COMPARATIVE OVERSEAS STRATEGIES:
PERSPECTIVES OF
THE JAPANESE ENGINEERING AND CONSTRUCTION INDUSTRY

by

TAKASHI WASHIMI

Bachelor of Engineering
Tohoku University, Japan, 1985

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Signature of Author
Department of Civil and Environmental Engineering

Certified by
Fred Moavenzadeh
Department of Civil and Environmental Engineering
Thesis Supervisor

Accepted by
Joseph M. Sussman
Chairman, Departmental Committee on Graduate Studies

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Abstract

Even though globalization is a core strategy of most major Japanese engineering and construction (E&C) firms, they have made a weak appearance in the international construction market. Few firms have seriously attempted to globalize, largely due to their lack of a strong incentive to advance in the international market. Today, however, circumstances are changing. Japan has become the largest construction market in the world and has received considerable attention from foreign countries. Foreign governments, especially the United States, have begun to press the Japanese government to open its construction market to foreign firms. As a result, the Japanese construction market has become exposed for the first time to internal internationalization.

The purpose of this study is to assess overseas strategies which have been taken by Japanese E&C firms. However, the Japanese unique contractual system and public construction policy make the assessment difficult. The study found that while competition determines the strategies of international E&C firms, Japanese firms are determined by designation in the area of public works. It is competition that determines the strategies of international E&C firms. The nature of this competition is controlled by the contractual system of a market, while the contractual system is influenced by the construction policy of a country. Therefore, in order to study Japanese E&C firms' overseas strategies, this thesis will also examine the Japanese domestic contractual system, its construction policy and the resulting strategies of Japanese firms.

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George Macomber Professor of Construction Management

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I remember the dinner many years ago when, my father said that he learned much more at MIT, where he studied chemical engineering in the 1950s, than at the University of Tokyo, where he was later granted his Ph.D. degree, I decided then to come to study at MIT someday. At that time, however, I had no concrete plan for studying abroad as I had to finish my Japanese college education first.

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Table of Contents

List of Tables

List of Figures

List of Formulae

chapter 1

INTRODUCTION

Major international engineering and construction (E&C) contractors are always looking for opportunities to increase their business in the international market, as there are often unpredictable opportunities there. Today, a relatively large percentage of construction work in industrial countries is in the maintenance of old structures; newly industrialized countries (NICS) and developing countries are spending considerable amounts of money to establish the infrastructures they need to proceed with industrialization. One of the goals of civil engineering is to contribute to the peace and prosperity of the world through participating in these international engineering and construction projects.

Construction is as old as history. Originally, it was not a means of making money, but the staff of life. However, engineering has changed its nature so that it is more efficient, productive, challenging and powerful. Great business opportunities have been born as civil engineering has evolved. On the other hand, the international construction grew out of domestic construction services, in response to customer dissatisfaction when their demands could not be met due to domestic limitations.

U.S. E&C firms have led and still dominate the international construction market. Their strengths are demonstrated in petrochemical engineering, procurement, and construction fields, which account for about half of the international market today. The success of the U.S. E&C firms in petrochemical engineering is attributed to their technological competitive advantages. Since petrochemical engineering was born and grew up in the United States, its E&C firms have been able to get technological advantages through collaborating with the U.S. petrochemical industry.

European E&C firms have a long history of exporting engineering and construction to their former colonies. They have also expanded their businesses to include new markets in the U.S., Asia and South America, using merger and acquisition (M&A) as their main strategy. This practice has been common in European industries as in other countries, including the United States, so that today a considerable number of U.S. firms are operated by large European businesses. The advantages European E&C firms enjoy in their former colonies are cultural similarity, geographical advantages and historical backgrounds.

Japanese E&C firms have expanded into the international market as Japanese industries have become more internationalized. They began to export their engineering and construction services on a commercial basis after World War II, having already had overseas experience through participating in military, colonial, and government work during the pre-war period. While the Japanese economy expanded and invested overseas, Japanese E&C firms enjoyed the collaboration of overseas businesses with Japanese industries. However, when the Japanese economy headed into a recession and Japanese investments began to be withdrawn from overseas, Japanese E&C firms realized that their competitive advantages had been acceptable only in their domestically based competition, and were not acceptable in the open competition system of the international market. It became apparent that as opposed to the international construction market, each country has its own business traditions and rules, which are accepted only in that country. Since the U.S. E&C industry has strongly influenced the behavior of the international construction business, many U.S. business traditions and rules have been built into the international construction market. Among engineering and construction exporters, Japanese contractual practices may be further from those of the international construction market because of the unique evolutionary process that the Japanese construction industry has taken.

Recent Japanese construction scandals have disclosed the unique nature of this industry, and brought out its structural peculiarity, which may be considered to be the cause of its weakness in the international construction market. It is not too much to say that the Japanese construction market, the largest in the world today, is dominated by Japanese E&C firms. This is not because Japanese contractors have been highly competitive, but because there have been many visible and invisible barriers which have protected the industry from foreign competitors. In this environment, Japanese construction firms have adjusted to their positions, shared immense investments with each other, and enjoyed high profit margins. Only when Japanese firms look for overseas projects, do they notice that there is fierce competition in other markets. Takeshi Monden, a staff engineer of the World Bank, in analyzing the reason why Japanese E&C firms could not contract the projects funded by the World Bank, said that they had no competitive cost advantage, which was critical for the World Bank fund projects. He also believed that they were able to get a contract only if they could supply tied funds from Japanese industries and the government.

The U.S. construction industry was concerned that the invasion of Japanese E&C firms into their construction markets might overwhelm many U.S. firms. However, that has not happened so far. The U.S. imported engineering and construction for $15.5 billion in 1987, but it decreased its imports to $8.9 billion in 1991. This was due mostly to the recession and the decrease of foreign investment in the United States. As Japanese industries decreased their direct investment in the U.S., Japanese E&C firms began to restructure their organizations and operations in order to make them compatible with the U.S. market which is characterized by open and fierce competition, low profit margins, difficult labor relations, high wages, and many disputes. On the other hand, U.S. E&C firms are taking the offensive in the Japanese market. The Japanese construction industry has never regarded the Japanese domestic market as a part of the international market. It has had to change both its domestic and overseas strategies and adjust to changing business environments.

This thesis first describes the environment of the international construction market from the perspective of Japanese E&C firms, then studies structural issues of Japanese E&C industries, and finally explores future strategies. The two cases studied in this thesis represent two major engineering and construction exporters, general contractors and engineering contractors.

chapter 2

OVERVIEW

2.1 The International Construction Market

The annual value of world construction put in place has been about $3 trillion in recent years; construction services contribute about 6.5 percent of the world's Gross Domestic Product (GDP). Table 1 shows each country's construction market size, excluding construction materials, machinery and equipment. Japan is the largest market in value, with more than $650 billion in construction work completed in the year ending March 31, 1992. The annual value of construction put in place in the United States has been more than $400 billion. The value of construction in Europe is estimated at about $500 million a year. A large part of world construction consists of small scale projects, such as the construction of housing and road maintenance. This market, while only a fraction of total construction, is nevertheless a big business and it dominated by relatively few major firms. In the U.S., 200 firms conduct about 85 percent of the business, while in Japan, 200 firms conduct about 45 percent. Industrial countries account for

Table 1. World Construction Market (GDP base)
- Comparative Statistics on Construction Service as a Component in National Economics, 1990 -

Country	GDP ($million)	Percentage of GDP	Total ($million)
Low-Income Economies			
Ethiopia	6,034	3.6	217
Bangladesh	23,355	5.8	1,355
Mali	2,510	4.0	100
Zaire	3,007	2.0	60
Burkina Faso	1,454	0.6	9
Nepal	3,021	6.7	202
Myanmar	21,793	1.3	283
Malawi	1,841	4.2	77
Niger	2,122	4.0	85
Tanzania	5,904	1.5	89
Burundi	1,104	4.1	45
Uganda	4,463	7.2	321
Togo	1,050	3.5	37
Central African Republic	1,096	1.8	20
India	272,876	5.6	15,281
Madagascar	2,672	3.8	102
Somalia	1,612	3.8	61
Benin	1,528	4.9	75
Rwanda	2,378	6.9	164
China	301,660	5.7	17,195
Kenya	8,756	6.9	604
Sierra Leone	463	1.8	8
Haiti	2,281	5.1	116
Guinea	155	5.6	9
Ghana	6,226	3.1	193
Sri Lanka	7,935	7.4	587
Sudan	10,386	4.5	467
Pakistan	46,839	3.6	1,686
Senegal	4,625	2.9	134
Afghanistan	2,126	5.8	123
Bhutan	268	8.4	23
Chad	1,394	1.6	22
Laos	473	3.7	18
Mozambique	1,256	13.2	166
Vietnam	8,526	4.4	375
Sub-total (Low Income)			40,309

