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# Development of the Chinese Construction Industry after the Cultural Revolution: Administration Framework, Economic Growth, and Market Structure

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Abstract

This paper presents the results of an investigation on the development of the Chinese construction industry after the Cultural Revolution in terms of administration framework, economic growth, and

market structure, with the consideration of Chinese currency inflation. The development was divided into three stages based on Chinese government policy changes on the construction industry. In each stage, the reform of administration framework was reviewed, and the market size and market structure in both the domestic and the international markets were analyzed. Value added and gross output value of domestic market, the number of contracts, contracting value, total turnover, and turnover in the market share of Chinese construction firms were used to describe the development in various regions and to illustrate the growth of Chinese construction firms in the international market. The results of this study provide valuable knowledge to practitioners, scholars, and educators who are interested in exploring the development of the Chinese construction industry.

## Introduction

In recent years, China has experienced huge economic growth. According to the World Factbook [Central Intelligence Agency (CIA) 2010], in 2010, China stood as the second-largest economy in the world after the United States measured on the basis purchasing power parity (PPP), which adjusts for price differences. As an important segment of the national economy, the construction industry has also increased greatly. From 2001 to 2008, the gross output value of the Chinese construction industry had an annual average growth rate (AAGR) of 22%, and it had surpassed the gross output value of the U.S. construction industry since 2007 based on the PPP [National Bureau of Statistics of China (NBSC) 2009; Huang and Bai 2011]. In the global market, the China Railway Construction Corporation and China Railway Group were the two contractors with the largest contracting revenue in 2009. Five Chinese construction firms were ranked in the Top 10 global contractors, and China had the most international contractors in a list of the Top 225 (see Reina and Tulacz 2010).

Because the Chinese construction industry plays a more important role in the global market, many researchers have studied a variety of aspects of its development since the mid-1990s, including the administration framework (Mayo and Liu 1995; Chen 1998; Bajaj and Zhang 2003; Xu et al. 2005), legal system (Lam and Chen 2004; Chui and Bai 2010), bidding system (Chen 1998; Shen and Song 1998; Shen et al. 2004), economic growth (Li 2001; Huang and Bai 2010), market structure (Sha and Lin 2001; Zeng et al. 2005), and international expansion (Li et al. 2001; Low and Jiang 2003; Zhao et al. 2009; Lan and Bai 2011). However, most of these studies focused on specific areas of the Chinese construction industry within a short period of time, and some were conducted a decade ago. Therefore, to bridge the gap of existing knowledge and to better understand the development of the Chinese construction industry, a comprehensive and up-to-date study is unquestionably needed.

## Research Objectives

The purpose of this study was to investigate the development of the Chinese construction industry in both the domestic and the international markets after the Cultural Revolution. To achieve this goal, the following three specific objectives were identified:

1. Investigate the reform of administration framework;
2. Investigate the growth of market size; and
3. Investigate the evolution of the market structure.

A comprehensive literature review was conducted first to reveal the administration framework of the Chinese construction industry, including the reform of the management system and organization framework, development of the legal system, and internationalization. Then, the growth of the market size and the evolution of the market structure from 1979 to 2008 were identified by analyzing economic statistical data obtained from public sources with the consideration of Chinese currency inflation over 30 years. Finally, the evolution of the market structure in both the domestic and international markets is discussed, conclusions on the development of the Chinese construction industry are drawn, and recommendations are proposed for future research.

The results of this study provide a great amount of quantitative information that is able to demonstrate the success of the transition of the Chinese construction sector from a controlled and restricted market to a liberalized and profit-oriented market. The success of the transition can be used as a model for other developing countries that are seeking approaches to reform their construction industry. The results of this study also provide valuable quantitative knowledge on how Chinese construction firms had been expanding business and playing a more important role in the global market. In addition, the results of this study provide valuable knowledge to practitioners, scholars, and educators who are interested in exploring the development of the Chinese construction industry after the Cultural Revolution.

