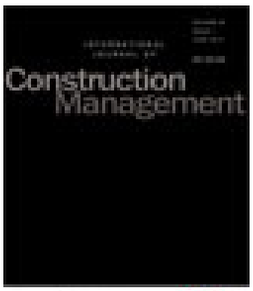

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LOCAL OPERATIONS OF CHINESE CONSTRUCTION FIRMS IN AFRICA: AN EMPIRICAL SURVEY

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Abstract
Over the past decade, Chinese construction activity in Africa has been dramatically enhanced with the launch of China's 'going out' national strategy and the support and coordination of the Chinese government, business associations, and banks, and with innovative financing approaches such as Angola Mode. Based on original empirical data collected through interviews and questionnaire surveys, this paper analyzes the local operations of Chinese construction firms (CCFs) in the African construction market. It provides a descriptive profile of CCFs in terms of project pursuit, procurement of materials and equipment, workforce composition, financing sources, technology practices, environmental and social safeguards, and language barriers. The study offers a unique look into the behaviour of a cross-section of the largest players from the Chinese construction industry at a time when they are expanding aggressively beyond their traditional home market. The article also characterizes indirectly the expanding but complex African construction market.

Keywords
Africa, Chinese construction firms, procurement, workforce, technology transfer, environmental issues

INTRODUCTION

According to the *IMF's Direction of Trade Statistics*, by 2005, the total value of trade between China and Africa reached US$36 billion, up from less than US$10 billion in 2001 (see Figure 1). Africa's exports to China comprise mainly oil, minerals and other natural resources such as timber, needed to fuel the dramatic growth of China's manufacturing sector. China's exports to Africa comprise mainly manufactured consumer goods. China's share of Africa's trade has jumped from 2 to 6 percent, making it the continent's third largest trading partner after the United States and France (Alden and Rothman, 2006). Complementing the growth in trade has been an expansion of Chinese foreign direct investment (FDI) in Africa, particularly in the natural resources sector. According to the Ministry of Commerce, the volume of Chinese FDI in Africa has escalated from around US$50 million per year in the early 2000s to around US$400 million per year in 2004-05. According to Broadman (2006), Chinese FDI is concentrated in the natural resource sector and Sudan was the largest recipient in 2004.

The drivers of this phenomenon are multifaceted. There is no doubt that "China's increasing need for energy sources and raw materials to fuel its rapidly growing economy" (CCS, 2006) is principal among these. Nonetheless, others are also important. In particular, "Chinese leaders and strategists believe China's historical experience and development model resonate powerfully with African counterparts, thereby creating a comparative advantage vis-à-vis the West" (Gill *et al*., 2006, v). They also believe that "Africa is on the verge of a developmental takeoff" (ibid.).

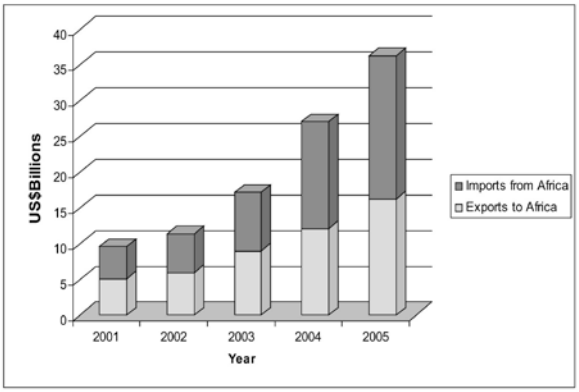

Figure 1 Growth of trade volumes between China and Africa
[Source: IMF Direction of Trade Statistics (2006) and Ministry of Commerce (2006)].

Faced with the growing interest of international contractors to participate in the opportunities created by the rapid increase in China's domestic construction demand and the (partial) liberalization of the construction market after China's entry into the World Trade Organization, CCFs have become active players in the international construction arena. According to the China International Contractors Association (CHINCA, 2005), "China Inc." has become the world's sixth-largest engineering contractor, with a turnover of US$21.8 billion in 2005. In that year, Chinese contractors signed 49 contracts worth over US$100 million each (CHINCA, 2005). Between January and August of 2006, China did US$17.1 billion of overseas contracting business, up 45.5 percent over the same period in 2005. According to the Chinese Ministry of Commerce, there was a 106 percent rise in the value of newly-signed contracts, taking the total up to US$32.7 billion. The nation's turnover in overseas contracting business is expected to increase by 15 percent year-on-year during the 11th Five-Year Plan period (2006-10) and reach US$50 billion. In 2006, for the first time ever, there were two CCFs among the Engineering News-Record Top 10 Global Contractors list and five more among the top 50 (ENR, 2006).

China has had a long-standing policy of providing aid to Africa. Chinese Premier Zhou Enlai's tour of 10 African countries between 1963 and 1964 offered support to African people and leaders, and Chinese overseas development assistance became a feature of relations, focusing on infrastructure development as well as technical and student exchange visits (particularly in the field of medicine). Simultaneously, Chinese contractors have made inroads into the African construction market over the past four decades. The most well-known Chinese projects in Africa include construction of the Tazara railways linking Zambia's copper mines to ports on the Indian Ocean and government buildings and stadiums, often financed directly by China. Over the past few years the number of contracts awarded to Chinese firms, the financial amounts and technical complexities, and the range of countries and sectors have increased dramatically. Moreover, while the scale of Chinese official development assistance (ODA) to Africa has grown, Chinese firms have proven capable of winning open tenders. Many observers and influential reports have noted the rising commercial, financial and political profile of China in Africa. Le Monde, the influential French newspaper, even asked whether Africa will be Chinese in a decade.