Country	GDP ($million)	Percentage of GDP	Total ($million)
Middle-Income Economies			
Mauritania	1,005	5.6	56
Liberia	1,194	2.5	30
Zambia	3,910	3.5	137
Lesotho	582	18.7	11
Bolivia	5,477	2.7	148
Indonesia	107,294	5.5	5,901
Yemen	7,873	11.0	866
Cote d'Ivoire	9,369	9.0	843
Philippines	43,858	4.4	1,930
Morocco	25,175	5.5	1,385
Honduras	4,891	4.4	215
El Salvador	5,113	2.6	133
Papua New Guinea	3,201	5.7	182
Egypt	62,932	5.0	3,147
Nigeria	32,426	1.9	616
Zimbabwe	6,199	2.2	136
Cameroon	13,363	5.9	788
Nicaragua	34,136	3.5	1,195
Thailand	80,172	7.2	5,772
Botswana	2,478	5.7	141
Dominican Republic	7,103	7.2	511
Peru	40,835	8.1	3,308
Mauritius	2,537	7.1	180
Congo	2,425	1.8	44
Ecuador	10,876	3.3	359
Jamaica	3,994	13.1	523
Guatemala	7,644	2.0	153
Turkey	108,411	6.6	7,155
Costa Rica	5,686	3.3	188
Paraguay	5,265	5.5	290
Tunisia	10,004	4.9	490
Colombia	41,122	5.7	2,344
Jordan	3,869	6.2	240
Syria	24,770	4.3	1,065
Angola	4,838	1.9	92
Cuba	16,399	9.3	1,525
Korea (North)	23,000	6.0	1,380
Lebanon	2,656	4.8	127
Mongolia	1,933	5.8	112
Sub-total (Middle Income)			43,718

Country	GDP ($million)	Percentage of GDP	Total ($million)
Upper-Middle-Income Economies			
Chile	27,791	5.8	1,612
Brazil	447,473	7.0	31,323
Portugal	59,680	7.5	4,476
Malaysia	42,373	3.5	1,483
Panama	4,949	3.3	163
Uruguay	8,218	3.5	288
Mexico	241,386	3.9	9,414
Korea (South)	239,772	12.9	30,931
Yugoslavia	101,413	6.0	6,085
Argentina	105,751	1.9	2,009
South Africa	102,004	3.2	3,264
Algeria	54,100	17.3	9,359
Venezuela	48,274	4.9	2,365
Greece	65,958	6.8	4,485
Israel	53,968	5.3	2,860
Hong Kong	70,048	5.5	3853
Trinidad and Tobago	5,094	9.2	469
Singapore	34,599	6.1	2,111
Iran	392,807	5.3	20,819
Iraq	64,340	8.0	5,147
Sub-total (Upper Middle Income)			142,516
High Income Oil Exporters			
Oman	10,622	3.1	329
Libya	27,963	12.7	3,551
Saudi Arabia	82,996	9.1	7,553
Kuwait	22,842	2.3	525
United Arab Emirates	33,780	9.2	3,108
Sub-total (Oil Exporters)			15,066

Country	GDP ($million)	Percentage of GDP	Total ($million)
Industrial Market Economies			
Spain	491,260	8.3	40,775
Ireland	42,612	9.0	3,835
Italy	1,090,755	5.9	64,355
New Zealand	44,026	3.5	1,541
United Kingdom	980,124	6.8	66,648
Belgium	192,392	5.8	11,159
Austria	157,378	7.0	11,016
Netherlands	279,153	6.2	17,307
France	1,190,772	5.3	63,111
Japan	2,940,362	8.8	2,58,752
Finland	137,251	9.7	13,313
Germany	1,488,234	5.6	83,341
Denmark	129,264	5.8	7,479
Australia	294,639	8.8	25,928
Sweden	228,110	7.6	17,336
Canada	570,137	6.6	37,629
Norway	105,703	4.2	4,440
United States	5,392,200	4.8	258,826
Switzerland	224,845	7.6	17,088
Sub-total (Industrial Economies)			1,003,897
East European Economies			
Hungary	32,901	5.1	1,678
Poland	53,290	9.5	5,063
Albania	2,169	6.4	139
Bulgaria	20,726	8.0	1,658
Czechoslovakia	37,034	10.0	3,703
Romania	37,625	9.3	3,499
former USSR	1,096,697	11.0	120,637
Sub-total (East Economies)			136,377
World Total			1,381,883

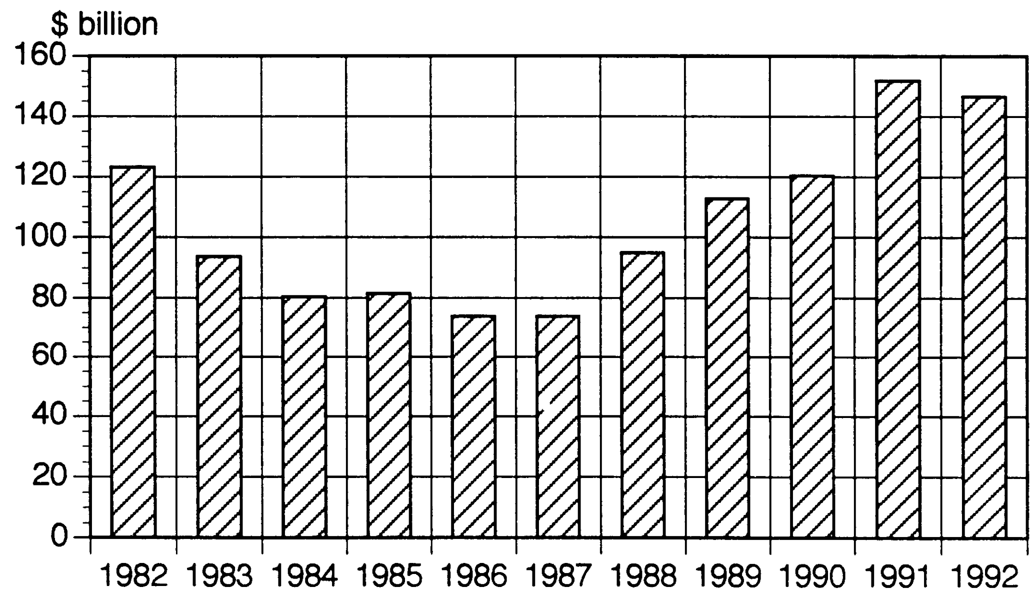
Sources: United Nations, "Statistical Yearbook," 1990/91.
Britannica, "Book of the Year," 1993

73 percent of world construction value. Most construction demands in industrial countries are fulfilled by the domestic industries, while most international contract awards come from developing countries, due primarily to their lack of technology, finances and resources. The Engineering News Record (ENR) has reported the top 250/225 international contractors for many years. These firms, which are estimated to account for about 70% of the total international contract value, provide data showing recent trends in the world construction market (Figures 1 and 2, and Table 2). In recent years, petrochemical projects have increased their dominance of the international market (Figure 3). This means that high-level management and coordinate skills are needed for large, complicated projects, As a result, U.S. construction and engineering firms have increased their business opportunities to dominate the world market. (Table 3 shows the value and percentage of the international operation of the five largest contractors in selected countries.) The primary obstacle for fulfilling these opportunities will be inadequate financing. Future opportunities will require the adaptation of new financial techniques and strategies.

There are many incentives and disincentives to participate in the international market. Although international contractors enjoy higher profit margins in the international market (Figure 4), each exporter has a different perspective. For instance, the Japanese E&C contractors' incentives include the internationalization of Japanese industries, lower interest rates,

Figure 1.

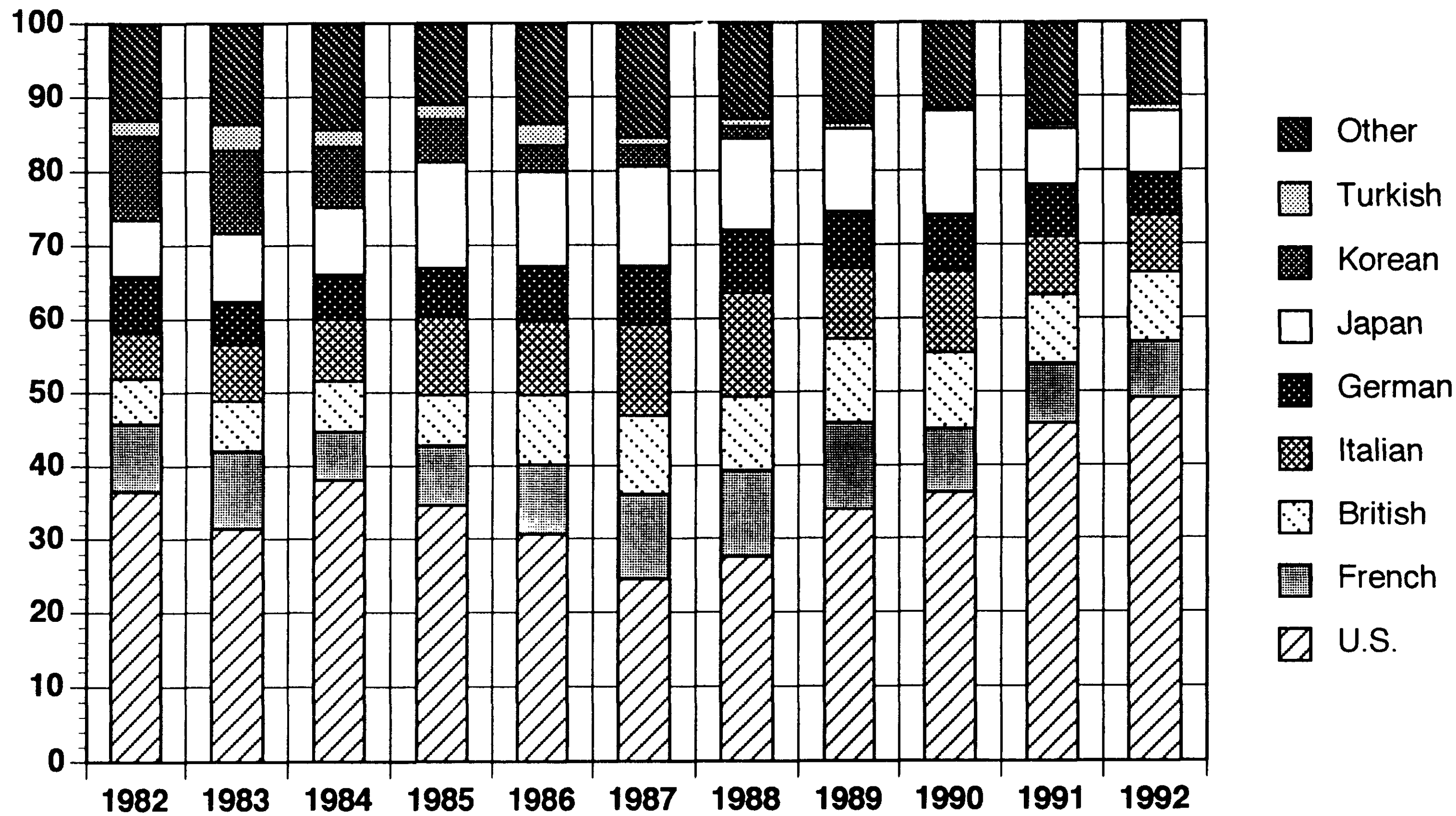
International Contract Value Awarded to the ENR's Top International Contractors