## Literature Review

According to the changes of political and economic policies by the Chinese government, the Chinese construction industry has experienced three milestones in its evolution. Shortly after the Cultural Revolution in 1979, China adopted an open-door policy in order to attract foreign investments. In October 1992, construction industry reform was announced at the Chinese Party Congress Convention (Mayo and Liu 1995). In December 2001, China was formally admitted to the World Trade Organization (WTO) and committed to liberalizing the construction market (Xu et al. 2005). These political and economic policies set the direction in which the Chinese government wanted the construction industry to develop, and thus regulated the market trend. As a result, the changes in Chinese government policy played a dominant role in the development of its construction industry. Therefore, based on the Chinese government policies on reforming the construction industry, the development of the Chinese construction industry after the Cultural Revolution was divided into three stages; i.e., the first stage from 1979 to 1992, the second stage from 1993 to 2001, and the third stage from 2002 to 2008.

### First Stage from 1979 to 1992

During the first stage, the administrative framework of the Chinese construction industry consisted of the Ministry of Housing and Urban-Rural Development of China, National Development and Reform Commission, and People's Construction Bank of China (Lu and Fox 2001; Bajaj and Zhang 2003). The government assigned projects to contractors and provided all finances for construction works (Shen and Song 1998). China had no unified construction law before 1996 and government administrative control had a dominant influence on the construction market (Lu and Fox 2001; Shen et al. 2004). The assignment method was used widely as the major procurement method until 1984 when the Provisional Regulations on Tendering for Construction Projects was issued (Lu and Fox 2001). There were three major types of construction firms; i.e., state-owned enterprises (SOEs), urban and rural collectives (URCs), and rural construction teams (RCTs) (Chen 1998). SOEs were known for lack of

autonomy and vagueness in property rights, while URCs and RCTs were market oriented and had more flexible management but poor quality and low professional and management levels (Sha and Lin 2001; Chen 1998).

In the international market, the Ministry of Foreign Economic Relations and Trade was responsible for overseas contracting business, giving approval for the enterprises to work overseas and taking general administration roles for Chinese construction enterprises abroad (Chen 1998). Large-scale SOEs at the central government level were able to obtain licenses to bid for projects in the international market, such as the China Road and Bridge Corporation, China Civil Engineering Construction Corporation, China International Water and Electric Corporation, China National Complete Plant Import and Export Corporation, etc. These SOEs were supervised by the Office of Large Scale State-Owned Enterprises under the State Council (Low and Jiang 2003). Chinese foreign contracting services included the following industries: residential, petrochemical, transportation, manufacturing, water supply and drainage, water conservancy and electric power, etc., which covered almost all the fields in the international construction market.

### Second Stage from 1993 to 2001

During the second stage, the administrative framework developed into corporate organization, tendering and bidding, supervision, and contract management systems (Sha 2004). The construction legal system developed into three levels: laws, administrative regulations, and departmental rules (Lam and Chen 2004). The two most important laws, the Construction Law and the Tendering and Bidding Law, were enacted in 1997 and 1999, respectively. After the Tendering and Bidding Law was introduced, it became a legal requirement to award all public contracts through bidding procedures (Shen et al. 2004). The number of contract bids increased from 21% in 1990 to 35% in 1995 (Shen and Song 1998). The market share of SOEs, URCs, and RCTs dropped by 35% by the end of 2001, whereas the market share of foreign funded firms (FFFs) and other types of domestic firms (OTDFs) increased considerably during this period (Zeng et al. 2005).

With the international expansion of Chinese construction firms, about 219,900 construction workers had been sent abroad by 1994. At the end of 2001 the cumulative dollar amount of overseas contracts since 1976 was reported to be US\$127.87 billion, of which the 2001 amount alone was \$16.45 billion. While engaging in international construction, equipment made in China was also exported in large volumes. The total export value of equipment and material that accompanied overseas construction projects in 2000 was \$875.59 million (Lan and Bai 2011). This also helped the development of the construction industry at home (Chen 1998). During this stage, the price war among Chinese firms in some traditional markets of developing countries such as Pakistan, Iraq, and other Middle Eastern and African countries commenced with their expansion.