Many media reports and business statements have accused Chinese state-owned and private companies of using aggressive pricing to make fast, strategic inroads at the expense of European and South African companies that once dominated these sectors. For example, according to

the head of African operations at Vinci, the world's largest contractor, Chinese firms often submit bids three-quarters less than those of Western firms when invited to tender for traditional building sites (Les Echos 2007). A comparison of labor practices across 11 projects in Tanzania found that three of the four projects operated by Chinese contractors had exceptionally low standards—with long working hours, low pay, low safety and health standards, and poor workers' rights (ILO 2005). Namibia's Construction Industries Federation claims that Chinese construction companies are operating illegally because none of them has a valid affirmative action compliance certificate, a requirement for all companies with 25 or more employees. At the same time, some anecdotes highlight the high efficiency of Chinese contractors and their willingness to do more with less—for instance, putting engineers at work in simple offices made of local wood rather than in expensive, air-conditioned premises.

Given contradictory viewpoints, it is important to analyze and describe the workings of CCFs in the African construction market. This article contributes to the growing body of scholarship on Chinese international contractors (e.g., Low *et al*. 2004; Low and Jiang 2004;Shen *et al*. 2006; Zhao and Shen 2008), by responding to the following research questions:

- How are CCF mandates distributed across African countries? And across sectors?
- How do CCFs win work in Africa—international competitive bidding, competitive bidding among Chinese firms, or sole source negotiation?
- What types of financing typically support the projects being constructed by CCFs in Africa?
- From which suppliers do CCFs typically purchase heavy construction equipment and construction materials?
- What is the ratio of Chinese to African workers? Do lower wages make Chinese firms more competitive than their Western counterparts?
- What kinds of environmental and social safeguards are in place for projects executed by CCFs?
- And how does the combination of Chinese, African and European languages play out on the ground in the context of Chinese project organizations? Is there a language and cultural barrier?

RESEARCH GOAL AND METHOD

This study sets out to characterize Chinese contractors' operations in the African construction market. The study is descriptive, and is not intended to develop new theory or to extend existing theory. The contribution of the study lies in assembling fresh interview and survey data from Chinese executives.

The study was initiated by identifying the organizations that are central to the official Chinese policy of supporting, financing, and building African infrastructure (see Table 1). This list includes MOFCOM, China Exim Bank, CHINCA and some state-owned enterprises that are playing a major role in Africa.

Table 1 Interviewees' organizations

Abbrev.	Organization	Internat. revenue ($M)	Global revenue ($M)	ENR Rank.	Location of head office
MOFCOMM	Ministry of Commerce	N/A	N/A	N/A	Beijing
Exim Bank	China Exim Bank	N/A	N/A	N/A	Beijing
CHINCA	China International Contractors Association	N/A	N/A	N/A	Beijing
CSCEC	China State Construction Engineering Corp.	2,076.10	12,525.00	20	Beijing
CRBC	China Road & Bridge Corporation	759.5	1,269.50	50	Beijing
CCECC	China Civil Engineering Construction Corporation	355.5	412.2	76	Beijing
CIWEC	China International Water & Electric Corp.	270	355.1	97	Beijing
BCE	Beijing Construction Engineering Group	53.5	2,502.10	180	Beijing
CNPC Pipeline	China Oil & Gas Pipeline Bureau	50.6	71.5	183	Hebei

Data source: Engineering News Record (2006)

Ten high-level officials/managers from the organizations accepted a request for an interview; face-to-face interviews with these respondents were conducted in Beijing. The personal information of the respondents is, however, kept confidential and their opinions do not necessarily reflect those of their organizations.

Following the face-to-face interviews, a wide-ranging survey questionnaire was distributed to a sample of Chinese contractors who were known to have African operations. The Chinese contractor population is already well documented from two sources. One source is the ENR list of the world's top 225 international contractors and the top Chinese contractors ranked by their 2005 revenues (ENR, 2006). The second source is a dedicated database maintained by the first author of this paper in the context of his ongoing research program. The two combined sources are believed to represent approximately 90 to 100 percent of the population of large-scale Chinese contractors. With input of an official from CHINCA, the two databases were filtered down to a selected list of 35 contractors that have been active in Africa in recent years.

Survey instruments were then faxed to the sampled contractors. All 35 Chinese contractors responded to the questionnaire survey (see Table 2). The high response rate can be attributed to the fact that the study was endorsed by a top university and a professional association of China. Of the 35 Chinese contractors, 23 were listed in the ENR 2006 Top International Contractors. Noticeably, only 6 of the 35 firms are headquartered in western and central regions of China while the remaining are based in Beijing or eastern coastal municipalities and provinces such as Shanghai.

All the Chinese construction firms that responded to the survey have had operations in Africa in the past six years and, for many of them, business in Africa is highly strategic.

More details about the research design/conduction and the findings about the entry strategies of CCFs can be found in a companion paper (Chen and Ryan 2010).