Source: ENR, The Top International Contractors.

Figure 2.

Share in the International E&C Market by Country



Source: ENR, The Top International Contractors.

Table 2.

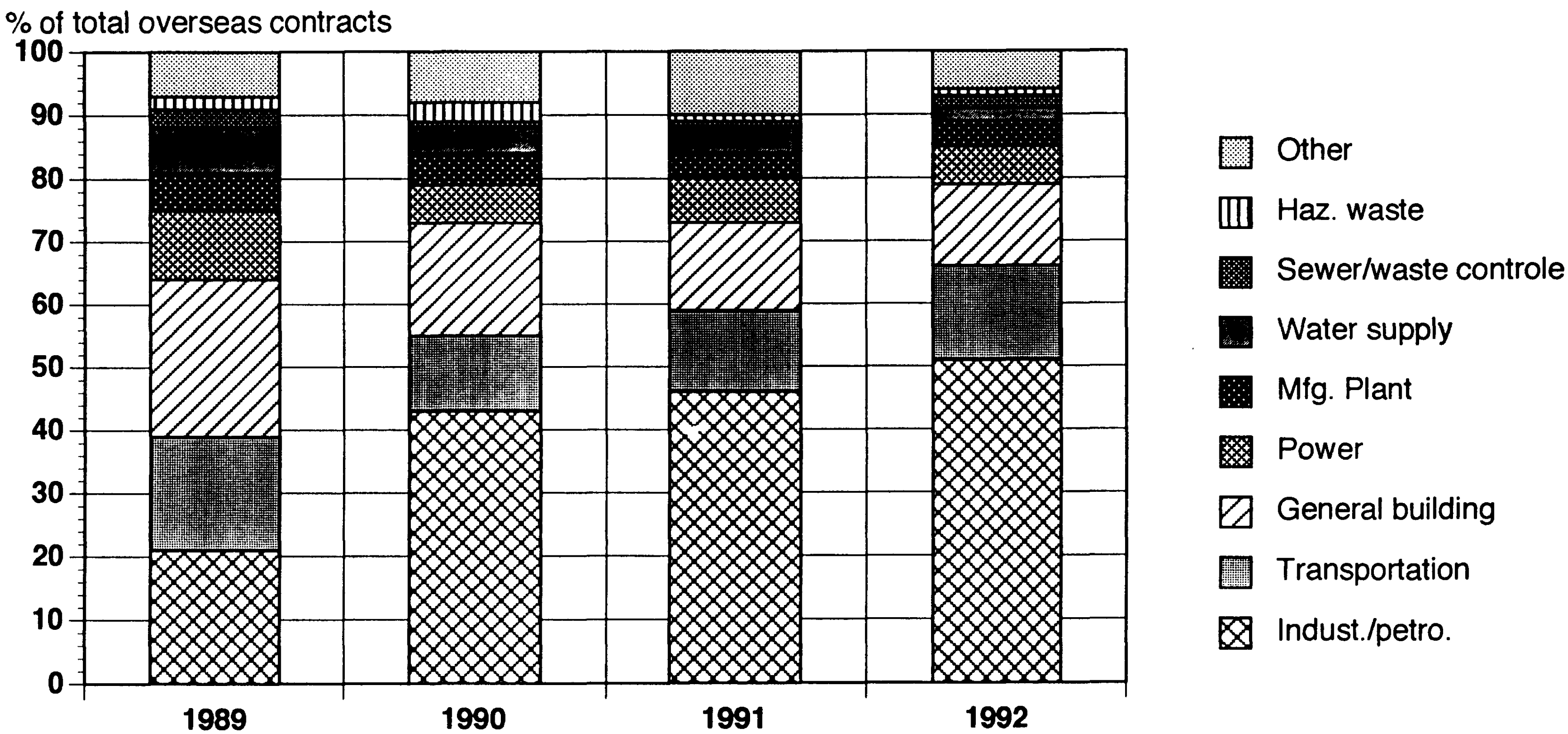
Headlines about "The Top International Contractors" in ENR
(1982-1993)

1982	**Foreign market growth despite recession** - Contractors confront problems in slow market -
1983	**Recession cuts foreign work almost 9%** - Contractors confront changes -
1984	**Foreign contracts take a dive** - Sagging markets abroad keep many contractors near home -
1985	**Foreign contracts slump further** - Asia and North America only regions to improve in 1984 -
1986	**Foreign contracts inch upward** - Smaller markets blossom as Midwest, Asia wither -
1987	**Foreign awards continue decline in most regions** - Mideast work declines by a quarter -
1988	**Foreign contracts hold steady** - Surge in Europe offsets most of the decline in other regions -
1989	**Foreign contracts bouncing back** - Volume of international business best in six years -
1990	**Foreign contracts stay alive as markets take on a new look** - Cautious contractors reposition themselves to exploit new opportunities -
1991	**Instability slows growth abroad** - Rapid economic, political changes restrain Europe as contractors eye promising Far and Mideast markets -
1992	**Firms set sail for hot markets** - Asia overtakes Europe as most active market in the world -
1993	**International contracts dip slightly in 1992** -Mediocre year doesn't dampen spirits as contractors see brighter days ahead -

Source: ENR, The Top International Contractors, 1982-1993.

Figure 3.

Market Segmentation in the International Market



Source: ENR, The Top International Contractors.

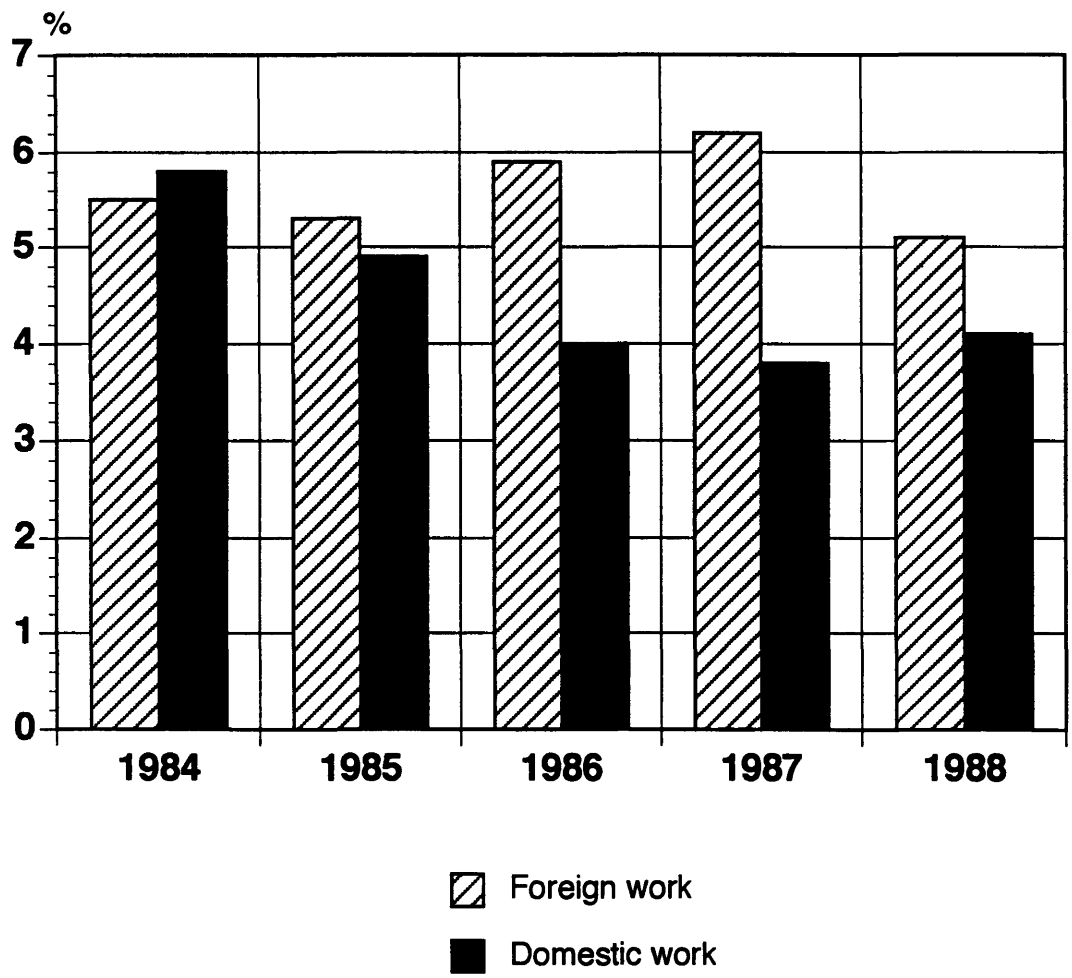
Table 3. Percentage of International Operations
- Five Largest Contractors in Selected Countries -