### Third Stage from 2002 to 2008

During the third stage, China was a member of the WTO. China presented itself as a developing country in its WTO commitment to achieve maximum protection in the construction market, and therefore opened its doors in a progressive and limited way. To meet WTO requirements, a special task team was established to review the construction laws and regulations, and the constraints on foreign participation were abolished or modified (Lam and Chen 2004). The reform of SOEs was undertaken

under government policies, and there were an increasing number of private construction firms as a result of the privatization of URCs and RCTs (Low and Jiang 2003).

The accession to the WTO offered new opportunities for Chinese construction firms to conduct business in countries that had been traditionally against their entry. More than 1,600 Chinese firms had the required qualifications (set by the Chinese government) to carry out international engineering and construction contracts, among which the dominant ones were large SOEs. The WTO accession also provided Chinese contractors the legal mechanism to protect their interests. Any disputes could be settled by applying WTO principles (Zhao et al. 2009). International projects carried out by Chinese firms were mainly concentrated in building construction, communication, transportation, and the petrochemical and power industries (Li et al. 2001). On the other hand, the WTO agreement required China to open its construction market to foreign countries and allow wholly FFFs to be set up in China 5 years after its entry to the WTO (Low and Jiang 2003). As a result, the Chinese construction firms would face increasing competition in the domestic market because the Chinese construction market was becoming rapidly internationalized.

In summary, most of the previous studies investigated particular aspects of the Chinese construction industry within a limited time span, and many were outdated. Therefore, to bridge the gap of existing knowledge and to better understand the development of the Chinese construction industry, a comprehensive and up-to-date study is unquestionably needed. The rest of this paper will present the data collection, data analysis, and development of the Chinese construction industry along with conclusions and recommendations.

## Data Collection

Data on the Chinese construction industry from 1979 to 2008 were obtained from the China Statistical Yearbooks (NBSC 2009) for the years of 1996–2009. The collected data sets covered the development of the Chinese construction industry in both the domestic and the international markets. In the domestic market, the collected data included the value added of construction, the gross output value of construction, and the market share of SOEs, URCs, RCTs, OTDFs, FFFs, and Hong Kong, Macao, and Taiwan funded firms (HMTFFs). The value added of construction refers to the final result of the activities of production and the operation of construction firms in monetary terms; the gross output value of construction refers to the total of construction products and services, expressed in monetary terms and produced or rendered by construction and installation firms (NBSC 2009). In the international market, the collected data included the number of countries with contracts signed, the number of contracts, contracting value, total turnover, and turnover by regions. These data covered construction projects and labor services undertaken by Chinese firms in foreign countries. Construction projects refer to projects carried out through the bidding process; labor services refer to the activities of providing technology and labor services in the form of receiving salaries and wages (NBSC 2009).

## Data Analysis

The data analysis included the following two steps: (1) converting the value of the Chinese yuan in each year to the equivalent 2008 value by applying buying power factors, and (2) analyzing the development of the Chinese construction industry in the domestic and international markets from 1979 to 2008. In the first step, inflation rates were converted to buying power factors, which describe how many

Chinese yuan in previous years had the same buying power as one Chinese yuan in 2008. The buying power factor in 2008 was selected as 1.00 for the convenience of calculation, and the buying power factor in each previous year was then calculated using the formula (Eschenbach 2003):

$$F_{T-1} = F_T(1 + f)$$

The results of the buying power factors of the Chinese yuan from 1979 to 2008 are shown in Table 1. The value added and gross output value in the domestic market, and contracting value and turnover in the international market, of the Chinese construction industry in each year were then multiplied by their corresponding buying power factors for the data analyses presented in the rest of the paper.