The following sections report findings focused on CCFs' local operations in Africa in terms of distribution of projects, project pursuit, material and equipment purchasing and handling,

Table 2 Particulars Chinese contractors participating in the questionnaire survey

Details of surveyed Chinese contractors		**Number**	**% of total**
*By international revenue (million US$)**			
	≤ 50	7	20.0%
	50-100	4	11.4%
	100-500	8	22.9%
	≥ 500	4	11.4%
*By global revenue (million US$)**			
	≤ 100	5	14.3%
	100-500	7	20.0%
	500-1000	5	14.3%
	≥ 1000	6	17.1%
*By ENR ranking (Top 225 international contractors)**			
	Top 100	8	22.9%
	Top 101-150	4	11.4%
	Top 151-225	11	31.4%
By location of headquarters			
	Beijing	17	48.6%
	Shanghai	5	14.3%
	Other cities	13	37.1%
By ownership			
	State-owned	35	100.0%
	Private	0	0.0%

**: There are 12 surveyed contractors not listed in ENR's top 225 international construction firms.*
Data source: Engineering News Record (2006)

workforce composition, financing and insurance arrangements, building code and technology practices, environmental and social safeguards, and the influence of language barriers.

DISTRIBUTION OF CCFS IN AFRICA

All of the CCFS who responded to the survey have had operations in Africa in the past six years. In terms of functional specialization, general building is by far the most common (36.4%), followed by water supply (20.7%), transportation (13%) and power (9.8%). As for the project types in Africa by the Chinese contractors, it appears that many are transportation projects. Basically there are a lot of building and infrastructure projects: housing, roads, bridges, hydroelectric plants, and railroads. Chinese contractors are gradually doing more EPC general contracts (CHINCA 2005).

As far as the average number of projects completed each year is concerned, the quality of the responses is uneven. Almost half of the respondents with African operations (15 out of 33) did not provide the data; for the remaining 18 CCFs, three report very high figures (170, 80, and 40 projects per year for China Jiangsu International Economic-Technical Cooperation, Qingdao Construction Group Corporation, and China Road & Bridge Corporation, respectively), with

the remainder on the contrary quoting very low numbers. Similar limitations restrict the analysis of data on revenues.

PROJECT PURSUIT

It is commonly thought that the strategy of CCFs is to secure as many jobs as possible. On the contrary, the interviews suggest that CCFs are in fact quite selective in maintaining a manageable portfolio of works. In the case of CIWEC, "*We cannot afford more business due to our limited scale. Too many projects will worsen the effectiveness of management and bring about failures. Once management is ineffective, a small problem might corrode the profit earned in several projects. So, the current main principle of CIWEC is to sustain the stability of business and to improve the management*."

If the process described by one interviewee can be described as widespread views, CCFs are not very different from their Western industry peers in how they decide to embark on a project: "In order to decide whether to pursue a project or not, we start the screening process as soon as we get the information about the project. We look at the country, the project type, and the source of funding. After the analysis we would send a team out to visit. We visit every project before we bid. We would talk to the client and see what requirements they have. We would also learn about other potential bidders. If we are interested in a market, we may send out the team to investigate as soon as we hear about the project."

The CCFs were asked to evaluate the percentage of works acquired through three different procurement methods: international bidding, bidding among CCFs, and sole source negotiation. The evidence suggests that international bidding is the principal procurement method, representing slightly less than 50% of contracts won in Africa by CCFs (Figure 2). This result is in line with the evidence in Foster, Butterfield, and Chen (2007), who show that CCFs are winning an increasing share of construction projects financed by non-Chinese, multilateral agencies.

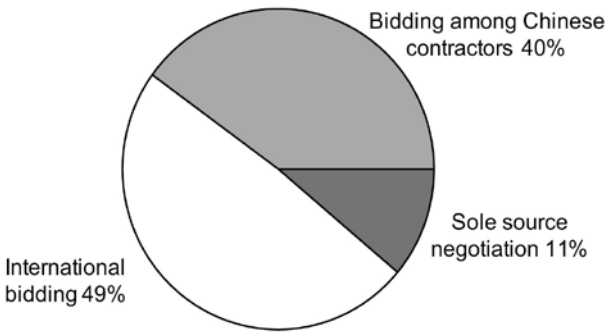

Figure 2 Procurement methods used by sampled Chinese contractors in Africa (by number)
Further analysis by the types of contractors (building versus infrastructure)

Still, bidding among Chinese contractors for projects financed by Chinese funds is a not so-distant second method (almost 40% of projects) followed by sole source negotiation (11%). As one respondent described: "*Of all the projects that we have tendered, many are from competitive bidding. However, the contract amounts are very small, relatively speaking. The big ones are the governmental projects. One type is the economic aid projects [funded by the Chinese government]*."

In terms of funding, most CCFs fund their African jobs through project grants (16) and export credit (11) (Figure 3). This is in line with previously-presented evidence, and in particular with the fact that the lion's share of Chinese financing for projects in Africa goes to energy-producing countries (Algeria, Angola, Nigeria, and Sudan). In turn, these countries also have the largest concentrations of CCFs. Commercial and concessional loans are also important sources (10 each).