	Firm	Plant %	Int'l	Total	Int'l %
U.S.A.					
1	Bechtel Group Inc.	57	15,172.6	23,656.8	64.1
2	Flour Daniel Inc.	86	4,880.0	22,946.0	21.3
3	Brown & Root Inc.	91	10,275.2	13,718.1	74.9
4	The M.W. Kellogg Co.	90	10,358.0	13,418.6	77.2
5	Foster Wheeler Corp.	95	6346.0	8794.0	72.2
U.K.					
1	John Brown/Davy	96	10,081.0	13,040.0	77.3
2	Balfour Beatty Ltd.	n/a	460.0	2,550.0	18.0
3	Trafalgar House Const.	0	1,007.0	2,172.0	46.4
4	Bovis Construction Group	2	1,325.0	2,105.0	62.9
5	Costain Group PLC	9	425.0	1178.0	36.1
German					
1	Phillip Holzmann AG	n/a	2,731.5	11,796.4	23.2
2	Hochtief AG	1	1,182.0	5,319.0	22.2
3	Bilfinger+Berger Bau AG	12	2,027.6	4,264.3	47.5
4	Dyckerhoff & Wildmann	29	326.0	2,605.0	12.5
5	Walter Bau AG	0	195.0	2,395.0	8.1
France					
1	Bouygues	28	2,933.0	9,779.0	30.0
2	GTM-Entrepose	27	2,149.8	5,292.3	40.6
3	Spie Batignolles	17	1,285.0	3,940.0	32.6
4	CEGELEC	40	1,294.0	2,942.0	44.0
5	DUMEZ	14	1,473.0	2,621.0	56.2
Japan					
1	Shimizu Corp.	13	1,071.0	17,653.0	6.1
2	Kajima Corp.	4	938.7	15,477.0	6.1
3	Taisei Corp.	12	444.8	14,187.6	3.1
4	Obayashi Corp.	0	917.9	13,356.7	6.9
5	Takenaka Corp.	0	703.3	12,884.3	5.5
Others					
	Hyundai E&C (Korea)	37	1,151.7	3,421.6	33.7
	Skanska (Sweden)	2	662.0	3,652.0	18.1
	China Harbour (China)	0	915.5	2,368.1	38.7

Source: ENR, The Top International Contractors, August 23, 1993

Figure 4.

Profit Margins of International Contractors



Source: ENR, The Top International Contractors.

increasing ODA, high technologies in some fields, and the attractive Asian market as a neighbor. The disincentives include the large domestic market, language and cultural differences, a lack of capabilities in overseas businesses, the continuing rise in the value of Japanese currency, and unexpectedly fierce competition. Of course, even if there are more incentives than disincentives, this does not mean that Japanese E&C firms will do well in the international market. The ability to accomplish superior work is necessary. Although the Japanese E&C industry has been protected and has enjoyed running its business according to its own rules in the domestic market, it has few competitive advantages when it competes under other rules. This does not apply only to the Japanese case; almost all countries set their own rules in domestic markets or impose entry barriers on foreign exports. The point at issue is how international E&C firms solve these problems and get into other markets.

2.1.1 The U.S. Market

New U.S. market contracts awarded to international contractors in 1992 accounted for only $8.9 billion or 6.1% of the international market. This was only a fifth of the value of the Asian market or a fourth of the European market. The U.S. gained many more contracts in the international market than it gave; this would indicate that although many international E&C firms consider the U.S. market to be relatively open, there must be strong invisible barriers. These barriers are visible statistically: U.S. contracts to foreign contractors declined from $15.3 billion in 1990 to $8.9 billion in 1992, a drop of 42%. This trend is partly due to the U.S. recession which started in 1990. Further problems result from lower profit margins and troublesome lawsuits, so that even if the entry barriers were erased, the U.S. market might not be attractive to foreign firms.

Britain had the largest share of the U.S. market in 1992. Germany, Japan, France, Italy and Canada followed. No country dominates this market and there is fierce competition not only among the foreign competitors but also within U.S. E&C firms. Only Italy increased its U.S. contracts in 1992 over 1990. Japan lost 55%, Canada 53%, Britain 35%, France 33% and Germany 32%.

Japanese E&C firms' performances in the U.S. have been greatly affected by Japanese direct investments in the U.S. because 55% of the total contracts in the U.S. are awarded by Japanese industries. In recent years, however, not only has Japanese foreign direct investment declined (see Table 4), but also failures of real estate and development investment have added to the burden of Japanese E&C firms. The Japanese operation in the U.S. needs restructuring along with other overseas strategies in Japanese industries.

Table 4. Japanese Foreign Direct Investment

($ million)

	1989	1990	1991
Europe	14,808 (162.4%)	14,294 (96.5%)	9,371 (65.6%)
North America	33,902 (151.8%)	27,192 (80.2%)	18,823 (69.2%)
Asia	8,238 (147.9%)	7,054 (85.6%)	5,936 (84.2%)
Total	67,540 (143.6%)	56,912 (84.3%)	41,584 (73.1%)

*The percentage changed from previous year.

Source: OCAJI, "Kensetsu-gyo oyobi Sekaiteki Kigyo no Kokusai-ka, Genchi-ka Seisaku ni Kansuru Chyosa Kenkyu," 1993.

2.1.2 The European Market

The European market was 23% of the total in 1992, having increased steadily in size since 1983. Table 5 shows the growth rate of construction markets in selected European countries. The amount of western European construction investment as a whole, however, has not changed noticeably, while eastern Europe and the former Soviet Union tantalize with their huge potential markets but shortage of cash. Hence the expansion of the European market is due mostly to market intervention between countries.

The U.S. was the top runner in the market in 1992. U.S. and European E&C firms held a total of 93,6% of the market. Japan has moved back as a result of decreasing Japanese direct investments in Europe. Since Japanese E&C firms contracted 98% of their business from Japanese firms, contracts in Europe have depended greatly on direct investments. It is not too much to say that Japan cannot join the competition in Europe.

Table 5.

Growth Rate of European Construction Markets

	1987	1988	1989	1990	1991	1992	1993
Austria	3.1	5.7	4.1	5.8	5.9	4.9	4.2
Belgium	5.0	14.0	10.0	6.0	-1.0	1.0	2.0
Denmark	1.9	-4.3	-4.4	-5.0	-6.5	1.8	2.2
Finland	1,0	10.0	14.0	0.0	-14.0	-14.0	-3.0
France	4.2	5.2	4.8	2.5	0.3	-0.1	0.7
Germany	0.0	3.0	5.0	5.0	4.0	1.5	1.0
Ireland		-3.4	11.4	14.7	-2.5	0.3	5.0
Italy	-1.1	1.2	3.8	2.1	1.4	0.1	-0.9
Netherlands	2.0	11.0	3.1	1.5	-0.2	-3.4	-2.4
Norway		-0.8	-13.0	-9.1	-3.3	-3.1	3.0
Spain	10.4	10.5	13.0	9.0	4.0	-1.0	2.0
Sweden		2.4	7.6	0.8	-1.5	-3.0	-4.3
Switzerland	5.8	6.4	6.1	0.3	-4.6	-3.2	2.0
United Kingdom	8.0	7.0	4.0	1.0	-9.0	-5.5	-0.5
Euroconstruct countries	3.2	4.8	4.8	2.9	-0.2	-0.7	0.5

* '92, '93 expected

Source: OCAJI, "Kensetsu-gyo oyobi Sekaiteki na Kigyo no Kokusaika, Genchi-ka ni Kansuru Chyosa Kenkyu," 1993.

2.1.3 The Asian Market

Asia is the largest and the most promising market in the world. New contracts grew by 23% in 1992 to $42.6 billion or 29.1% of the total. Together with the European market, it controls the international market today. By 1992 the U.S. contractors had penetrated this market very successfully, and accounted for about a half of the total. Japan had 18.8% of the market, and Europe had 22.1%. Despite the great number of opportunities, competition for the Asian market is fierce, not just among international contractors, but regional and national contractors are involved as well. Table 6 shows major projects in progress in the Asian region.

Broadly based economic growth through much of east and south-east Asia has fueled a strong demand for office, industrial, and residential construction. Figure 5 shows the GDP growth rate in selected Asian countries in 1993. Competitive pressures and rising materials costs may be keeping contractors' profit margins narrower than they would like, but huge investments have been put into public infrastructure projects. Roads, ports, airports, and railways are in urgent need of expansion. Power generation and delivery networks, stretched to the breaking point, threaten brownouts and power cuts. Except for debt-burdened Indonesia and the Philippines, governments are gearing up to spend unprecedented sums on the essential foundation work for future economic growth.