**Table 1.** Buying Power Factors of Chinese Yuan from 1979 to 2008

Year	Inflation rate (%)	Buying power factor
1979	—	5.03
1980	5.99	4.75
1981	2.38	4.64
1982	1.93	4.55
1983	1.50	4.48
1984	2.83	4.36
1985	9.30	3.99
1986	6.50	3.74
1987	7.30	3.49
1988	18.80	2.94
1989	18.00	2.49
1990	3.10	2.41
1991	3.40	2.34
1992	6.40	2.19
1993	14.70	1.91
1994	24.10	1.54
1995	17.10	1.32
1996	8.30	1.22
1997	2.80	1.18
1998	-0.80	1.19
1999	-1.40	1.21
2000	0.40	1.20
2001	0.73	1.20
2002	-0.77	1.21
2003	1.17	1.19
2004	3.90	1.15
2005	1.82	1.13
2006	1.47	1.11
2007	4.77	1.06
2008	5.92	1.00

In the second step, the development of the Chinese construction industry was divided into three stages as indicated in the literature review section. In each stage, the developments in the domestic and international markets were analyzed separately. In the domestic market, the value added and gross output value were utilized to represent the market size, and the number and gross output value of firms in each type were used to illustrate the market structure. The correlation between market size and market structure was examined using the Pearson correlation coefficient, which indicates the strength and direction of a linear relationship between two random variables. The correlation is positive for an increasing relationship and negative for a decreasing relationship, with maximum values of  $\pm 1$  in a linear relationship (Rodgers and Nicewander 1988). In the international market, the number of contracts, contracting value, and total turnover were utilized to represent the market size; turnover in various regions was used to illustrate the market structure.

## Development of the Chinese Construction Industry

### First Stage from 1979 to 1992

Since 1979, China has been adopting an open-door policy; however, the construction industry was not reformed until October 1992. Therefore, during this period, the Chinese construction industry was still controlled by the government and was largely under the traditional assignment system.

### Domestic Market Size

As illustrated in Fig. 1, the value added and gross output value numbers were very low in the late 1970s and early 1980s. The AAGRs of the value added and gross output value were 13 and 9%, respectively, as shown in Table 2. However, the AAGRs in each year fluctuated quite often, ranging 2–31%, except in 1989 when the value added declined by 17% and the gross output value decreased by 4%. Despite this recession, the value added and gross output value increased considerably by 329 and 221%, respectively, during this period.

**Table 2.** Domestic Market of the Chinese Construction Industry from 1979 to 1992

	Market size (100 million yuan)		Market structure (number)		
Year	Value added	Gross output value	SOE	URC	RCT
1979	723.66	NA	NA	NA	NA
1980	928.25	1,362.37	1,996	4,608	50,800
1981	960.44	NA	NA	NA	NA
1982	1,004.15	NA	NA	NA	NA
1983	1,213.00	NA	NA	NA	NA
1984	1,380.60	2,254.43	3,017	6,724	80,400
1985	1,666.76	2,692.58	3,385	7,765	82,600
1986	1,968.74	2,769.53	3,608	8,977	76,186
1987	2,323.78	3,056.82	3,788	9,837	73,849
1988	2,379.68	3,065.30	3,798	10,336	73,090
1989	1,976.85	2,935.34	3,927	9,179	67,000
1990	2,075.34	3,248.02	4,275	9,052	60,818
1991	2,370.73	3,329.16	4,638	9,187	59,269



1992	3,105.90	4,367.80	4,985	9,551	63,321
AAGR (%)	13	9	6	5	-1

Note: NA = not available.

### Market Structure

The number of RCTs was about five times more than the total number of SOEs and URCs on an average basis, as seen in Table 2. On the other hand, unlike the SOEs and URCs, the number of RCTs had a decreasing trend since 1985; which resulted in a negative AAGR of -1%. The Pearson correlation of the gross output value and the number of SOEs was 0.935, and the same correlation coefficients for the URCs and RCTs were 0.604 and -0.707, respectively. This clearly indicates that while the growth of SOEs was strongly correlated with the development of the domestic market, the URCs were falling behind and the RCTs did not keep pace with the development during the first stage.