CCFs, like other international contractors, prefer not to bid for projects funded by host governments and put greater trust in reputed international funding agencies, as explained by one respondent: "*If the host government funds the project, the date of payment is uncertain, especially when the ruling party changes and the new government may not honour the contract signed by the previous government. In fact, we had this kind of experience and couldn't get any money after the construction work had been done. At the beginning of a project, the host government may make some prepayment, which is surely not enough. Consequently, the contractor still has to put in some money and expects to be reimbursed from the progress payment at later stages. The problem is that if the host government becomes unable to make payment after the contractor has put in money (usually 20% of the total project amount) into the project, the situation facing the contractor becomes very awkward. The contractor has to negotiate with the host government to solve the problem but, on the other hand, cannot stop the construction work.*"

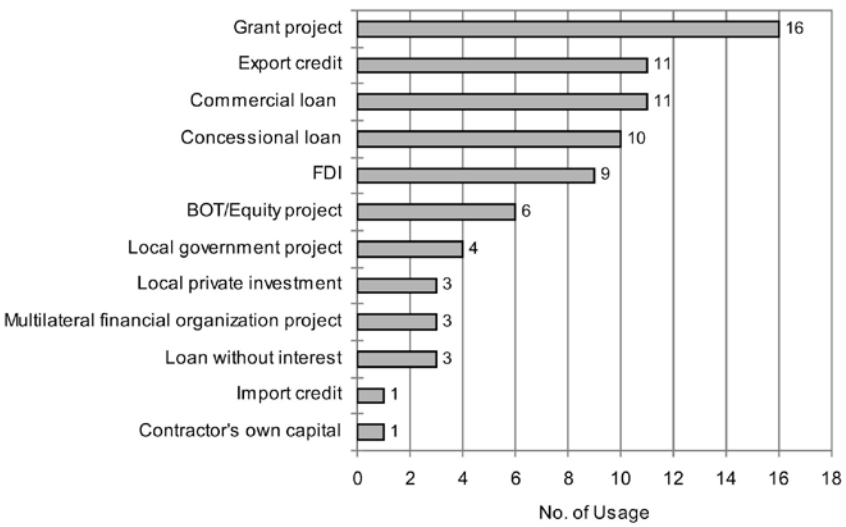

Figure 3 Financial terms for projects by sampled Chinese contractors in Africa

MATERIAL AND EQUIPMENT SUPPLY

Material supply shortfalls and quality-control problems are recurring themes in Africa. According to a respondent, "*there is almost nothing [in Africa]. Although there are some cement and brick factories in North Africa, it still cannot meet all the needs of construction projects. In Sub-Sahara Africa, everything has to be imported." Also "in many African countries, building material supply and equipment do not meet our demand and standards….Most of the material and equipment are from outside the host country."*

CCFs generally buy construction equipment from Chinese manufacturers. The motivation for preferring Chinese-made equipment is clear. According to a survey respondent, "*Although the quality is still not good, the price is much lower. For example, for a 3-year project, we can import a foreign bulldozer, which costs US$300,000 and can work for more than ten years. If we do not manage to win the next project, this bulldozer remains idle with high residual value. In contrast, although a Chinese bulldozer only lasts three years, it is very cheap (US$100,000) and completely depreciated by the end of the project."*

The manager from CRBC mentioned the importance of maintenance (parts, accessory availability, and expertise of maintenance workers) in equipment purchasing decisions. *"More than half of our equipment is made in China. There are various reasons, one of which is their lower cost. Another is the source of accessories. The Japanese equipment may not cost a lot, but their parts are very expensive. Another consideration is maintenance workers. They are more familiar with Chinese equipment but may not know much about the more advanced foreign-made equipment to take advantage of its latest technologies."*

According to the respondents, CCFs *generally leave the equipment in Africa and do not ship them back* to China once the project is completed. The explanation from a respondent is typical, "*We bring the equipment in as a temporary import item. If other projects follow, we would keep the equipment there. If there is nothing following the completion of a project, we would transport it to neighbouring countries instead of bringing it back. The customs collect a few kinds of fees: first there is duty, and they also collect VAT appreciation tax. On top of that, we need to pay excise tax. All these are according to the timetable set by the host country. For cars, the time period is 5 years; 8 years for equipment. This way whether you transport it out doesn't matter anymore. Each country has its own unique tax policy.*"

While the export of heavy construction equipment from China to Africa is unlikely to change in the medium to long-term, it does seem likely that over time, Chinese businesses will set up more factories for the local production of construction materials.

WORK FORCE

Of all the accusations that are levied at CCFs' operations in developing countries in general, and in Africa in particular, the most recurrent is that they use limited local labor. This is argued to be true in the case of trained managers and supervisors. However, survey results on the use of local labor are vague on this and it is difficult to interpret the high degree of variance among company responses . On average, CCFs employ an equal number of Chinese and local workers (see Figure 4) and they overwhelmingly resort to Chinese nationals for managerial positions. Indeed, fewer than 10% of the skilled workforce positions are occupied by locals.

