 'the' construction market for the 21st century. However, several significant weaknesses plague the market, in addition to the weaknesses that plague the Chinese and international construction firms that are attempting to capitalize on the market's opportunities.

This paper will first examine the strength of the Chinese market and show why there is much reason to be optimistic about its prospects. It will then outline the greatest weaknesses of that market and the construction firms operating within it. To close, it will comment on the trajectory that the market will likely take in the short and long-term.

This paper was prepared based on lecture notes, personal interviews and power point materials collected at the Institute of International Engineering Project Management (IIEPM) Summer 2007 conference, which took place at Tsinghua University from July 9-20. The two-week program – attended by students, practitioners and academics from around the globe – offered an intense but comprehensive introduction to the legal, political, social and economic environment of construction work in China. In essence, it offered an introduction to the practices that local and foreign construction firms need to master in order to survive and grow in the Chinese market. Conference instructors came from different organizations with various educational and professional backgrounds, including university professors (local and overseas), governmental officials, Architectural, Engineering and Construction (AEC) firm management, client organization representatives, lawyers and consultants.

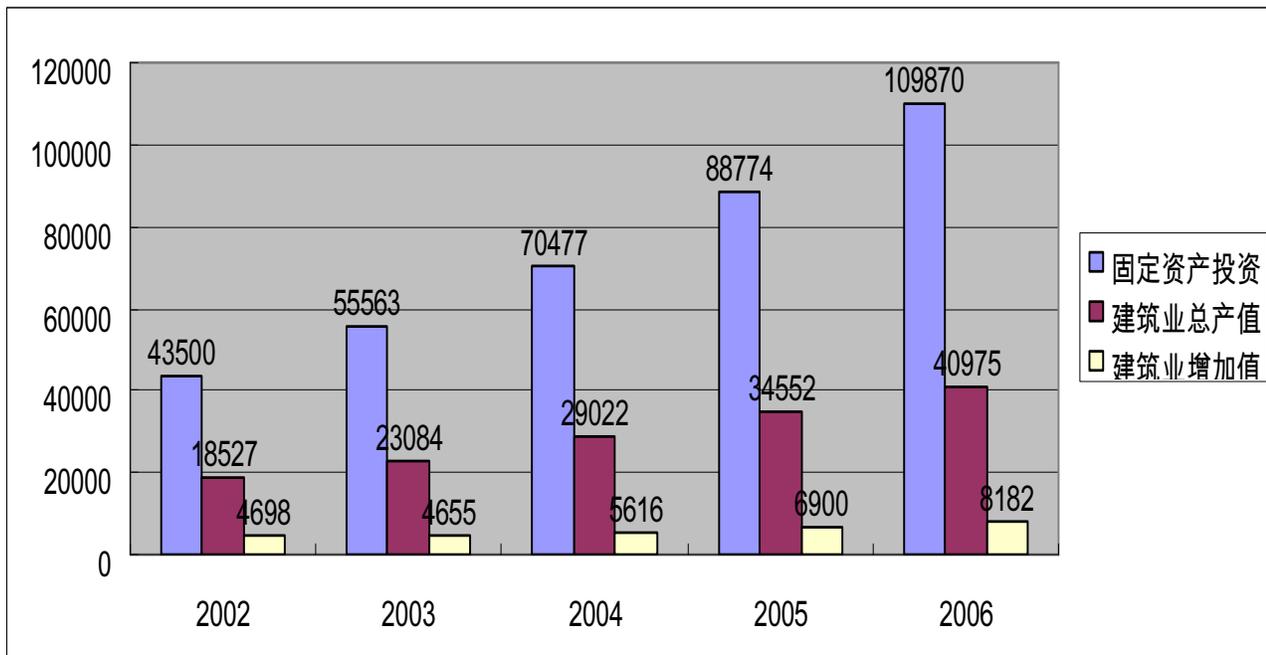
This paper offers a broad, industry-wide, China-wide, "helicopter view" of all that is going on in the Chinese construction industry. It will be of interest to several audiences. Western

construction firms seeking Chinese joint venture partners will gain useful insights into the strengths and weaknesses of their Chinese counterparts. Western investors and developers looking for capital investment opportunities will gain both a unique perspective of the macro-trends that are now sweeping China, but also a sober appreciation for the “on the ground” implementation challenges of actually getting permits approved, contracts signed, projects developed, and disputes settled. Researchers and practitioners from the fields of construction management, legal studies and project finance will come to a fuller understanding of the state of practice—and the research, education and consulting opportunities—that exist as China conducts what may be the largest program of urbanization and building construction in human history.

Strengths of the Chinese Construction Market and Construction Firms

Clearly the greatest strength of the Chinese Construction market is its size. Investment in fixed assets, construction market GDP and the added value of the construction market in China have more than doubled in the last four years alone (see Fig.1). With this fantastic growth, which looks to continue well into the future, Chinese contractors are assured ample business opportunities in which to hone their management practices and business approach. The capacity of the Chinese Construction market is also illustrated in the sheer volume of Chinese participants: as of 2005, there were 15,545 design firms and 104,297 construction firms in China, employing upwards of 40 million people. Altogether, China currently consumes 25% of the world’s output of steel.

Figure 1: Investment in fixed assets (blue), GDP of construction industry (red) , construction industry added value (white) from 2002 to 2006 (100 Million Yuan)



Source: Presentation by Hui Zhao, IIEPM Conference, Beijing, July 12, 2007, Deputy Director of Rural Development Department, China's Ministry of Construction, 2007.

Other trends in China also point to the opportunities available within its construction market. For instance, China is currently undergoing an amazingly strong and rapid process of urbanization. While this is of course true for major cities such as Beijing Shanghai, and Guangzhou, the effects can be seen in hundreds of 'smaller' cities throughout the country's 23 provinces. For instance, in the centrally located city of Chongqing, 453,400 people become part of the urban population every year, and between the years of 1998 and 2006, the percentage of the area's population that was considered 'urban' grew from 14 to 46.7¹. Although part of this change must be attributed to the growth of the cities themselves – accompanied by the seizure of

¹ For further discussion of China's urbanization, and especially the case of Chongqing, see "Urbanisation in China: China's Chicago," The Economist Print Edition, July 26, 2007, available online at http://economist.com/world/asia/displaystory.cfm?story_id=9557763

neighboring lands and relocating its people to the ‘city’ – the net effect on the construction market is the same: an unprecedented need for new residential buildings and service facilities for the growing urban masses.