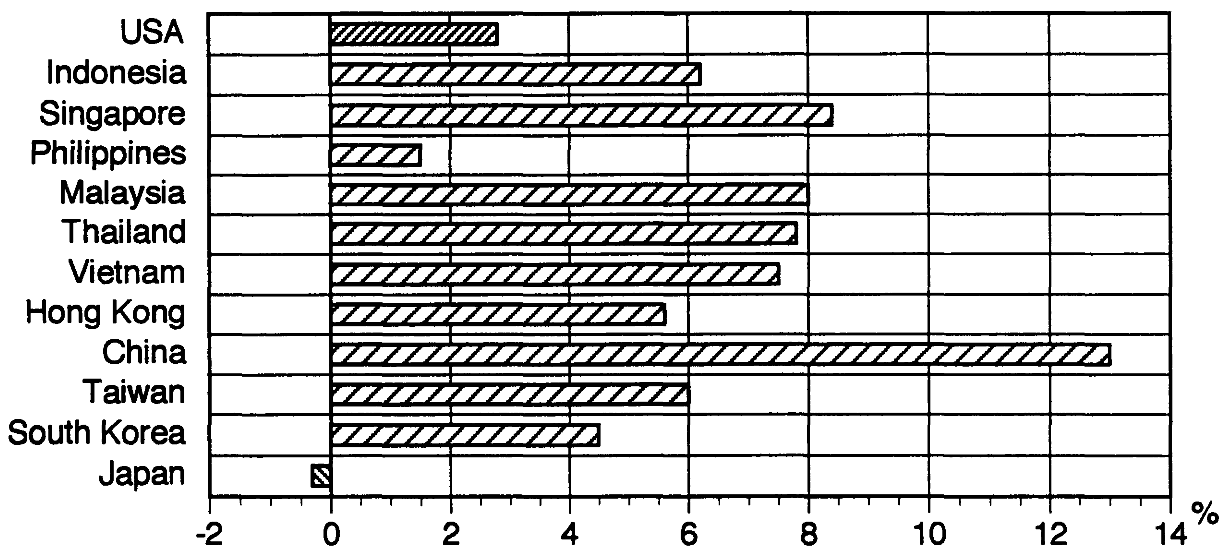
Table 6. Major Ongoing Projects in Asia

Project	Owner	Cost	Period
South Korea			
Transport Project in major cities	Government	$42,000	1900-2000
Development of west coast	Government	$35,000	1990-2011
Seoul Subway Project	Seoul Metro. Government	$6,100	1990-2000
Sewage Treatment Project	Government	$3,000	1990-1995
Hong Kong			
Expansion of port facilities	Government	$6,349	1991-2006
Chep Lap Kok airport	Government	$4,440	1991-2006
Highways and railway systems	Government	$3,456	1991-2006
Sewage treatment programme	Environmental Protection Board	$2,560	1990-1995
Urban development at Tung Chung	Government	$1,510	1991-2006
Taiwan			
Power station projects	Taiwan Power Co.	$59,000	1989-2001
Environmental Protection	EPA	$40,000	1990-1999
Taipei Mass Transit System	Taipei City Council	$12,000	1988-2000
Chiang Kai Shek Airport II	Government	$716	1991-1995
Singapore			
Road Development Programme	Public Works Dept.	$560	1990-1995
Pulau Brani Terminal Development	Port Authority	$467	1990-1994
Indonesia			
Otefin plant at Cilacap	Pertamina/Shell	$1,500	1990-1994
Jakarta Outer Ring Road	PT Jasa Marga	$824	1991-1996
Batam Industrial Park	PT Batamindo Investment Corp.	$500	1990-1994
Jakarta Horbour Road	PT Citra Latoro	$350	1991-1996
Malaysia			
North South Highway	United Engineers	$2,000	1990-1993
Thailand			
Power Development Programme	Electricity Generation Auth.	$11,670	1990-2007
Bangkok expressway project	Bangkok Expressway Ltd.	$2,100	1990-1995
Bangkok Skytrain Project	Expressway Transit Authority	$1,200	1992-2000

Source: Quak, S.K., Market Abroad: Competitive strategies and market niches for the Singapore construction industry, 1991.

Figure 5.

GDP Growth Rates in Selected Asian Countries
(1993 est.)



Source: U.S. News, "The Lure of the Orient," Nov.22, 1993

2.1.4 The Middle Eastern Market

As the third largest market, the Middle East attracts mainly process plant engineering contractors.

Although the Middle East is still regrouping following the Persian Gulf war, the region is beginning to show signs of forward movement. The Organization of Petroleum Exporting Countries (OPEC) has taken steps to secure firmer crude oil pricing, and projected growth in oil revenues in 1993 should allow the governments in the region to resume petrochemical development projects postponed during the war. In the meantime, reconstruction continues.

U.S. E&C contractors accounted for 60.4% of the Middle Eastern market. Despite a shrinking market (4% less contracts awarded in 1992 than in 1991), the U.S. E&C firms began to dominate the market. The Chemical Marketing Reporter analyzed the strength of the U.S. E&C firms as the result of the good will generated by Operation Desert Storm. Economic shifts by many countries toward privatization, the liberalization of foreign exchange and increased joint venture type projects with foreign partners are clear signals for American participation. At one time Korean firms functioned in this market with cheap workers as their competitive advantage, but they no longer have this cost advantage in the foreign market and their status as international contractors has dropped.

Clients in this market are not necessarily Middle Eastern governments or their private sectors; many are multinational oil companies and process companies with their headquarters in the U.S., which makes it easier for U.S. E&C firms to perform well in this market.

2.1.5 The African Market

The size of the African market amounted to $14.5 billion in 1992, down from $21.7 billion in 1991. U.S. contractors accounted for 33.5%, less than the share it took for any other region. European contractors, having linguistic, cultural, and geographic advantages in former colonized countries, accounted for 52.7 %. Many Japanese go to Africa on a temporary basis to work for ODA related projects, while some Japanese firms have branch offices in African countries. Table 7 indicates the economic situation of Africa.

2.1.6 The Japanese Market

The largest construction market today in terms of annual value is the Japanese market, partly because of the inflated value of the Japanese yen. Although it was the largest borrower from The International Bank for Reconstruction and Development (IBRD) in the post war period, Japan has

Table 7.
Macroeconomic Indicators in Africa

Indicators	1988	1989	1990	1991	1992
Real GDP Growth (%)	4.8	4.2	3.4	2.6	1.9
Inflation (%)	17.0	17.9	15.9	23.7	19.7
Fiscal Deficit (% of GDP)	10.8	8.0	7.5	7.7	6.2
Growth of Money Supply (M2)	22.9	16.0	24.9	17.6	15.5
Export Growth, Volume (%)	3.6	-3.4	4.8	3.8	1.7
Import Growth, Volume (%)	2.6	-1.3	12.8	-5.2	1.1
Terms of Trade	-11.9	8.5	9.4	-8.6	-4.2
Trade Balance ($ billion)	-11.3	-8.6	-1.1	-4.1	-12.4
Current Account ($ billion)	-15.4	-11.3	-2.5	-4.6	-10.8
Current Account (% of GDP)	-5.1	-3.7	-0.7	-1.4	-3.8
Debt Servicing (% of Export)	26.7	28.7	25.1	28.6	32.4

Source: African Development Bank, African Development Report ,1993 become the bank's largest contributor as well as the world's largest investor. Total construction investments in 1992 amounted to ¥87.5 trillion ($818 billion) which accounted for 18.5% of the GNP. The private sector invested about 61% of the total and the public sector invested about 39%. The industry employed 619 million people, 9.6% of the total Japanese work force. This huge investment is due largely to the insufficient infrastructure in Japan. Table 8 shows Japan's poor social capitals.

Table 8. Comparison of Social Capitals

	Japan	U.S.A.	U.K.	France	Germ.
Floor space per house (m^2)	89.3	153.6	95.0	82.3	86.3
Floor space per person (m^2)	25.0	61.8	35.2	30.7	37.2
Sewer system comp. rate (%)	44	73	95	64	91
Public space per person (m^2)	2.5 (Tokyo)	19.2 (N.Y.)	30.4 (London)	12.2 (Paris)	37.4 (Bonn)
Paved road percentage (%)	66.7	90.0	100.0	100.0	99.0

Source: The Ministry of Construction, White Paper on Construction, 1991.

The ministry of construction conducted a survey of cases in which international E&C contractors, designers, and consultants were awarded contracts in both the private and the public sectors in Japan between 1985 and 1989. The total number of contracts awarded to international contractors, designers and consultants was 204 during this period. Urban development-related projects accounted for 46.1%, followed by resort development-related projects, which accounted for 31.4%. The U.S. was the clear leader with 139 contracts, 68.1% of the total, while the U.K. had 9.3%, Italy, 5.9%, and France, 5.4%. Table 9 shows how U.S. firms have been faring in Japan.

Table 9. U.S. Firms' Contract Amounts in the Japanese Market

	$ mil. Public works awarded to U.S. firms in Japan under MPA	$ mil. Non-MPA public works awarded to U.S. firms in Japan	$ mil. Japanese private-sector jobs won by U.S. firms	$ mil. Federal U.S. projects won by Japanese firms
1988	15	122	1	N/A
1989	92	106	214	52
1990	6	8	19	112
1991	248	272	26	100
1992	174	175	14	N/A

Source: ENR, U.S. getting tough with Japanese, May 17, 1993.