### International Market Size

As presented in Table 3, Chinese construction firms carried out international projects in only 11 countries in 1979. After the open-door policy, this number grew gradually at an average of adding 10 countries per year. By 1992, Chinese contractors had entered into the construction markets in 159 countries. In 1979, Chinese contractors took only 33 international projects with a total contracting value of \$176 million; in 1992, Chinese contractors had finished more than 1,000 international projects with a total value of more than \$10 billion. In the labor services, Chinese contractors started with 10 contracts at \$91 million in 1979 and exceeded 8,000 contracts at about \$3 billion of contracting value in 1992. The number of construction projects accounted for 77% in all the international projects by Chinese contractors in 1979 and decreased to 12% in 1992, whereas labor services took a larger percentage in terms of contract numbers. On the other hand, the contracting value and turnover of construction projects remained stable at approximately 80% between 1979 and 1992, and labor services took the remaining 20% of the contracting value and turnover.

**Table 3.** International Market Size of the Chinese Construction Industry from 1979 to 1992

Year	Number of countries	Construction project	Contracting value (\$100 million)	Turnover fulfilled (\$100 million)	Labor service	Contracting value (\$100 million)	Turnover fulfilled (\$100 million)
		Number of contracts			Number of contracts		
1979	11	33	1.76	NA	10	0.91	NA
1980	16	138	6.65	5.84	34	2.14	2.23
1981	36	250	12.81	NA	113	10.58	NA
1982	38	195	15.74	8.60	119	7.33	7.23
1983	40	280	35.80	14.11	180	5.60	6.14
1984	52	344	67.06	21.54	396	8.68	5.62
1985	71	465	44.53	26.45	458	5.95	6.86
1986	83	486	44.47	30.63	458	6.36	5.76
1987	95	616	57.52	38.88	833	8.41	5.10
1988	103	642	53.30	36.84	1,484	10.55	5.20

1989	124	776	44.35	36.95	2,324	10.73	5.03
1990	122	920	51.21	39.62	4,255	11.52	5.37
1991	147	1,171	59.06	46.10	7,267	25.39	9.20
1992	159	1,164	115.00	52.63	8,241	29.24	14.15

Note: NA = not available.

## Second Stage from 1993 to 2001

Since the beginning of construction reform in 1992 and the implementation of the Construction Law in 1997 and the Tendering and Bidding Law in 1999, the Chinese construction industry has been developing at a higher speed and has had huge changes in both the domestic and international markets.

## Domestic Market Size

As indicated in Table 4, the gross output value had an AAGR of 15%, 1.5 times larger than the AAGR of the value added at 6%. The value added and gross output value had very smooth and steady growth, as shown in Fig. 1, while the latter grew much faster than the former. By the end of 2001, the value added and gross output value had increased by 64 and 195%, reaching more than 700 billion and 1.8 trillion yuan, respectively.

**Table 4.** Domestic Market of the Chinese Construction Industry from 1993 to 2001

	Market size (100 million yuan)		Market structure (number)					
Year	Value added	Gross output value	SOE	URC	RCT	HMTFF	FFF	OTDF
1993	4,337.27	6,226.20	6,363	14,130	70,486	NA	NA	NA
1994	4,571.68	7,175.61	7,251	15,196	69,842	NA	NA	NA
1995	4,910.37	7,629.55	7,531	15,348	71,017	329	312	613
1996	5,334.74	10,070.69	9,109	29,044	NA	417	388	2,406
1997	5,466.53	10,794.96	9,650	29,872	NA	491	454	3,550
1998	5,944.80	11,997.48	9,458	28,410	NA	629	337	6,800
1999	6,254.55	13,487.00	9,394	27,197	NA	664	341	9,638
2000	6,651.42	15,052.96	9,030	24,756	NA	635	319	12,778
2001	7,093.09	18,369.34	8,264	19,096	NA	622	274	17,637
AAGR (%)	6	15	4	7	NA	12	-1	91

Note: NA = not available.