In addressing the demands of these increasing populations, many smaller city governments are forced to go beyond their traditional sources of funding. Luckily, China’s ‘opening up’ has provided these governments with many new options, including the following: listing their projects on the stock exchange, issuing enterprise bonds, seeking loans from foreign governments, finance leasing (since foreign banks can’t directly loan them money), concession contracts, and most relevant to our discussion of the Chinese construction market, Public-Private Partnerships (PPPs). These small cities’ increasing need for municipal services has led a large number of them to seek private funding, although one must note that the regulations regarding foreign involvement in government projects vary depending on the sector. That is to say, although even national defense projects are technically open to foreign investment, the applicable regulations make certain investments much more alluring than others. For instance, there are strict limits on foreign ownership in the water supply sector, whereas in the wastewater treatment sector there are no such regulations. In fact, by one estimate by Jumbo Analyses, over 70% of Green-land wastewater treatment plants involved some sort of PPP² (Liao Zhang, 2007). As such, it is clear that the market for such cooperation has already taken hold in China, and will continue to expand as the march toward urbanization continues, especially in those sectors with less governmental restrictions.

Also worth noting in examining the construction market in China is the relatively recent change in government regulations with respect to national residential patterns. For instance, up

until 1997 most Chinese people were assigned a government house, often with minimal space and sparse luxuries. In addition, foreigners who wished to reside in Beijing were relegated to ‘foreign zones,’ zones in which exorbitant rents were charged. Now that these restrictions have been lifted, many Chinese people are looking to find places to live that offer more amenities, while foreigners are looking to maintain their lifestyles in more comfortably priced locales. This has resulted in a boom in the luxury market³ (similar to that seen in the rest of the world), and an increase in the “square meters per person” that are being demanded by the Chinese, especially in major cities such as Beijing.

Two other trends worth noting in our evaluation of the Chinese construction market are China’s industrialization and massive growth population. China’s GDP has grown by more than 8% a year since 2000 and is forecasted to continue till 2010 (see Fig. 2). During this time, China has starkly moved away from the agricultural industry toward low-skill, labor intensive industries such as textiles and simple electronic good (such as toasters, fans and TVs). China’s ability to support these industries has depended crucially on its enormous population, a population that will continue to grow at a rate of 1.1% for the coming years. Although this number appears quite small, given a population base of over 1 billion, growth at a one percent rate provides scores of labor for new factories and industries throughout the nation, and also readily explains why China is the largest consumer of basic foods and industrial goods in the world.

Of course, the construction industry is a huge benefactor of the presence of cheap labor in China. In fact, many experts in the field tout low-cost labor as one of the greatest strengths of

³ Jessie Ho, “Luxury housing leads ongoing property market boom,” Taipei Times, July 19, 2007, online at www.taipeitimes.com/News/biz/archives/2007/07/19/2003370323.

China's construction industry. The savings aren't simply in the low wages that are paid to construction workers though; savings are also found in the amount of time these workers are willing to work and the conditions they endure. The laws regarding

Figure 2. China's real GDP change, past and future forecast.



Source: China Economic Intelligence Unit, 2007.

overtime in China are rarely enforced, and stories of Chinese workers toiling 3 shifts a day, day and night, even through national holidays, are commonplace. Also, many Chinese contractors dedicate a relatively miniscule percentage of their funds to addressing occupational safety, health and environmental concerns of their projects. Ethical issues aside, one result of these streamlined costs is that Chinese firms are often able to complete projects very quickly and at very low (financial) cost.

With the urbanization, industrialization and increasing wealth of the Chinese, it is no surprise that more international businesses are currently seeking to establish a firm presence in China. This results in a Chinese construction market, especially in large cities, that has an influx of insurance companies, banks and other professional service providers. However, in most cities, the available 'Grade A' office space⁴ constitutes far less than 10% of the total available office space. Ernst and Young and Price Waterhouse Cooper are just two of the corporations that have recently had to scramble to find the high-end, Grade A office space that they need to conduct their business in Beijing, and Beijing has the best office space in the whole country. As China's wealth continues to grow, it cannot be doubted that more firms will look to have a brick and mortar presence in the country. As a result, high quality office space will continue to be in great demand, and those in the Chinese construction market are sure to take note.

One strength of Chinese construction firms both in their own market and abroad is that they can often avail themselves of generous governmental financing (although we will later see that, in other cases such as those of PPP, governmental financing is a weakness). In bidding for aid-funded projects in Zambia, for instance, China has a marked advantage over other firms because it can provide cash 'up-front' for the 2% bid bonds that are required under World Bank bidding rules⁵. Zambian firms have much more difficulty accessing such capital, which leaves Chinese firms with a great, usually insurmountable competitive advantage. In addition, these Chinese government/bank loans can be crucial when projects (domestic or international) run over-budget or encounter unexpected difficulties.

⁴ As classified by Jones Lang LaSalle, based on the office building's characteristics such as location, wiring, insulation, back-up power generators, floor-to-ceiling height and the quality of property management.

⁵ Peter Mukalula, Lecturer at Copperbelt University in Zitwe, Zambia, personal interview, Beijing, China, July 9, 2007.

Last but not least, the Chinese construction market –like all other markets in China – have become more welcoming to foreign investment in light of China’s accession to the WTO in 2001 (Lu and Wang, 2002). Now that their 5-year accession anniversary has passed without major cause for concern, many international corporations should feel more secure in their investments in the region given WTO investment protections. In addition to allowing greater investment in the sector, accession has also benefited the construction market by increasing governmental transparency in their legislation and approvals, and the decreasing of restrictions on the sectors in which fully owned foreign entities could invest or own. Now that we are in 2007, the three year “transition period’ for the construction industry and the five year transition for the design and build industry are also over, and the Chinese construction market is officially completely open for foreign involvement.

Weaknesses of China’s Construction Market and Chinese Firms

According to Professor Hubert Vaughan, currently a consultant for the Chinese government on mega projects such as the 2010 Shanghai Expot, more than 80% of construction projects in China don’t finish on time or on budget. Moreover, he contends, the progress of projects are difficult to measure at any point in time, project baselines are often ignored, valuable man-hours are shamelessly wasted and there is a general inability to schedule and manage resources⁶. He attributes these disappointing results – which not only impact domestic efficiency but also pros-

⁶ See also “Managing construction projects in China – the transitional period in the millennium.” William K Chan, Francis K W Wong, David Scott, International Journal of Project Management Vol 17, No. 4, pp 260-1, 1999, for difficulties of Project Management in China how they have changed little over the intervening 8 years.

pects for joint ventures⁷ – to what he deems the Chinese ‘Do-and-Fix’ (DAF) methodology (see Fig. 3), which he contrasts with the more ‘Structured Methodology’ of much of the rest of the world.