2.2 Contractors

2.2.1 International Contractors

Who are main actors in the international market? The more complicated the construction project, the more industries participate in this market. In addition to traditional building and heavy civil contractors, process engineering contractors, plant manufacturers, trading companies, and steel companies have joined it. Today, general contractors and engineering contractors are the two major participants. Although both contractors are called engineering and construction firms, it is necessary to distinguish whether the firm is an engineering contractor or a general contractor in order to establish specific strategies and organizations. Their businesses are incompatible, and so are their strategies. General contractors and engineering contractors are distinguished as follows: a contractor with more than fifty percent sales from petroleum and industrial plant projects is classified as an engineering contractor; otherwise it is a general contractor.

A. General Contractors

According to the ENR (August , 1993), the amount of international contracts awarded in 1992 to 76 general contractors among the top 100 international contractors was $59.4 billion, or 42% of the total contracts (Table 10). Twenty-four engineering contractors accounted for $81.0 billion, or 58% of the total (Table 11). Engineering contractors enjoyed higher contract values, and also had a higher international market share: 56% compared to 22% for general contractors (Table 12). Ten U.S. building/civil contractors accounted for $9.3 billion, or $933 million per firm on average, thirty-six European contractors accounted for $33.9 billion, or $943 million per firm, and fourteen Japanese contractors accounted for $9.2

Table 10.

Top International General Contractors (1992)

ENR Rank	Firm	Country	International	Total	Int'l Ratio
9	Bouygues	France	2,933	9,779	30%
10	Philipp Holzmann	Germany	2,731	11,796	23%
11	Morrison Knudsen	USA	2,316	4,887	47%
12	GTM	France	2,150	5,292	41%
13	CRSS	USA	2,109	4,659	45%
14	Bilfinger Berger	Germany	2,028	4,264	48%
15	HBG	Netherland	1,895	3,056	62%
16	Fiatimpresit	Italy	1,887	4,208	45%
17	Mitsubishi	Japan	1,857	9,638	19%
20	DUMEZ	France	1,437	2,621	55%
21	Ebasco	USA	1,399	5,340	26%
22	Bovis	UK	1,325	2,105	63%
23	Ansald SPA	Italy	1,310	3,637	36%
24	CEGELEC	France	1,294	2,942	44%
25	Spie Batignolles	France	1,285	3,940	33%
28	Hochtief AG	Germany	1,182	5,319	22%
29	Hyundai	Korea	1,152	3,422	34%
31	Ballast Nedam	Netherland	1,074	1,685	64%
32	Shimizu	Japan	1,071	17,653	6%
34	Trafalgar House	UK	1,007	2,172	46%
35	IRITECNA SPA	Italy	1,005	3,059	33%
36	Nishimatsu	Japan	939	7,055	13%
37	Kajima	Japan	939	15,477	6%
38	Obayashi	Japan	918	13,357	7%
39	China Harbour	China	916	2,368	39%
40	ABB SAE	Italy	898	1,157	78%
42	Jacobs	USA	827	8,657	10%
44	Aoki	Japan	811	3,071	26%
45	Danieli & C.	Italy	758	768	99%
47	Takenaka	Japan	730	12,884	6%
48	Daewoo	Korea	696	2,731	25%
49	Andrade Gutierrez	Brazil	687	1,317	52%
50	Joannou & P.	Cyprus	685	685	100%
51	Dragados	Spain	681	3,075	22%
52	Skanska	Sweden	662	3,652	18%
54	PCL	USA	640	1,105	58%
55	Boskalis	Netherland	630	745	85%

56	The Austin	USA	619	2,238	28%
57	Odebrecht	Brazil	612	1,921	32%
58	China State	China	574	2,383	24%
59	Mannesmann	Germany	567	1,554	36%
60	Leigton Holdings	Australia	566	1,428	40%
62	George A. Fuller	USA	505	606	83%
64	Balfour	UK	460	2,550	18%
65	Lurgi AG	Germany	456	709	64%
66	Taisei	Japan	445	14,188	3%
67	Belleli	Italy	444	566	78%
69	ENKA	Turkey	427	601	71%
70	Costain	UK	425	1,178	36%
71	Rust	USA	408	5,710	7%
72	Jean Lefebvre	France	407	1,787	23%
73	Tokyu	Japan	398	4,794	8%
74	IMPREGILO	Italy	354	354	100%
77	Dyckerhoff	Germany	326	2,605	13%
79	Astaldi	Italy	307	443	69%
80	Sezai Turkes	Turkey	297	299	99%
81	The Turner	USA	295	3,342	9%
82	Taikisha	Japan	281	1,361	21%
83	Maeda	Japan	272	4,852	6%
84	Ed. Zublin	Germany	259	1,842	14%
85	KMG TRUDBENIK	Yugoslavia	240	327	73%
86	Noell	Germany	234	553	42%
87	S.B.B.M. & Six	Belgium	227	794	29%
89	Solel Boneh	Israel	222	222	100%
90	Dillingham	USA	214	571	37%
91	Hazama	Japan	212	5,855	4%
92	Sato Kogyo	Japan	208	5,776	4%
93	IPCO	Singapore	202	202	100%
94	McConnell Dowell	Australia	198	236	84%
95	Walter Bau	Germany	195	2,395	8%
96	Pomerleau	Canada	189	420	45%
97	GAMA	Turkey	184	366	50%
98	Keller	UK	181	232	78%
100	Mitsui	Japan	161	4,927	3%
Total			59,435	269,765	22%

Source: ENR, The Top International Contractors, August 23, 1993.

Table 11.
Top International Engineering Contractors

ENR Rank	Firm	Country	International	Total	Int'l Ratio
1	Bectel Group	USA	15,173	23,657	64%
2	The M.W. Kellogg	USA	10,358	13,419	77%
3	Brown & Root Inc.	USA	10,275	13,718	75%
4	John Brown/Davy	UK	10,081	13,040	77%
5	Foster Wheeler	USA	6,346	8,794	72%
6	ABB Lummus Crest	USA	6,285	7,870	80%
7	Flour Daniel	USA	4,880	22,946	21%
8	The Parsons	USA	3,623	11,800	31%
18	TECHNIP	France	1,700	1,870	91%
19	Stone & Webster	USA	1,671	7,307	23%
26	Consolidated Contrac.	Greece	1,263	1,263	100%
27	JGC	Japan	1,262	2,156	59%
30	Snamprogetti	Italy	1,137	1,649	69%
33	Filippo Fochi	Italy	1,030	1,270	81%
41	Guy F. Atkinson	USA	833	1,343	62%
43	Chiyoda	Japan	814	2,394	34%
46	The Badger	USA	730	950	77%
53	Tecnimont	Italy	660	705	94%
61	TEC	Japan	547	995	55%
63	McDermott	USA	473	963	49%
68	Techint	Italy	436	1,050	42%
75	Chicago B&I	USA	343	704	49%
76	Daelim	Korea	327	392	83%
78	SICOM	Italy	322	328	98%
88	All Ocean	Belgium	227	794	29%
99	United E&C	USA	175	3,217	5%
Total			80,971	144,594	56%

Source: ENR, The Top International Contractors, August 23, 1993.

Table 12.

Top 100 International Contractors: Comparison of Scale.
(1992)

	Criterion	Number of Firm	Int'l contracts /Firm ($ bill.)	Total contracts /Firm ($ bill.)	Int'l ratio
Plant Engineering Contractors	Ind./Petro.>50%	26	3,114	5,561	56%
Building/Civil Contractors	Ind./Petro.<50%	74	803	3,645	22%
U.S. PEC	Ind./Petro.>50%	13/26	4,705	8,976	52%
U.S. BCC	Ind./Petro.<50%	10/74	933	3,712	25%
European PEC	Ind./Petro.>50%	9/26	1,873	2,441	77%
European BCC	Ind./Petro.<50%	36/74	943	2,607	36%
Japanese PEC	Ind./Petro.>50%	3/26	908	1,848	49%
Japanese BCC	Ind./Petro.<50%	14/74	660	8,635	8%

Source: ENR, The Top International Contractors, Aug. 23, 1993.

billion, or $660 million per firm. U.S. E&C firms as a whole accounted for 50% of the 100 top international contracts, U.S. building/civil contractors contracted almost the same value per firm as the Europeans and Japanese did because 85% of the total contracts awarded to the U.S. went to engineering contractors. Although Japanese general contractors had a lower international share than their foreign competitors, this does not necessarily mean that they neglected the international market. Their contract values were in no way inferior to those of foreign building/civil contractors. Compared to the U.S. and Japanese general contractors, Europeans accounted for a higher international share of total sales. Their market segmentations were well-balanced, hence they were well-diversified to hedge risks and to stabilize businesses. Since Japanese general contractors rely mostly on the domestic market, their businesses are always influenced by the domestic economic situation.

B. Engineering contractors

Twenty-four international engineering contractors accounted for $81.0 billion, or 58% of the total of the top 100 contractors in 1992; their total contracts accounted for more than the total of the 76 other top general contractors (see above section). Internationalization is a must for engineering contractors; they may not survive if they operate only in the domestic market because it is too limited. Clearly, the U.S. dominates the international market. Seven contractors, Bechtel, Kellogg, Brown & Root, Foster Wheeler, ABB Lummus Crest, Fluor, and Parsons, account for 70% of the international process engineering market. Table 13 shows the major U.S. players competing in the international market.