## Domestic Market Structure

Three new types of firms have been introduced in the classification since 1995; namely, HMTFFs, FFFs, and OTDFs, and RCTs were no longer being classified. As shown in Table 4, whereas the number of SOEs and URCs increased slowly, the number of OTDFs climbed dramatically with an AAGR of 91%. The gross output value of firms in each type had also become available. The comparison of the number and gross output value of firms in each type in terms of percentage is presented in Figs. 2 and 3. In 1995, the number and gross output value of SOEs accounted for 31 and 63%, respectively, in the domestic

market; by 2001 these percentages had dropped to 18 and 35%, respectively. Likewise, the number and gross output value of URCs declined from 64 and 33% to 42 and 22%, respectively. On the other hand, the number of OTDFs increased considerably by 35% and their gross output value climbed by nearly 40%. In 2001, OTDFs gained more gross output value than SOEs, suggesting that OTDFs had become the major contributor to the domestic market. The Pearson correlation showed strong correlations with the growth of OTDFs and the development of the domestic market at 0.989 in terms of their number and 0.964 in terms of their gross output value. Although the percentage of gross output value of SOEs was declining, their actual gross output value was still growing and strongly correlated with the development of the market with the coefficient of 0.983; on the other hand, because the number of SOEs had decreased since 1997, it was not significantly correlated with the development of the market, and either did the growth of URCs. The market share of HMTFFs and FFFs were always no more than 1% in both their number and gross output value.

Through the comparison of market structure in both the number and gross output value of firms in each type, it was observed that the percentages of the gross output value produced by URCs were around half of the percentages of the number of accounted for by URCs. On the contrary, the percentages of the gross output value that SOEs produced doubled the percentages of their number, indicating that the output value of individual SOEs was about four times the output value of individual URCs. OTDFs had a similar percentage for both their number and gross output value. Therefore, the ratio of the output value of individual URCs, OTDFs, and SOEs can be concluded to be about 1:2:4.

### International Market Size

From 1993 to 2001, Chinese construction firms expanded their international business all over the world, up to the highest number of 188 countries in 1998 as shown in Table 5. The percentage of contracting value and turnover of construction projects tended to be very stable both at around 76% on average, reaching over \$15 and \$10 billion in 2001, respectively, with the number of contracts accounting for only 10% of the total. On the other hand, for labor services their contracting value and turnover contributed 22% on average and reached around \$4 billion in 2001, while their number of contracts was 89% of the total contracts.

**Table 5.** International Market Size of the Chinese Construction Industry from 1993 to 2001

		Construction project			Labor service		
Year	Number of countries	Number of contracts	Contracting value (\$100 million)	Turnover fulfilled (\$100 million)	Number of contracts	Contracting value (\$100 million)	Turnover fulfilled (\$100 million)
1993	158	1,393	99.11	70.06	10,212	30.77	16.62
1994	171	1,702	92.83	75.20	15,789	30.18	16.86
1995	178	1,558	98.79	67.43	17,397	26.49	17.78
1996	178	1,634	94.28	71.02	22,723	27.82	20.89
1997	181	2,085	100.49	71.22	25,743	30.09	25.55
1998	188	2,322	109.99	92.45	23,191	28.44	27.08
1999	187	2,527	123.41	103.12	18,173	31.85	31.74
2000	181	2,597	140.63	100.55	20,474	35.89	33.76



Year	Value added	Gross output value	SOE	URC	HMTFF	FFF	OTDF
2002	7,791.15	22,326.02	7,536	13,177	632	279	26,196
2003	8,922.58	27,496.14	6,638	10,425	535	287	30,803
2004	9,967.39	33,271.07	6,513	8,959	511	386	42,649
2005	11,673.30	38,904.67	6,007	8,090	516	388	43,749
2006	13,769.73	46,115.65	5,555	7,051	479	370	46,711
2007	16,202.03	54,065.50	5,319	6,614	482	365	49,294
2008	18,743.20	62,036.81	5,315	5,843	474	363	59,100
AAGR (%)	16	19	-6	-13	-5	5	15