The core difference between the DAF and structured approach is that with the DAF methodology, there is less emphasis on early planning, and as a result many changes in design and structure occur throughout the construction process. In addition, instead of the utilization of human resources ‘as needed’ (i.e. planners at the beginning, hard laborers only after the design is completed), under the DAF methodology, all employees are employed for the entirety of the project. This leads to a large waste of money and man-hours, but given China’s large need to provide employment to its people, this particular aspect is generally accepted. Under the Structured Methodology, on the other hand, extensive planning is undertaken, the initial plan is generally adhered to and manpower is only employed when needed.

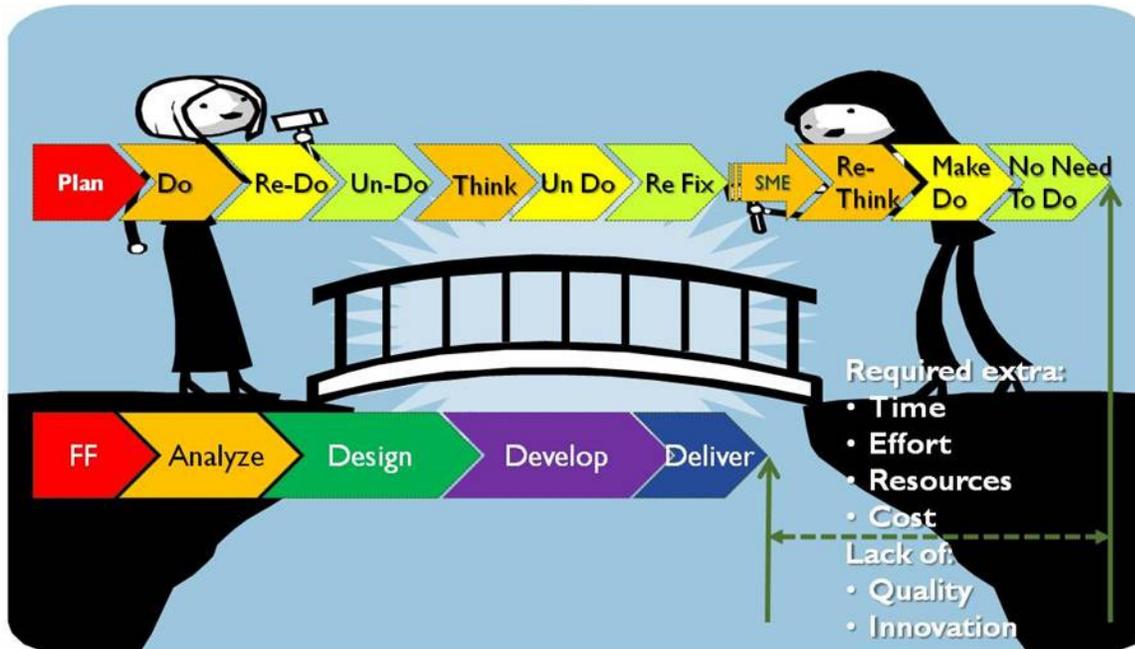
One reason for the prevalence of the DAF methodology in China is the presence of projects that are primarily political in nature, which are done for namesake if nothing else. These government projects are typically poorly defined, lack specific goals and detailed plans, and provide no measureables with which to quantify success. According to Professor Vaughan, one example of such a political project is 2010 Shanghai Expot. Since the details of the project are completely up in the air, the government leader who ordered the program is free – and expects to be able to – change his mind at any point

Figure 3. DAF v Structured Methodology.

⁷ See “Risk Assessment for Construction Joint Ventures in China,” Shen, L. Y., Wu, George W. C., and Ng, Catherine S. K., *Journal of Construction Engineering and Management*, January/February 2001, 76-81 for a discussion of the specific risks facing joint ventures in china.

The Do And Fix (DAF) vs. Structured Methodology

II



Prof. Hubert Vaughan - Institute of International Engineering Project Management, Tsinghua University - 2007-07-10

Source: Presentation by Professor Hubert Vaughan at IIEPM Conference, Beijing, July 20, 2007.

during the construction process and have her whims accommodated. Another example of such a project is the National Stadium (also known as the 'Bird's Nest) in the Olympic Village , in which the Beijing 2008 Olympic opening and closing ceremonies are to be held (See Figure 4). The specs to this multi-billion dollar project were changed when political pressure from academics and politicians led to the scrapping of the originally planned retractable roof, with the rationale that since China was a developing country, it could not afford such luxuries. The post-

contractual change did save China 37-40 million dollars USD⁸, but it also resulted in a serious drop in the price of the National Stadium, as all post-Olympic events and concerts held in stadium will be vulnerable to rain cancellations and inclement weather, in addition to reducing the Stadium's brand value and delaying the construction schedule by half a year (Wang 2007). In order to adequately compensate the private parties who will lease the stadium after the Olympics, the contract is set to be re-negotiated at the termination of the games. As we can see, with these kinds of political/namespace projects, planning is almost impossible and wastes are inevitable, and as a result Professor Vaughan urges construction firms to reject such offers.

In fact, the ability to change one's mind during a construction project is common throughout China with any kind of project, even outside of the government sector and political projects. Chinese customers expect that, if situations change or they simply change their mind, they will be able to modify the specifications of a building as desired. Moreover, most project managers within Chinese construction firms are unwilling to say 'No' to any of these requests, since they view the customer as the ultimate sponsor and because culturally they wish to avoid conflict and resolve issues harmoniously. Although this may eventually lead to a satisfied customer, it also results in much waste and the propagation of habits that are shunned by international construction firms.

Figure 4: Beijing's Olympic Village; National Stadium (sans roof) on the right.



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Source: Presentation by Lu JianZhong, at IIEPM Conference, Beijing, July 18, 2007.