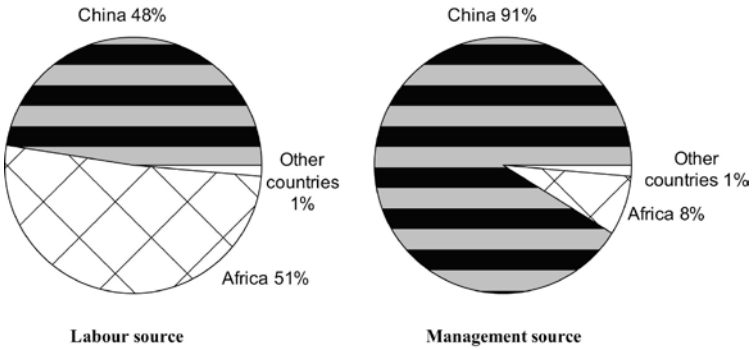

Figure 4 Sources of all workers and managers for sampled Chinese contractors in Africa

One respondent provided the following interpretation: "*We now have 2,000 workers overseas and the Chinese-to-African ratio is quite high because skilled African workers are rare and in general their productivity is lower. Although we can hire local operators, we prefer to fill professional vacancies with our own people. A few of them come from India or Pakistan. Ratios differ depending on the region and the country. In Mauritius, we hire a lot of locals. In Togo, Congo, Guinea, Botswana, and Tanzania, we use fewer. It also depends on the volume of the project. If a project is small, we would send skilled workers to lead the locals. The tasks for the locals are mostly of physical nature. In countries where we have been around for a while, we have established good relationships with many of these workers.*"

Another respondent elaborated further: "*Until the mid-1990s, although most Chinese technical staff didn't understand foreign languages, host countries had few limitations to China-imported labor force and thus workers were mostly secured from China. At the time it was reasonable to pay US$100~200 per worker per month, which was a bit higher than that in the local labor market. Using Chinese workers ensured fast communication within project teams and prompt completion of the work. Since 1995, Chinese domestic labor price has grown pretty fast and the salary for overseas workers has also increased several times. We had to adjust the ratio of Chinese labor to local labor, from 1:1 in 1995, to ⅓ Chinese workers and ⅔ local workers in the late 1990s, to roughly 1:5 ~ 1:6 nowadays*."

And the situation continues to change as the market evolves: "*Our goal is to become more localized. This is simply market-driven, or more precisely, cost-driven. There are only so many skilled workers [in Africa]. With so many big projects now, the demand for skilled workers has driven their cost up very rapidly. For instance, a roller operator might start at CHY2,000 a month. Now it has escalated up to CHY7,000 a month, costing almost as much as our own people. In those cases, if we need ten roller operators, we might consider sending two or three operators from the mainland and training the locals*."

Also, "*in 2003 and 2004 there were many labor disputes about Chinese workers. The main causes were attempts by China-based labor export agents to get extra income from the Chinese workers.*" (MOFCOM official)

Interestingly, of the six CCFs that operate in 10 or more African countries, five show an above-average incidence of local labor – the exception being the China National Electronics Import & Export Corporation, which requires highly-skilled technicians to install its products.

To Chinese expatriates, working in Africa used to mean a high salary while sacrificing other things. Perspective was provided by a respondent: "*The project managers are Chinese, but they usually return to China after their project is completed. I have some friends who immigrated to Africa. Although Africa in general is less developed and poor, there are plenty of opportunities to earn money. For one who is fluent in the local language and who has certain business intelligence, it is very easy to earn money over there. Moreover, African people are very friendly.*"

Not all respondents, however, share this conviction: "*Whether they are willing to stay there depends on a few factors. One of which is Chinese traditions and values toward family life. After they have been out of the country for too long, they want to come home. When we first started, the workers and the management team would come home for vacation every other year. It worked out back then. A few years later it became every 18 months later, and more recently every year. Now the standard of living in the mainland has improved, the wife and kids get disgruntled if the man is away too long. They just want him to go overseas and make some money. In the 1970s, when our predecessors went to work in Mongolia, they would come back every 5 years. They were saving money for food and necessities*."

FINANCIAL ISSUES

Financial support through bonds and equity issuance is mostly provided by domestic credit institutions – indeed central bank governor Zhou Xiaochuan recently encouraged Chinese banks to open more branches in Africa. According to the survey (Figure 5), the Bank of China (which has a subsidiary in Zambia and a branch in Johannesburg) is the most important sponsor for bonds related to construction, well ahead of the China Exim Bank and others. With respect to the provision of debt instruments, China Exim Bank is by far the largest provider, followed by the Bank of China and others. Data shows that Sinosure (China Export and Credit Insurance Corporation) and independent insurance companies are the most important sources of insurance coverage.

Long term cooperative relationships do exist between CCFs and certain banks, like the one between a respondent's company and Bank of China. "*As for bonds, we usually select larger banks, like the Bank of China. Every year we negotiate an amount of credit with the bank, considering our financial status and the amount of international construction. If the amount of credit is not enough, we would get additional credit from other banks like CITIC Bank, the Industrial and Commercial Bank, the Bank of Communications, and China Construction Bank. We work mainly with the Bank of China*."

Arrangement of export credit in the construction field is still not very popular and many CCFs have just started to take advantage of this product. As one respondent indicated, "*We're also working on an export credit project. We've only started working on this type of project in recent years. We tend to do more with buyer's credit, and let the buyer deal with the Chinese government. This tends to be less risky. We are exploring the possibility of obtaining seller's credit. Dealing with buyer's credit takes a bit longer. It all depends on whether the two governments have a mutual agreement. If they do, the process would be swift*."