### Domestic Market Structure

The number of SOEs and URCs continued to decrease from 16 and 28% in 2002 to 7 and 8% in 2008, respectively; likewise, their gross output value declined from 30 and 18% in 2002 to 20 and 5% in 2008, respectively, as illustrated in Figs. 4 and 5. The loss of the market share suggested that they had lost the dominant influence in the domestic market. On the other hand, OTDFs contributed most to the market growth in both the number of firms and the gross output value, acquiring 83 and 74% of the market share in 2008, respectively. The Pearson correlation again showed strong correlations with the growth of OTDFs and the development of the domestic market at 1.000 in terms of the gross output value and 0.959 in terms of the number of firms. The gross output value of SOEs also had a strong correlation with the domestic market with a coefficient of 0.995 because of their growing output value; however, their decreasing numbers resulted in a negative coefficient of -0.941. The declining of URCs had led to negative correlation coefficients as well. More FFFs started business in the Chinese market after China's WTO accession with an AAGR of 5%, and their gross output value increased considerably by 20% annually. However, the market share of HMTFFs and FFFs were still under 1% in both their number and gross output value.

### International Market Size

As shown in Table 8, by the end of 2008 the contracting value of construction projects had reached over \$100 billion and the turnover had surpassed \$50 billion, accounting for 88 and 82% of the total projects on average, respectively, while their number of contracts took only 9%. For labor services, representing 90% of the total contract number, their contracting value and turnover had exceeded \$7 billion since 2007, accounting for 11 and 17% on average, respectively.

**Table 8.** International Market Size of the Chinese Construction Industry from 2002 to 2008

	Construction project			Labor service		
Year	Number of contracts	Contracting value (\$100 million)	Turnover fulfilled (\$100 million)	Number of contracts	Contracting value (\$100 million)	Turnover fulfilled (\$100 million)
2002	4,036	182.16	135.44	30,163	33.30	37.16
2003	3,708	210.24	164.66	38,043	36.74	39.38

2004	6,694	274.21	200.88	53,271	40.28	43.16
2005	9,502	334.63	245.92	63,410	47.97	54.08
2006	12,996	732.65	332.92	94,386	58.08	59.64
2007	6,282	822.78	430.81	161,457	71.00	71.73
2008	5,411	1,045.62	566.12	157,682	75.64	80.57

## International Market Structure

Table 9 gives the turnover distributed over various regions. On average, Asia accounted for 50% of the market share at \$17.5 billion; Africa contributed \$8.8 billion at 22% of the market share; Europe took an 8% share at \$2.9 billion; and Latin America, North America, and the Oceanic and Pacific Islands had 5, 2, and 1% of the market share, respectively. Except for North America, the turnover of Chinese contractors in the other five regions increased constantly from 2002 to 2008. Similar to the previous stage, Asia and Africa were still the two largest international markets, and they had relatively high growth rates of turnover at 28 and 49% in 2008, respectively. Europe and Latin America also had increasing growth rates of turnover. North America was the only market where turnover declined by 26% after China's WTO accession.

**Table 9.** International Market Structure of the Chinese Construction Industry from 2002 to 2008

	Turnover (\$10,000)							
Year	Asia	Africa	Europe	Latin America	North America	Oceanic and Pacific Islands	Other	Inner country
2002	944,646	244,777	133,994	49,554	87,352	14,781	24,827	236,687
2003	1,075,603	337,090	168,416	84,391	36,785	10,258	32,927	305,367
2004	1,208,299	462,315	189,139	100,476	42,734	13,179	9,884	431,406
2005	1,363,976	708,982	276,919	165,814	58,901	10,284	76,028	364,790
2006	1,886,151	1,059,976	422,979	218,717	142,790	35,651	5,324	190,555
2007	2,530,643	1,345,624	431,042	309,915	114,502	46,155	5,065	294,404
2008	3,251,025	2,009,895	384,616	304,752	64,559	109,813	976	385,148
Average	1,751,477	881,237	286,729	176,231	78,232	34,303	22,147	315,480
Percentage (%)	50	22	8	5	2	1	1	11

## Discussion

In the domestic market, the gross output value grew relatively slowly prior to 1993. During the period of 1979 to 1992, the Chinese government had adopted the open-door policy, and the construction sector was not reformed and still under the assignment system. Therefore, despite their smaller number, SOEs were the backbone of the construction industry and created the majority of the gross output value in the domestic market. After the reform of the construction sector was announced in 1992, the construction industry grew at a higher rate and the market structure started to change. The market share of SOEs and URCs peaked during 1995 to 1997 and then declined continuously each year

after that. The evolution of the market structure suggested that it took 3–5 years for the construction reform to reveal its effects and for the traditional types of construction firms to lose their advantages and competitiveness. At the same time, OTDFs started to emerge at an overwhelming rate and grew from their debut to be the major contributor in the domestic market in less than 10 years. Since then, the construction sector has kept developing toward a liberalized and profit-oriented market.