The instability of the Chinese construction market in which firms must operate has many other sources. First and foremost, as hinted at in the previous paragraphs, contracts are not honored and are considered malleable subject to *ad hoc* opportunism. Four main factors make this so: 1. Relations before business. In China, *guanxi* is the basis of most business transactions (Phen and Leong, 2000), and since these personal connections are strong there may seem to be less need for formalities such as contracts. The reliance on *guanxi* is also problematic for contract enforcement because those agreements are often rooted in a particular personal relationship as opposed to the legal structure. As a result, if an election (or imprisonment) leads to a change of the government official with whom a business has negotiated, it may find yourself completely out of luck if the new official is not sympathetic to that agreement (which is quite likely if the past official was corrupt). This is especially problematic at the local level of government, in which personnel changes are more frequent. 2. State owned enterprises. As mentioned earlier,

with government enterprises there may be less of a concern with money and time rather than politics and image, so contracts might not be so important. Moreover, if the company is not publicly listed, there are not a large number of independent stakeholders who will suffer a direct financial loss if the project is late or over-budget. 3. Not a litigious society. Culturally, Chinese firms are more inclined to resolve disputes harmoniously and informally, and there is not a common practice of looking to third parties like courts for help. 4. Weak courts. Courts in China lack the independence they need to be impartial, and are decentralized to such a degree that uniformity in legal enforcement cannot be expected in any given locality (Guo, 2006). Thus, the enforceability of contracts is quite undependable, especially at the local level in which governmental relations and personal expediency likely trump most formalities. Given all these factors, it is no surprise that the vast majority of contracts are renegotiated, those that aren't end in arbitration and that international firms put little stock in the contracts they sign.

Another source of instability relevant to the Chinese construction market is the fact that China is such a rapidly developing country. With such a quickly growing economy and changing society, construction regulations also change quickly to meet new demands and respond to new political pressures (See Figure 5 for recent changes in relevant PPP laws). For instance, in 2002 the Chinese government outlawed having fixed returns Build-Operate-Transfer agreements. As a result, all companies that had signed fixed return BOTs at the time were left with worthless contracts, and most were forced into arbitration to mitigate their losses. The legal framework is even more perilous in light of the fact that there is no national law regarding PPP; as a result, companies both foreign and domestic must depend on provincial governments (which are often much less competent and have a paltry understanding of the nature of PPP agreements) in determining the relevant legal framework, which often consists of multiple laws that sometimes are in

conflict. An example of changing regulations due to political pressures happened in the construction of the National Stadium as discussed earlier, and the recent 5th Ring Road in Beijing. Although the initial PPP contract called for the road to be a toll road, after increasing discontent among citizens within China and frequent traffic jams on the 4th Ring Road, the government decided to renege on the contract and remove the toll⁹. Although the contracting parties were compensated for the change, the terms were never made public, and thus this provides little solace to those worried about the stability of Chinese regulations regarding construction projects.

Governmental regulations regarding the tendering of construction projects are also largely inefficient. Unlike in most Western nations, in China, when evaluating bids for governmental projects, points are deducted from bidders whose price falls below the established ‘reasonable price’. Clearly, this method works against any bidder who is more efficient or innovative, and as a result firms are encouraged to submit bids with costs that are greater than their actual needs, for in doing so these firms not only net themselves more money but also increase their chances of winning the governmental contract. One more reasonable alternative to this practice that has been proposed is to give extra points at a set scale for the amount they fall below the reasonable price. The bidders who bid below that price can then be interviewed and questioned as to how they derived their price, and be asked to prove that they are able to carry out the work more efficiently than their competitors (Zou *et al*, 2007).

Another issue with the government’s regulation of the tendering process relates to its assessment of construction plans for its projects. In general, the time given to the governmental experts to evaluate all private bid submissions, which consist primarily of construction plans, is

⁹ “Beijing 5th-ring road stops collecting vehicle passing fee,” December 30, 2003. Beijing Daily, available online (in Chinese) at www.enviroinfo.org.cn/Environment_Protection/Government_Activities/

f123013_en.htm.

between half a day and a full day, with a small payment in the range of \$50-200 RMB (Zou *et al*, 2007). However, half to one day is insufficient to assess four or more construction plans comprehensively, particularly in the case where the experts are not given any information regarding the project nor the plan itself. This practice leads to shoddy, incomplete governmental evaluations and makes it more likely that issues will be missed in the plan that will only complicate the project at some point during its development.

Current laws regarding land ownership in China also undermine many opportunities in the Chinese Construction market. First and foremost is the inability for anyone, public or private, to actually own land within the nation (the only exception being ‘commonly owned’ land, which is a classification that is applied in rural areas to promote sustainable farming). Commercial land can be leased for 50 years, and residential land for 70. Although the government has made gestures toward property ownership more like the western world¹⁰ – such as recent legislation guaranteeing that residential leases will be ‘automatically renewed’ (although possibly with a fee) – the differences in land ownership continue to effect both commercial and residential construction market in China, especially for foreigners. For instance, Hong Kong continues to be unable to turn a profit on its subway lines in Shenzhen, largely because it cannot own the relevant land, while Chinese firms who are easily turning a profit on all other lines. Lastly with respect to property ownership, the Chinese Construction Market suffers because most buildings do not have one owner; instead, they are ‘strata-owned,’ a system in which a different person lays claim to each floor or group of floors in the building. This weakens the market for many reasons, including the difficulty of high-name international firms (such as Ernst and Young) to

¹⁰ “Property Rights in China: China’s Next Revolution.” *The Economist*, May 8, 2007. Available online at http://economist.com/opinion/displaystory.cfm?story_id=8815075

buy large office buildings to meet their professional needs. Most of these firms are unwilling to have to deal/negotiate with many different owners (or to simply own a couple of floors in a building), and thus have a much tougher time finding the types of accommodations that they need. In addition to making transfers of entire buildings more difficult, strata-ownership leads to more rapid depreciation of the value of each entire building, as different land owners are prone to care for and manage their respective parts in widely varying ways, with widely varying results.

Figure 5: Recent Legal Changes in PPP-relevant Regulations



Source: Presentation by Wang ShouQing at IIEPM Conference, Beijing, July 17, 2007.

Many other weaknesses of the Chinese construction market and Chinese construction firms stem from the relative immaturity of the market. Put simply, some Chinese people are not accustomed to the way that the free market operates. For instance, in February 2007 when the Chinese stock market saw its largest drop in a decade, many people who owned stocks went to the stock market building to complain, as they believed it was a violation of their rights to lose money on their investments. Also, landlords who own land are in the habit of continually raising their rents, even in times in which their actual land values are dropping. This unclear understanding of the risks and benefits of investments in the free market throughout Chinese society has important ripple effects for the market, not the least of which because of the real possibility that the real estate market (and stock) will overheat in the near future, leading to dramatic losses and possibly massive social unrest in the nation. The government, which does see a real estate market overheat as a very serious problem (although they publicly state that the overheat will ‘definitely’ not happen and many others agree that it is unlikely¹¹), has taken measures to make this less likely, such as by limiting foreign investments in real estate and clamping down on inflation.