John Brown/Davy of the U.K. alone accounted for 12.5% of the market, Japan accounted for 3.2%, and others competed for the rest. In general, engineering contractors hold a higher percentage of international contracts than general contractors. For example, nine European engineering contractors account for 77% of total sales on the international market. In the engineering business, a few large "monopolistic" multinational enterprises actively contract projects from all over the world.

In summary, competition between general contractors is based largely on cost, while competition between engineering contractors is based on specialized technology. General contractors are domestically oriented, while engineering contractors are internationally oriented. Therefore, it would be unwise for Japanese general contractors to plunge recklessly into the international market, even if they see more opportunities in there. Chapter 4 studies the actual cases of Japanese general contractors and engineering contractors in order to see what deteriorates their competitiveness in the international market and what their strategies should be in the future.

Table 13.

Largest U.S. International Contractors
- U.S. Firms that held the top shares of the foreign market
between 1980 and 1988 -

Firm	Share of individual companies in foreign market held by US firms (%)
Bechtel Group, Inc.	16.0
Parsons Corp.	12.0
Fluor Daniel	7.2
Lummus Crest	7.2
M.W.Kellogg Co.	6.8
Foster Wheeler Corp.	6.7
Brown and Root, Inc.	4.5
C.F. Braun	4.3
Morrison-Knudsen Co.	2.7
Guy F. Atkinson Co.	2.4
Total	69.8

Source: Arditi and Gutieures, "Performance of US construction in foreign markets", Construction, Management and Economics, No.9, 1991.

2.2.2 Learning Practices from foreign contractors

In the pre-industrialization period, the Japanese construction industry was not composed of construction firms but of individuals such as carpenters, steeplejacks, and manual laborers. As other industries developed in the industrialization period, the construction industry also evolved, as construction systems, methods, and management styles were learned from the west. Even in the post-industrialization period, learning better ways of construction and understanding foreign construction practices for import/export engineering and construction were important. Today, in order to get contracts in the international market and make better profits, an E&C contractor should know market characteristics, especially cultural characteristics, business traditions, and legal matters. The first step to success for an international contractor depend largely on how well it understands foreign markets and foreign competition as well as its own comparative and competitive advantages. The international engineering and construction business is considered to be tougher and to require more patience than international manufacturing or capital service businesses because it is a labor intensive industry and requires good human relations.

Japanese overseas construction activity began at the turn of the century with a railway project in Korea. During this early period, Japanese E&C contractors did not need to learn much from their host countries, which were mostly in east and south-east Asia, because overseas projects were dominated by colonial, government, and military constructions. They exported their domestic organizations overseas to execute projects for the Japanese, by the Japanese. Immediately after World War II many Japanese contractors operated in overseas markets, but, their projects at that time were limited to postwar reparations. Only after the completion of these reparations did Japanese contractors begin to export construction services on a commercial basis. Foreign contracts awarded to Japanese contractors increased in the 1970's, thanks to the Middle East petrochemical plant construction boom.

In addition to traditional building and heavy civil contractors, late-comers to the engineering and construction industry such as process engineering contractors, plant manufacturers, steel makers, and trading companies started to export engineering and construction service to the new market, the Middle East, by following Japanese overseas investments and by learning from foreign competitors' experiences and technologies. They expanded their business quickly and made their appearance in the ranking of the top international contractors by using their competitive advantages effectively. Although traditional general contractors had longer experience in terms of overseas construction, they did not expand their engineering services in the Middle East as quickly as the late-comers. Because of their lack of competitive advantages in the petroleum engineering field, their conservative business style and organizations, and the huge domestic market, general contractors did not take a positive attitude toward learning about the new market and about new fields, especially process engineering projects. This reluctant attitude put Japanese general contractors outside international competition and limited them to the domestic market. They had to content themselves with sub-contractor's positions in large process engineering type projects. Unfortunately, many Japanese general contractors drew limits on its business while other Japanese industries - process engineering contractors, plant manufactures, steel makers, and trading companies - sought opportunities.

It is generally thought that the Japanese are very good at imitation but weak at creation, and it is true to a degree that modern Japanese society is based on imitations of Western systems. Japanese industries adopted a wide range of new organizations, technologies, and institutional systems from the West after the Meiji Restorations of 1868 and was able to catch up with western powers within a few years. These imitation/transformation practices made Japan the first non-Western industrial country. Its success was attributed to its careful selection of models, clear policies, and its awareness that Japan was a developing country, not a developed country. Table 14 shows not only the sources from which Japan drew its organizational models and the wide range of institutional areas in which Western models were used, but also the rapidity of the initial borrowings.

Japanese restructuring in the Meiji era was based on the imitation and transfer of these systems from highly developed nations, and the same thing has happened in the E&C industry. The Japanese E&C industry has also grown with absorption of foreign technologies, organizations, and systems. Many Japanese E&C firms have established their offices and subsidiaries in the U.S. to learn sophisticated U.S. construction management methods. Since both countries' industrial structures and delivery systems are incompatible, the best way to learn U.S. E&C firms' secret of success in the international market is to stay in the U.S. market and learn from U.S. competitors through open competition.

Table 14. Major Organizational Emulation Cases in Meiji Japan

Source	Organization	Year
Britain	Navy	1869
	Telegraph system	1869
	Postal system	1872
	Postal saving system	1875
France	Army	1869
	Primary school system	1872
	Police system	1874
	Judicial system	1872
	Military police	1881
United States	Primary school system	1879
	National bank system	1972
	Sapporo Agricultural College	1879
Germany	Army	1878
Belgium	Bank of Japan	1882

Source: D.E. Westney, Imitation and Innovation ,1987.

Unlike European E&C firms, which penetrated the U.S. market through company acquisitions, Japanese E&C firms have preferred to start by establishing their own subsidiaries. The subsidiaries, in their turn, have learned about the U.S. market while working for Japanese manufacturing firms which have built their offices, plants and factories in the U.S., and have developed other real estate there. Merger and acquisition (M&A) has not been a familiar way to expand business in Japanese industries because it goes against their "friendly coexistence" policy. It is also difficult to delegate powers and responsibilities to foreign managers because many Japanese believe that mutual understanding based on Japanese traditional business styles and cultures has deteriorated. Accordingly, the learning practice includes two key components: the gradual development of Japanese contractors' management skills by taking on increasingly difficult roles; and learning particular U.S. techniques by working closely with U.S. firms through joint ventures and subcontracting relations. Detailed studies using particular models will be done in chapter 4.