In the international market, Chinese construction firms had little international involvement before 1979. After the open-door policy, Chinese construction firms started to pursue international projects and export labor services. The revenue from construction projects was the major contributor to the contracting value and turnover of the Chinese construction firms, accounting for around 80%, despite the fact that there were many more contracts in the labor services. Asia and Africa had been the largest two international markets for Chinese construction firms since they started international business, mainly because of their inexpensive labor cost. There were also historical reasons; in the 1950s, the Chinese government provided financial and technical donations to other developing countries in Asia and Africa. In other developed regions, Chinese construction firms were not able to gain more market shares and were not competitive compared with other construction firms in those areas.

## Conclusions and Recommendations

This study presents a comprehensive investigation of the development of the Chinese construction industry after the Cultural Revolution, with the consideration of Chinese currency inflation, to identify the reforms of the administration framework, growth of the market size, and evolution of the market structure. The development was divided into three stages based on Chinese government policy changes in the construction industry. The first stage was from 1979 to 1992, the second stage was from 1993 to 2001, and the third stage was from 2002 to 2008.

During the first stage, the Chinese construction industry was largely controlled by the government under an assignment system. During this period, the value added and gross output value increased by 329 and 221%, respectively; however, with frequent fluctuations. SOEs were the backbone in the domestic market, while RCTs were declining under the reform. In the international market, Chinese contractors expanded their business from 11 countries in 1979 to 159 countries in 1992, with 80% of the contracting value and turnover in construction projects and 20% in labor services.

Since the unified construction laws were issued in 1992, the Chinese construction industry has been developing at a higher speed. The value added and gross output value experienced very smooth and steady growths and increased by 64 and 195%, respectively, until 2001. While SOEs and URCs had lost half of their market share, the number and gross output value of OTDFs had been growing by 35 and 40%, respectively, by 2001, and had become the major contributor to the growth of the domestic market. In the international market, Chinese contractors expanded business all over the world and reached 188 countries. The percentage of the contracting value and turnover of construction projects tended to be very stable at around 76% of the total, while their number of contracts accounted for only 10% of the total. Labor services took 89% of contracts and only contributed 22% to the contracting value and turnover. Asia and Africa were the largest two markets for Chinese contractors,

accounting for 58 and 15% of the total turnover, respectively. The turnover fulfilled in other overseas regions was relatively small.

After the WTO accession in 2001, the domestic market had become more liberalized to foreign companies, and more FFFs had started business in the Chinese market. At the same time, Chinese contractors continued to exploit the international market. The value added and gross output value had the fastest and steadiest growth with AAGRs of 16 and 19%, respectively. The market share of SOEs and URCs continued to decrease, while OTDFs had gained more than 70% of the domestic market. In the international market, the contracting value of construction projects had reached over \$100 billion and the turnover had surpassed \$50 billion, while those of labor services had exceeded \$7 billion. Asia and Africa were still the two largest international markets, and they had relatively high growth rates of turnover at 28 and 49% in 2008. North America was the only market with a declining turnover after China's WTO accession.

Through a comprehensive investigation of the development of the Chinese construction industry in both the domestic and international markets, this study provides valuable knowledge to interested practitioners, scholars, and educators on how the Chinese construction industry grew from a restricted and controlled market to a liberalized and internationalized market after the Cultural Revolution. The administration framework, economic growth, and market structure of the Chinese construction industry were reviewed and analyzed using statistical data. Future research is needed to explore additional issues of the Chinese construction industry, such as quality, productivity, and sustainability, by obtaining on-site data from ongoing construction projects. In addition, further research is encouraged to investigate the existing problems and future challenges faced by the Chinese construction industry in the more competitive and fast-changing global market.

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