On the government side, regulatory policies and relative market immaturity also contribute to the weakness of the Chinese construction market and their firms’ competitiveness. Firstly, government regulations and slow approval processes make PPP financing difficult. Since every financial decision must be approved by the finance ministry and other governmental agencies – each of which is separate from each other department and engages in independent decision-making – complex financial agreements are difficult to implement. This is especially true of those agreements that require financing over long periods of time, as personnel in each depart-

¹¹ “Economic Focus: Home Truths,” *The Economist*, July 5, 2007. Available online at http://economist.com/finance/displaystory.cfm?story_id=9440844.

ment will change, and each approval is another chance for the financing liquidity to be stopped. Another result of the excessively intricate approval processes for government financing – and financing from government operated banks such as the China ExIm bank – is that many of these agencies are not considered reliable, which is also partly due to the fact that these institutions have a high debt-to-asset ratio. Altogether, the poor creditworthiness of these main Chinese financiers hurts not only PPP agreements and joint ventures with foreign private international firms, but also their ability to provide loans to their own domestic construction firms to compete both within the nation and internationally.

One last negative effect of the immaturity of the Chinese market on Chinese construction firms is through the medium of currency fluctuations. The Yuan has rapidly appreciated in value in the past couple of years, and with these rapid changes it becomes more difficult for international firms to guarantee their returns, even in joint ventures with local firms or governments. Yet, most believe that the Yuan will not wildly fluctuate in the near future, and most firms can satisfactorily mitigate this risk through proper contract clauses (difficulties of enforcing contracts aside) and currency hedges.

Other great weaknesses of Chinese construction firms relate more to their internal workings than their environment. Firstly, the labor that man most of their projects are migrant workers, both those that travel from their farms to work in less busy agricultural seasons and those that are ‘relocated’ to the city and give up their former work. Both of these groups of workers are highly unskilled (and accident prone if not thoroughly trained), and the first groups’ continued reliance on farming leads to frequent labor shortages during peak harvest seasons. On the higher level, there are few good project managers within Chinese construction firms, and as such they are in very high demand. The lack of good managers is, among the other factors discussed

above, largely responsible for the prevalence of lagging, inefficient projects that are hugely over-budget, in addition to poor communication between the firm and the client, unnecessary safety mishaps and poor resource utilization. Lastly, Chinese construction firms face difficulties abroad because their professional licenses are oftentimes not internationally recognized. One speaker quipped that only about 10% of China's huge number of engineering graduates can obtain engineering qualifications in the United States or Europe.

Next in our discussion of the weaknesses of China's Construction market and its firms, we examine the issues that these firms are facing in their attempts to move into the international scene. In many ways, these weaknesses can be seen as natural extensions of the weaknesses in their own domestic market.

Probably the largest issue that Chinese firms face abroad is their lack of familiarity with the regulations that much of the European Union and United States have in their construction markets, especially with respect to environmental standards and the treatment of labor. We can see China's lack of experience in relevant international standards through one example construction project, in which many of these issues arose: in 1997, China Communication Construction Company (CCCC) prepared a bid for a project to do work on the Bay Bridge in San Francisco. Their bid of 400 million was less than one-third of the bid that eventually one, 1.4 billion, from Fru-Con. Yet, the real twist in this story is that Fru-Con never had to compete against the significantly lower bid, because CCCC never even submitted it.

Why? CCCC representative Jianzhong Lu cited three reasons. First, CCCC was intimidated by the environmental restrictions that were in place on the bridge construction. The project specs informed CCC that their construction "couldn't disturb the birds in the morning" and "couldn't allow to rust to enter the water"; CCCC, like most other Chinese construction firms

(Zeng, 2003), did not even know where to start in addressing these concerns, nor did they have anyone on staff to help them. In China, to say the least, the environmental restrictions they had confronted were far less stringent. A second concern of CCCC was their inability to deal with labor unions in the United States. Lu noted that laborers in China are accustomed to working up to three shifts a day, overtime every day including weekends. However, from what he had heard such practices would not work in the U.S., and the visa processes were such that they could not simply import all of their own labor. The last concern of CCCC, intricately connected to other two, was the highly litigious nature of the United States. At least in his perception, any mistakes in the U.S. could lead to costly and lengthy lawsuits, and the CCCC didn't have the personnel to deal with this situation either. In his recollection, CCCC had never been 'taken to court' in China for any such reason.

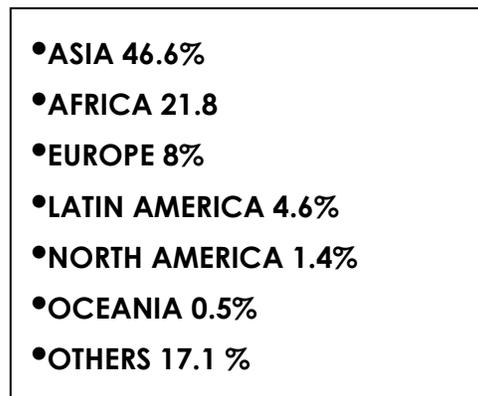
Needless to say, Chinese firms' greatest successes are highly concentrated in markets in developing countries that more closely resemble their domestic scene, such as Africa¹² (See Figure 6). In such markets, they can often bring their own labor, work them as they please, and pay about as much attention to environmental concerns as they are accustomed. Lastly, there is little concern about being taken to court in these countries, especially as most of them are quite grateful for the Chinese projects they receive, which are usually at a significantly lower economic cost than other international bids, as evidenced by the Bay Bridge example, and by other reports that Chinese firms typically undercut Western competitors in Africa by 40% or more. However, this is also a weakness of the firms in the larger picture, as their investments are heavily concentrated

¹² In addition, there has been some work suggesting that Chinese culture is particularly apt for joint ventures in certain Southeast nations. See "Kwan, Ang Yee and Ofori, George (2001) 'Chinese culture and successful implementation of partnering in Singapore's construction industry', *Construction Management and Economics*, 19:6, 619 - 632.

in the most instable and volatile regions of the world, and their profit margins in these areas, if they exist at all, are often well below 5%¹³.