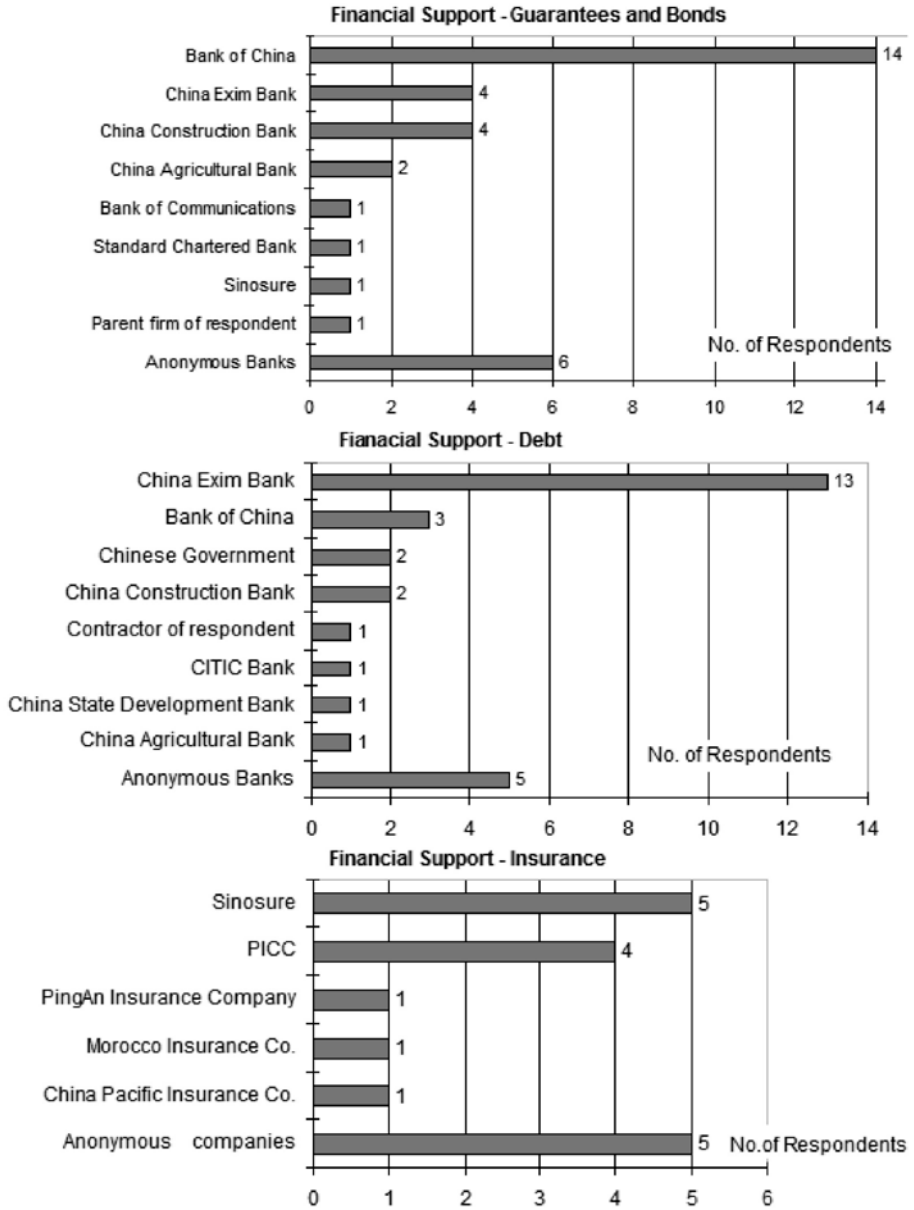

Figure 5 Financial support (guarantees and bonds, debt, and insurance)

TECHNOLOGIES AND ENVIRONMENTAL ISSUES

In Africa, different construction standards and codes are used and usually, CCFs do not have much control but let clients' decisions or local practices dictate. When possible, CCFs also try to recommend Chinese standards and codes, which usually meet or exceed typical practices in Africa. A respondent explained, "*If we participate in a World Bank project, we must abide by British standards. We cannot choose the standards, but sometimes we can make recommendations for our own domestic standards. We follow the decisions of the engineer,*

who decides on the standard to be used. Either way, it should not be any less than the Chinese domestic standard."

Another respondent said that in Africa standards are quite different from Chinese standards. "*In these projects, the designers are usually European, and they sometimes accept our recommendations about construction. The easiest way to do construction is to adhere to the original design. The reason is the superintendents and the designers are usually interconnected, and they do not expect any changes to the design, especially if it contradicts their interests. In 1985, we secured a dam construction project. The reservoir is roughly 40~50 million m3. The design was very conservative and we proposed an alternative to the French designer. They agreed that our proposal was technically feasible, but they didn't think our idea made any sense in terms of business. The profit is positively correlated to the quantity of construction work. The Africans had poor operation and maintenance skills so they preferred the conservative design with high security. Our proposal was technically reasonable but unrealistic*."