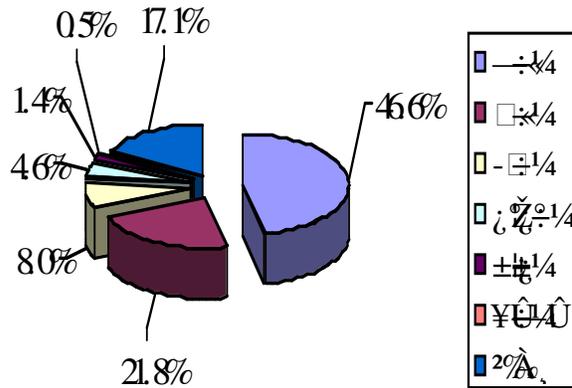
One last weakness to note of Chinese firms attempting to do work abroad (and even much of their work at home) is that, when faced with international competition on all fronts, Chinese firms generally only win contracts that are focused on low-end work¹⁴. That is to say, international projects and joint ventures in China are generally designed and managed by non-Chinese and built by the Chinese. The strength on the labor side of projects connects with the huge population boom in China, as noted earlier, and closely mirrors what is perceived as the strength of China's economy in general (Lu and Wang, 2002). In addition, the weakness in higher-end services ties into the issue discussed

Figure 6: Geographic Distribution of Chinese Overseas Investment in 2004



¹³ See generally "Risk management framework for construction projects developing countries," Shou Qing Wang, Mohammed Fadhil Dulaimi, Muhammad Yousuf Aguria, *Construction Management and Economics* (March 2004) **22**, 237-252.

¹⁴ See Raftery, J., Pasadilla, B., Chiang, Y.H., Hui, E.C.M. and Tang, B.S. (1998) "Globalization and construction industry development: implications of recent developments in the construction sector in Asia, *Construction Management and Economics*, 16, 735, anticipating the difficulties of China moving into high value-added services almost 10 years ago.



Source: Chinese Ministry of Commerce, 2007.

earlier regarding Class A office space: the majority of buildings that the Chinese have built and designed in the past are created to meet the needs of their domestic firms. As a result, Chinese firms are generally unfamiliar with the sorts of requirements that international corporations have with respect to their office space and similarly with the sorts of buildings that are generally sought after in the developed world.

One last challenge confronts Chinese construction firms as they attempt to increase their involvement abroad: Chinese companies are relatively small when compared to their multinational corporation competitors. Although when taken together the many separate Chinese corporations look huge, there is in fact no capital and human resource relationship between these corporations, forming little firm basis for co-operation and collaboration. Even the biggest of China's 104,297 firms has only 3,000-4,000 employees and approximately 3 million RMB contract turnover each year.

We will close this section by discussing some of the difficulties of international firms setting up in China and participating in the Chinese construction market. Before starting however, we must note that both the strength of the Chinese market and above-listed weaknesses of Chinese firms would suggest that international opportunities abound in the country, and, if we judge them based on their behavior, most multi-national corporations seem to agree.

Oddly enough, China's accession to the WTO has actually had the perverse effect of radically decreasing the number of Foreign Investment Construction Enterprises (FICE) in China, with foreign market share falling from about 6% to the current level of 3%. The primary reason for this drop is the requirement of foreign enterprises officially registering within China. The requirement for obtaining 'Class A' status, the status with the most privileges and investment opportunities within China, are quite stringent, including high investments within the country and having at least 200 professionally registered Chinese engineers on staff. And even after satisfying all of these requirements, Class A firms are still only able to invest a maximum of 50 million dollars in a project, which limits them to participating in projects with an overall value of less than 250 million dollars USD. Given the large hurdles to obtaining the qualification and the paltry rewards (at least for now), it is of little surprise that, of all of the FICE registered in China, only 79 have Class A status (about 6.64% of the total FICEs in China), and over half of those are from Hong Kong. Figure 7 summarizes the other challenges that foreign firms face in the Chinese construction market, in addition to strengths and opportunities, as perceived by a project manager at one of the largest construction firms in Hong Kong.

One researcher who has done extensive research on risk management by international firms in China is Professor Wang ShouQing at Tsinghua University¹⁵. He has itemized the

¹⁵ Most recently, "Analysis of political risks and opportunities in public private partnerships (PPP) in China and selected Asian countries: Survey Results," Chinese Management Studies, Vol. 1. No. 2, 2007.

unique and critical risks faced by international firms in China's PPP Projects and the relative success of various mitigating measures. His conclusions are presented in Figure 8. The boxes on the left show the risks while the boxes on the right show the mitigating measures. The numbers in the boxes on the right indicate the relative efficacy of the mitigating measures, on a 1-5 scale.

Figure 7: SWOT Analysis

SWOT of Foreign Contractors Operating in China	
<u>Strengths</u> <ul style="list-style-type: none"> •Technological Advanced •International Experience •Awareness on HS & E •Sustainability Sensitive •Project Management oriented Foreign Client preferred 	<u>Weaknesses</u> <ul style="list-style-type: none"> •No Local Network •Lack of Local Resources •High Cost •Not Familiar with Local Statutory Regulation
<u>Opportunities</u> <ul style="list-style-type: none"> •Increasing Turnover •JV with Local Strong Contractor •PPP or PFI •Higher Return 	<u>Threats</u> <ul style="list-style-type: none"> •Local Protectionism •Unforeseen Risk •Price / Currency Fluctuation •Local Contractors become more competitive

Source: Gammon Construction Limited, 2004

Figure 8.

Unique/Critical Risks in China's PPP Projects and the relative success of various Mitigating Measures (on a scale of 1-5)

<u>Risk</u>	<u>Measure 1</u>	<u>Measure 2</u>	<u>Measure 3</u>
Change in Law	Obtain government's guarantees, e.g. adjust tariff or extend concession period. (4.0)	Insurance for political risk. (3.0)	Maintain good relationship with government authorities especially officers at state or provincial level. (2.2)
Corruption	Maintain good relationship with government authorities especially officers at state or provincial level. (2.6)	Establish JV with local partners especially the central government agency or state-owned enterprise. (2.4)	Enter into contract to prevent corruption. (1.8)
Delay in Approval	Establish JV with local partners especially the central government agencies or state-owned enterprises. (3.1)	Obtain government's guarantees to adjust tariff or extend concession. (3.1)	Maintain good relationship with governments. (3.0)
Expropriation	Establish JV with local partners especially the central government agency or state-owned enterprise. (2.3)	Rely on a combination of international consortium and insurance policies (political insurance). (3.4)	Obtain support of sponsor's government, e.g. export credit. (3.3)
Local Entities' Reliability	Gain accurate financial & other information about local entities and choose the most capable ones. (3.2)	Maintain good relationship with government officers at state or provincial level. (2.4)	Appoint independent accountant to audit the local entities. (3.0)
Force Majeure	Obtain government's guarantees to adjust tariff or extend concession period. (3.8)	Insure all insurable Force Majeure risks. (3.8)	Obtain government's guarantee to provide finance help if needed. (3.1)
Exchange Rate & Convertibility	Obtain government's guarantees of exchange rate & convertibility, e.g. fixed rate or to adjust tariff or to adjust tariff	Use dual-currency contracts, with certain portions to be paid in RMB and other transactions denominated in foreign	Use hedging tools, e.g. forward, swap. (2.5)

	or extend concession to cover the cost. (3.9)	currency. (2.9)	
Financial Closing	Equity financing and cooperation with government partners. (2.8)	Adopt alternatives to contract payment, e.g. land development rights. (2.2)	Use Initial Public Offerings on stock to raise funds especially equity finance. (1.9)
Dispatch, Transmission Constraint	Enter into take-or-pay power purchase arrangements with power purchaser (government). (4.3)	Enter into dispatch contracts with government authorities to dispatch power plant at full capacity for a minimum number of hours each year. (3.8)	Government to guarantee that transmission line will be ready for dispatch. (3.6)
Tariff Adjustment	Have a formula for tariff adjustment that can enable objective calculation of tariffs each year. (4.2)	Maintain good relations with government and a positive public image of the project. (2.5)	Separate and re-define tariff, e.g. portions of tariff fixed while portions adjusted, or portions paid in foreign \$. (3.2)

Chinese Construction Market and Firms Development Trajectory

The construction market has begun and will continue to change in the coming years. Ms. Jihong Wang, managing partner at Beijing City Development Law Firm in the fields of urban infrastructure, construction and real estate and government legal affairs, believes that international ideas and practices are driving many of these changes. She lays out ten ways by which such change is occurring:

1. Internationalization of Construction Ideas

Most fundamentally, Wang cites the growing influence of western ideas regarding project management, government involvement and even environmental and safety procedures as shaping the trajectory of China's Construction Market development..

2. Internationalization of Relevant Law and Regulations

The trend in recent changes in governmental regulations with respect to construction projects (including PPP) have moved toward more openness in the market and more transparency from government. In addition, the government has attempted to address weaknesses in its financing through advance disbursement policies and have put strict environmental protections on the books. As Daniel Wu, a construction manager from Intel put it, China's government is moving "from production to administration, from controller to service provider, and from central planning to macro control." Step by sluggish step, governmental procedures becoming more streamlined and predictable, and required governmental approvals are becoming easier to obtain (although he himself acknowledges the process will take a very long time).

Li Shirong, deputy director of the chongqing foreign trade and economic relations commission and former vice mayor responsible for urban development and construction, recommends that the government should commission a bureau for public works to hire its own management team. That way, the project managers working on governmental projects will be intimately familiar with governmental approval and finance mechanisms, which would be a large improvement on the current situation, in which hired project managers – generally incompetent to begin with – have to ask the public officials how to proceed at every stage of construction. Li hastens to point out that other countries that are now 'developed' had public bureaus to facilitate

the process of their development, at times in which they had a large number of government projects just like China presently does.

3. Internationalization of Project Management:

The Ministry of Construction of P.R.C., the National Development and Reform Commission and many private construction firms are advocating for and embracing multi-management modes such as Engineering, Procurement and Construction (EPC) and other systems of developing/investing as a single, unified agent. In addition, to address the weaknesses of Chinese project managers, many professional project management companies and consultant firms have been established such as the Project Management Research Committee (PRMC), which has as its aim to promote project management professionalism, and to facilitate dissemination and sharing of professional information both on a domestic and international basis (Lu and Wang, 2004).

Professor Vaughn has tips for construction firms that he uses in his own practice to increase the efficiency and quality of Chinese project management. First and foremost, Vaughn encourages firms to give financial incentives to discourage changes from a project's initial plan. In studies, he found that these types of incentives, such as when he would force the customer to pay for any changes to the original plan or give project managers bonuses when the project was completed without changes, he was able to decrease the number of modifications to a project by up to 60%. In addition, Vaughn suggests that firms incorporate governmental approval in to the process of the project as smoothly as possible. For instance, by integrating Subject Matter Expert (SME) review approval into the early stages of project development, he has been able to increase the efficiency of his projects by 25%.

4. Internationalization of Contract Model

To address the problems that many firms see with contract formation and implementation in China, the contract model provided by Ministry of Construction of P.R.C. has fully borrowed the structure and specific clauses from the International Federation of Construction Engineers (FIDIC), which attaches more importance on procedural specifications. Of course, the FIDIC is not strictly followed; instead, it is gradually being modified and adapted to the practices of the Chinese construction market, and more and more Chinese professionals are being trained on its nuances (Lu and Wang, 2004).

5. Internationalization of Building Design Code

Traditional Chinese building design and construction technical code is increasingly facing challenges from innovative construction technologies from abroad, and many of the flaws of the design code are being exposed as woefully inadequate by these international standards. Industry and government insiders agree that the building technical code renewal is imperative and claim that it will soon be coming.

6. Internationalization of Construction Materials and Construction Techniques

The participation of foreign designers and construction firms in the Chinese market has introduced new building materials, environmentally friendly materials and novel techniques to the Chinese market. This technological and skill transfer has resulted in such conceptually groundbreaking projects as the "Respiratory Curtain Wall" in the Water Cubic (in which water events will be held in 2008 Olympics, located to the left of the National Stadium in Figure 4) and the novel and breathtaking design of the new CCTV Site in Beijing.

7. Internationalization of Dispute Settlement Mechanism

As a means to deal with the weak and often undependable courts in China, arbitration is becoming widely used, especially in the projects involving concession contracts. An inter-mediation system is also forming.

Wang Shouqing believes that international firms ought to have learned many lessons from their experiences in China that can help them avoid disputes in their future work¹⁶. Most importantly, he feels that firms should never exploit the corruption of a particular governmental official or a lack of knowledge on the government's part to extract an agreement with lopsided terms that benefit the company. The corrupt official will eventually get caught, in the long-term, and the firm will be penalized for its behavior. In addition, past projects show that when an international firm make what are perceived as excessive profits, the government and angry citizens are more likely to take adverse action. For instance, with the Hangzhou Wan bridge, when the government saw the project's incredibly high rate of return, it awarded other construction firms projects to build two bridges in the near vicinity of the Hangzhou. In addition, with the Qingdao VEOLIA Wastewater treatment facility, the government forced renegotiation of its contract when it realized that it was duped into an unfairly high off-take price. An example of the right way of dealing with this issue is seen in the Laibin B Power plant, in which the private parties reduced its tariff line because it was making a good profit, which kept government officials and Chinese citizens satisfied with the project.

¹⁶ See *inter alia* "Risk management framework for construction projects in developing countries," Shou Qing Wang, Mohammed Fadhil Dulaimi and Muhammad Yousuf Aguria. *Construction Management and Economics* (2003) 21, 00-00.