Technology selection is primarily determined by the contractor with approval and confirmation by the engineer or superintendent. According to a respondent, technology selection is based on the nature of the specific project, rather than whether it is located in China or Africa. "*We must report our building technology to the engineer to get his approval. technology is not defined by national boundaries. You can't really say this is Chinese technology or that is European technology. Whichever technology is the most appropriate and effective is the one I will use*."

Another respondent noted: "Chinese technology is accepted throughout Africa. …Our company decides on the technology and building techniques to be employed.…The techniques and technology are not that different from those being used in the mainland."

With regard to environmental and social safeguards, 17 CCFs apply international standards required by the financing entity, 15 the local ones, nine the same as is common in China, and only three responded that they were free to chose their own standard. A respondent noted that upstream requirements of international donors, like the UN for environmental impact assessments, seldom have an influence on downstream construction operations: "*The Chinese focus on construction work. Europeans, on the other hand, have been deeply involved in African projects, as they designed and superintended most of them, including more than 90% of the projects funded by international financial organizations. As part of the project feasibility study, an environmental report must be submitted, but this is not something that Chinese companies have to worry about. These kind of environmental studies are usually conducted by United Nations-related organizations. Before international financial organizations decide to invest, the environmental taskforce of the United Nations implement the monitoring. The treatment of construction waste and polluted air must follow its standard. Therefore, in Africa and Asia, the problem about environmental protection doesn't exist. The projects in which host governments invest basically face the same situation*."

LANGUAGE BARRIER

Most construction work requires only a rudimentary communication capability, so on all but the most technically challenging projects, the language barrier does not create a serious bottleneck. The manager at CCECC described this as follows: "*Even though there is no formal*

training in language, most Chinese can pick up basic language in a month or two after they've entered into a country." But for management, the language barrier is more serious. "The management team is mainly made up of Chinese. We have a very practical challenge—and that is our language. We have difficulty communicating with the locals."

Professional translators, therefore, play a very important role in bidding and construction execution, but in some companies, translators are being phased out because the new generation of managers and engineers receivr much better training in the local language. This can be reflected in the self-introduction by a respondent who originally worked for his company as a translator and later became a very versatile manager. "*Since 1983 I worked as a translator in the first three years of my career in [the respondent's company], assisting the technical staff to prepare bidding packages, and learned a lot of technical details from them. Only when I understood the technical details was I able to accurately do translation during negotiation. Similarly, procurement, banking and customs affairs also require accurate and clear translation. I have to understand how equipment is composed, how many components as well as the name, type, location, and function of specific components. After doing this for ten years, I more or less become an expert in this area, even better than most young engineers. Of course, since 1993, new generations of university graduates have become more fluent in foreign languages and are better acquainted with technical terms.*"

SUMMARY AND CONCLUSION

Overall, cost competitiveness derived from access to cheap capital, low-cost labor, and cheap building materials, as well as political support from Beijing channelled through frequent high-level missions and effective on-the-ground communication are the main factors for the current success enjoyed by CCFs across Africa. CCFs compete largely with other CCFs and they fear that this competition may exacerbate in the future if effective coordination mechanisms are not implemented. Indigenous construction companies do not represent a strong source of competition and are thought to lack financial and technical capacity. In fact, low skill and technology endowment limit the CCFs' interest in establishing collaborative ventures with local companies.

While political support from the Chinese government has undoubtedly played a critical role in softening the entry of Chinese companies, it was found that the Chinese face the same challenges as other construction players: economic and political instability, poor quality of local inputs (including both labour and construction materials), and weak infrastructure. Cultural misapprehensions may also be common, but generally language differences between Africans and Chinese have not seriously impeded construction projects.

This research paper is a first small step in a broader effort to decode the African markets (e.g., market demands, major risks, and major players), evaluate Chinese contractors' performance (e.g., market share, geographic coverage, and profitability) and review their entry strategies. Much further research is needed to explore specific answers to critical debates such as the role of government-to-government ties, the resolution of labour disputes, and the attitude towards social and environmental safeguards.

The simultaneous boom of CCFs in global markets and growth of African construction activity is no coincidence. The spectacular growth of China in recent years has sustained

world demand for commodities and natural resources that Africa has in abundance, but for which infrastructure is often lacking. CCFs are called to build such infrastructure, often with home funding, but often also with international backing. In such context, it is important to consider how the Chinese presence in Africa can contribute to broader global developmental objectives, even as it satisfies China's goals and objectives.

In summary, it was found that CCFs in fact obtain more jobs through international open bidding than via bidding among Chinese contractors (implicitly projects funded with Chinese sources); they usually purchase their materials and equipment from China mostly because of business reasons; their work force is dominantly Chinese but localization is increasing; financial services are secured from Chinese financial organizations and some good but complicated financial arrangements such as export credits are not extensively utilized yet; they do not have much stake in selecting the standards, codes, technologies, and environmental protection gauges; language barrier is not a big issue on the production frontline but can cause trouble for engineering and management professionals; and over time, the education of new generations of Chinese engineers and managers is doing a better job of incorporating language training.

Although the evidence presented in this paper is largely anecdotal, it is the first time that a survey has been conducted to profile and describe CCFs with an African presence. Naturally, the results are somewhat mixed due to the fact that respondents represent experiences across a range of small, medium, and large size projects, in various sectors, and across a variety of African countries that have unique political, economic, and social environments. Nevertheless, the investigation presents a starting point for exploring the business operations of CCFs in Africa at a time when many African and international market participants and observers are curious to learn more about this growing trend.