Another suggestion that Wang has for both Chinese firms and their joint venture partners is to limit the amount of governmental involvement in their projects. Although one always wants to maintain good relations with the government, a good image of the project and close ties with public officials, when the government is enmeshed in the details of a project, it is most likely to lead to inefficiency, especially if continual governmental approvals are required or the government believes it has the ability to make modifications to the project specs as the project progresses. In essence, it's best to limit government involvement to the oversight of price, quality and progress of the work.

8. Internationalization of Project Participants

Although certain Chinese regulations make it difficult for foreigners to enter the market, the Chinese construction market is still attracting numerous foreign participants. This growing number of participants is largely focused on high-end work, which brings elite foreign architects, construction companies, project consulting companies and consulting firms to work in China and share their expertise.

9. The Expansion of Chinese Construction Companies to Overseas Construction Market

The top ten Chinese Construction companies take a decent percentage of works in overseas construction market, from African Market to America, Europe, Hong Kong, Macau (Jianghe Group, CSCEC). This percentage is likely to grow given the construction industry's size, capacity for growth and need to keep it's millions of employees working.

Lu Jianzhong has specific ideas about how his company, CCCC, and others will and ought approach foreign investment in the future. Specifically, he urges Chinese firms to do the following:

a) Do not go blindly and in a rush. Instead, before attempting to invest abroad, each firm should conduct a thorough self-analysis and select a suitable market, preferably one with rich resources, reliable sources of payment and a stable socio-economic situation. Moreover, it is best if the barriers for foreign entry are low and Chinese labor is permitted to staff the project and there are little to no security concerns.

b) Continue to focus on projects financed by the World Bank, Asian Development Bank, and other aid institutions. Chinese firms are generally very competitive for these sorts of projects (as many are located in areas of the world with low barriers to entry), and the Chinese have the ability through these projects to establish their presence in many developing markets for future investments.

c) Get more support from government by means of favorable loans, commercial loans, insurance and support funds.

d) Cooperate extensively with famous international contractors (to build a reputation), with other Chinese contractors, with non-contracting firms, and with resource explorers/added-value processors, in addition to local stake holders. This is to be done by means of PPP (such as BOT and BT) and Joint Ventures.

e) Buy foreign companies in the U.S., Canada and Europe.

f) Hire better consultants, good HR people and more local staff.

g) Work hard to internationalize Chinese standards and better understand foreign ones.

10. The Diversification of Project Fields, Contractors Begin to Play as the Owners

Slowly but surely, the traditional business fields for China have been broken and firms with diversified capabilities have been developed. In the construction field, more Chinese contractors have stepped up from simply being involved in the construction phase of mega-projects to being involved in the entire project design, development and delivery.

Conclusion

Given China's massive urbanization, constant industrialization and rapid economic expansion, it is almost assured that its GDP will continue to achieve impressive growth in the coming years in all markets, especially construction. And yet, the evidence presented in this paper shows that the Chinese construction industry faces many hurdles, 'Do-and-Fix' approach to project management, their lack of familiarity with international standards and 'high-end' project work (such as design), and their habits of not respecting schedules or budgets and wasting resources. Other challenges highlighted include oscillations in labor supply, lack of skilled labor, and lack of international accreditation of training programs to train skilled labor. Moreover, many Chinese firms expect project specs to change throughout the life cycle of a project, which can be a plus if workers face disruptions head on without being fazed, but a minus because if workers don't make effort to develop detailed work schedules. Suggestions developed in part III of this paper provide some insight into how to overcome some of these challenges and how to improve project and risk management practices in China.

There are also several key lessons in this paper for investors and developers looking for capital investment opportunities in the region. Firstly, given China's unmistakable trend towards

urbanization, many municipalities will be in need of extra funding in order to provide public services to their ever-increasing populations. In addition, people's increased ability to choose their own housing locations and amenities has led to a marked boom in the luxury market. Moreover, investors have reason to be optimistic as China moves towards FIDIC standards in their contract formulations and as they adopt internationally recognized dispute settlement mechanisms to cope with lax contract enforcement. Of course, the market is a source of many concerns, not the least of which being that individuals and corporations still cannot own land in China. Most buildings in China are strata-owned, and those owners often don't charge market rents for their properties as a result of their weak understanding of the market; what's more, many governmental projects (especially those related to the Beijing 2008 games) are focused on political ends more than financial ones. Most frustratingly, there are still strict limits on the amount that fully-owned international firms can invest in China and the sectors in which they can invest. Also worth noting are concerns about rapid changes in relevant policies and a market over-heat followed by a dramatic correction. For all of these reasons, investors and developers should surely pay close attention to Wang ShouQing's research-supported advice about dispute avoidance and risk mitigation when contracting with Chinese governmental entities.

The present analysis suggests several areas of future research that may be fruitful for scholars, educators and consultants involved in Chinese practice. Construction management experts ought think long and hard about the state of the Chinese industry to get a better understanding of the manifold concerns it raises with international investors. They should also begin to think about how they can educate and train Chinese contractors to work in Western markets, which will necessitate new legal, environmental, safety and human rights sensitivities. Those focusing on legal studies may want to examine how entrance into the WTO has simultaneously

expanded and limited foreign penetration into the Chinese construction market; for instance, while investors have more protection and the government is de-regulating the market, many measures have been put in place to protect domestic firms and keep Chinese citizens gainfully employed. Moreover, legal scholars ought to look closely at contractual irregularities in China and how the move towards FIDIC standards and changes in the jurisprudence of Chinese contracting affect tendering practices and the levels and modes of corruption in the industry. For the students of project finance, it would be useful to study how China's generous, but erratic, governmental financing, highly complex approval system, high debt-to-equity ratio and general unreliability in upholding agreements leads to difficulties for complex real estate financing and PPP projects. It's also worth noting that the consulting opportunities open to these practitioners are broad, most specifically with respect to environmental and labor laws in foreign countries, foreign countries' judicial practices and international standards regarding building specifications, especially high-end office and other luxury professional spaces.

This paper has provided a "helicopter-view" of the state of the Chinese construction industry that addresses topics essential to anyone considering joint ventures, investments or research in the region. Clearly, there are significant structural issues that the Chinese government and private industry will need to address, but for those who understand the potential pitfalls, there are huge opportunities in the region. China's present trends towards industrialization and urbanization may be more dramatic than in any other society in the whole of human history, and these macro-trends have undeniably positive implications for the construction market. We hope that this paper—by highlighting bottlenecks and mitigation measures—will benefit all parties as they seek to situate themselves in advantageous positions to witness and take part in the spec-

tacular trajectory of China's construction industry, as skyscrapers continue to rise up from the ground!

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