Sometimes the international media tends to dwell on political issues associated with the rise of China in Africa, however, this investigation suggests that CCFs are now more commercially driven than politically driven as ever before. Strikingly, more than half of the CCFs' order volume is being won on a competitive basis with financing backed by multilateral donors—and not by Chinese government sources.

Further research is needed to explore other topics associated with CCFs in Africa, such as localization and technology transfer, mechanisms of market coordination provided by the Chinese government, linkages between CCFs and Chinese providers of export credit and project financing, and possibilities for synergetic joint-ventures between Chinese firms and international contractors who may have complementary skills and resources.

REFERENCES

Abdul-Aziz, A. (1994). "Global strategies: a comparison between Japanese and American construction firms." *Construction Management and Economics*, 12(6): 473–484.

Aguilar, R. and Andrea, G. (2007). "The Asian Drivers and Angola." *Mimeo*, Gothenburg University and OECD Development Centre.

Alden, C. and Rothman, A. (2006). *China and Africa Special Report: Terms of Endearment from Marxism to Materials,* CLSA Asia-Pacific Markets, Shanghai, China, September.

Broadman, H. (2006). *Africa's Silk Road: China and India's New Economic Frontier.* The World Bank.

CCS (Centre for Chinese Studies). (2006). *China's Interest and Activity in Africa's Construction and Infrastructure Sectors,* prepared for DFID China, Stellenbosch University.

Chen, C. and Ryan O. (2009). "Chinese contractors in Africa: home government support, coordination mechanisms, and market entry strategies." *Journal of Construction Engineering and Management,* 135(11), 1201-1210.

Chew, D. A. S. (2006). "International Strategic Management of Chinese Construction Firms." *Mimeo,* School of Civil and Environmental Engineering, Nanyang Technological University.

CHINCA. (2005). The medium- and long-term strategic plan for China's international construction industry. China International Contractors' Association.

De Lorenzo, M. (2007). "China and Africa: A New Scramble? Jamestown Foundation." *China Brief,* 5 April.

ENR. (2006). "The Top 225 Global Contractors Rankings." *Engineering News Record*, August 21-28: 27-54.

Foster, V., Butterfield, W. and Chen, C. (2007). *Looking East: A New Source of Infrastructure Finance for Africa*. Director's Office of the Sustainable Development Department of the Africa Region of the World Bank.

Fraser, C. and Zarkada-Fraser, A. (2001). "The philosophy, structure and objectives of research and development in Japan." *Journal of Construction Management and Economics*, 19(8): 831-840.

Gill, B., Huang, C. H. and Morrison, J. S. (2006). *China's Expanding Role in Africa Implications for the United States*, A Report of the CSIS Delegation to China on China-Africa-U.S. Relations.

ILO. (2005). "Baseline study of labour practices on large construction sites in the United Republic of Tanzania, Sectoral Activities Programme." *Working papers*, No. 225.

Les Echos. (2007). *Comment le BTP français tente de préserver sa place en Afrique,* 2 April.

Low, S. P., Jiang, H. B. and Christopher, H. Y. L. (2004). "A comparative study of top British and Chinese international contractors in the global market." *Construction Management and Economics,* 22, 717-731.

Low, S.P. and Jiang, H.B. (2004). "Internationalization of Chinese Construction Enterprises." *Journal of Construction Engineering and Management*, 129, pp.589-598.

Raftery, J., Pasadilla, B., Chiang, Y. H., Hui, E. C. M. and Tang, B. S. (1998). "Globalisation and construction industry development implications of recent developments in the construction sector of Asia." *Construction Management and Economics*, 16(6): 729–737.

Schultmann, F. and Sunke, N. (2006). *Study on the Future Opportunities and Challenges of EU-China Trade and Investment Relations: Construction*, Chair of Business Administration, Construction Management and Economics, University of Siegen.

Shen, L. Y., Zhao, Z. Y. and Drew, D. (2006). "Strengths, weaknesses, opportunities and threats (SWOT) for foreign-invested contraction enterprises: a China study." *Journal of Construction Engineering and Management,* 132(9), 966-975.

The Center for Deng Xiao Ping Theory Research of Guangdong Province (2003). "Implementation of the Going Out Strategy." *Qiu Shi,* 2003, No. 3.

Thouret, J. L. (2006). *Rapport sur l'internationalisation des entreprises de bâtiment et travaux publics chinoises,* VINCI Construction Grands Projets, China office.

Wang, Y. (2004). "Going Out Strategy: Chinese Construction Firms' Opportunities, Competitive Advantages and the Reality." *Petroleum Chemical Construction*, 2004, No. 2.

Yanosek, K., Keever, G. and Orr, R.J. (2007). "Emerging-Market Infrastructure Investors: New Trends for a New Era?" *Journal of Structured Finance,* 12(4).

Zang, X. Y. (2001). "Retrospect and Prospect of Opening to the Outside World: the Great Practice of the Opening Up Idea of CCP." *Port Economics,* 2001, No. 4.

Zhao, Z.Y. and Shen, L,Y. (2008). "Are Chinese contractors competitive in international markets?" *Construction Management and Economics*, 26(3), 225-236.