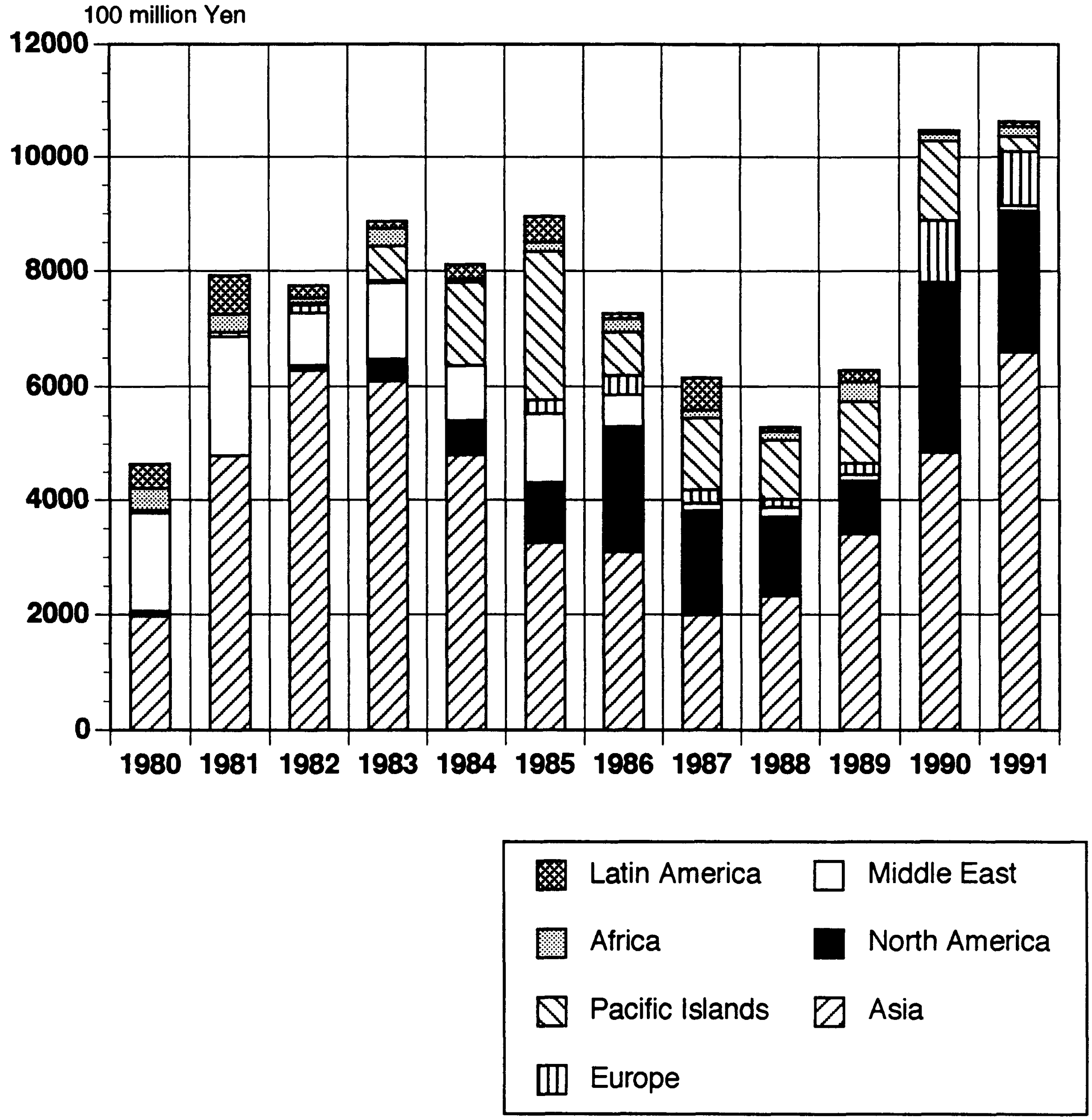
2.3 The Japanese Construction Industry

2.3.1 Japanese E&C firms in the international market

Overseas construction contracts awarded to the members of the Overseas Construction Association of Japan, Inc. (OCAJI) in 1991 amounted to ¥1,063.9 billion (a 1.5% increase over the previous year, Figure 6), of which ¥520.8 billion went to companies registered in Japan and ¥542.1 billion to their overseas subsidiaries. These calculations do not

Figure 6.

Overseas Contracts of Japanese E&C Firms by Region



Source: OCAJI, "Kensetsu-gyo oyobi Sekaiteki na Kigyo no Kokusai-ka, Genchi-ka Seisaku ni Kansuru Chyosa Kenkyu," 1993.

The Ministry of Construction, White Paper on Construction, 1991.

include contract awarded to major engineering firms, such as JGC, Chiyoda and TEC, which do not belong to OCAJI. Contracts in Asia accounted for 61.9% of the total, 23.2% in North America, 9.0% in Europe and the rest was spread out in the other regions.

The primary reason why Japanese E&C firms have increased their contract value in the international market is not because they are competitive, nor because the international market has expanded, but because Japanese foreign direct investment has increased. Table 15. shows the clients of overseas contracts awarded to Japanese contractors.

Table 15. Overseas Clients of Japanese Contractors (1991)

billion yen

	Public (Overseas)	Private (Overseas)	Japanese Industries	Total
Asia	255.0 (39%)	170.3 (26%)	233.4 (35%)	658.8
North America	36.1 (15%)	74.7 (30%)	135.8 (55%)	246.6
Europe	0.0 (0%)	1.8 (2%)	93.6 (98%)	95.4
Pacific	5.2 (19%)	6.3 (23%)	16.1 (58%)	27.7
Other	19.6 (55%)	8.0 (23%)	7.8 (22%)	35.4
Total	316.0 (30%)	261.1 (24%)	486.8 (46%)	1,063.9

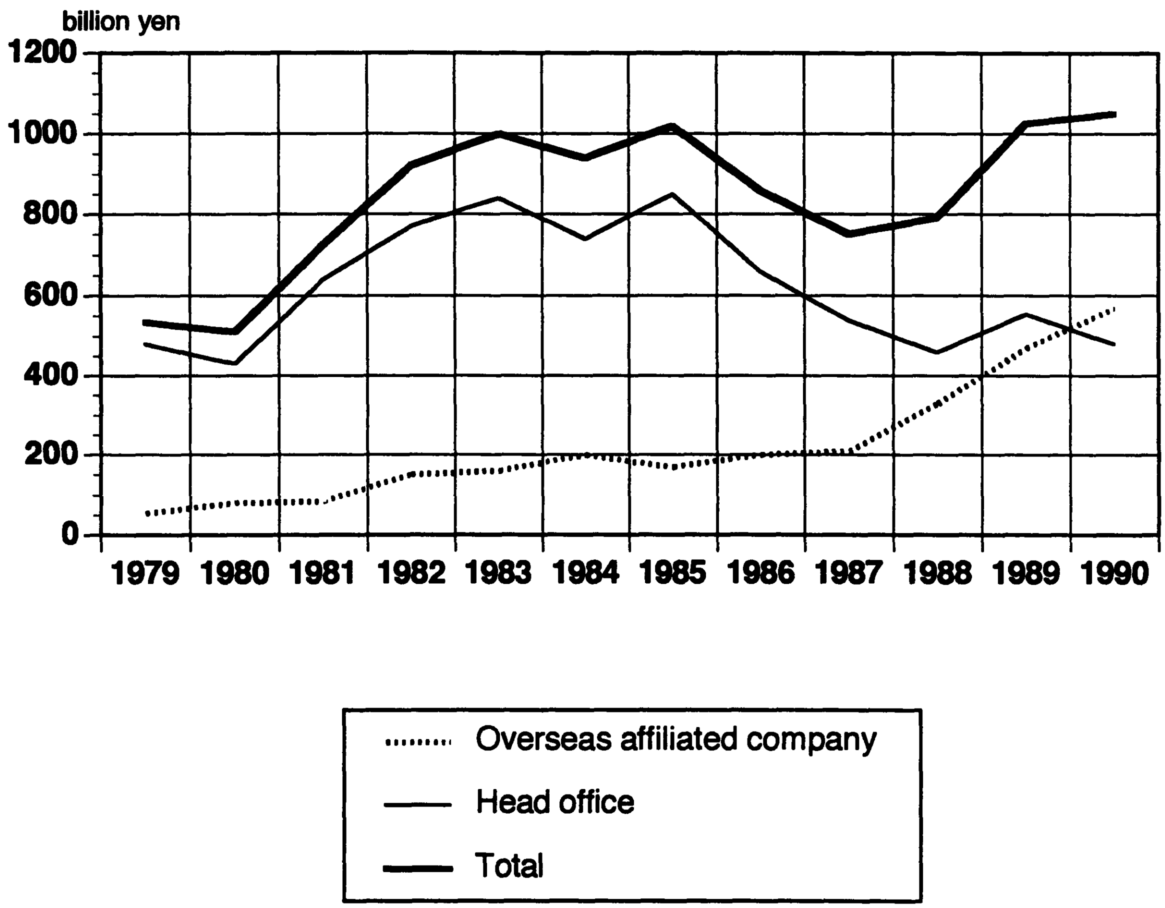
Source: OCAJI, "Kensetsu-gyo oyobi Sekaiteki na Kigyo no Kokusai-ka, Genchi-ka ni Kansuru chyosa Kenkyu," 1993.

The fact that about half of the contracts were awarded by Japanese industries in overseas markets indicates that Japanese E&C firms depended largely on the domestic economic situation. It would be untrue to say that Japanese E&C firms firmly established their business bases in Europe and the Pacific region because clients of these markets are mostly Japanese industries. Rather, it is because Japanese E&C firms started their business in these regions only recently and the marketing and operation systems of their regional subsidiaries are not well established yet. Even in North America, where Japanese contractors established their subsidiaries first, they could not penetrate the market successfully. Only a few large technological-oriented firms have been awarded public works by the governments in North America. On the other hand, Japanese contractors have been more successful in the Asian market, where they have more experience and a longer history than in other regions. Only 39% of the total were Japanese clients in the Asian market. The data stated above show Japanese contractors' basic strategies: first, learning the market and business traditions through collaborating with Japanese clients, mostly manufacturing industries; second, after gaining some experience in the country working with Japanese clients, seeking more opportunities from the government of that country; third, after acquiring a good reputation through participating in public works, seeking opportunities from private sectors in the country or from multinational industries operating there. At this time, 20% of the Asian and 37% of the Pacific region's public contracts are supported by the Japanese government.

The recent trend is for overseas subsidiaries to replace their parent

Figure 7.

Share of International Awardsin Japanese Parents Companies
and their Affiliated Firms



Source: OCAJI, "Kensetsu-gyo oyobi Sekaiteki na Kigyo no Kokusai-ka, Genchi-ka ni Kansuru Chyosa Kenkyu," 1993.

firms' headquarters as the main actors (see Figure 7). Ninety-one per cent of the total contracts in North America and 89% in Europe have been awarded through overseas subsidiaries (see Table 16). This is due largely to the fact that Japanese industries operate through overseas subsidiaries which function as primary clients in overseas markets, where they have established independent regional offices.

Table 16. Divisions where Contracts were Awarded (1991)

(¥ billion)

	Headquarters	Overseas subs.	Total
Asia	433.2 (66%)	225.6 (34%)	658.8
North America	23.0 (9%)	223.7 (91%)	246.6
Europe	10.9 (11%)	84.5 (89%)	95.4
Pacific	24.6 (89%)	3.2 (11%)	27.7
Other	29.1 (82%)	6.2 (18%)	35.4
Total	520.8 (49%)	543.1 (51%)	1,063.9

Source: OCAJI, "Kensetsu-gyo oyobi Sekaiteki na Kigyo no Kokusai-ka, Genchi-ka ni Kansuru Chyosa Kenkyu," 1993.

Building-related construction is the main work exported by Japanese contractors. Eighty-three per cent of the total contracts were building-related projects in 1990. Table 17 shows the shares of construction export among building, plant and heavy civil work and whether headquarters or subsidiaries are in charge of the business. Since the major clients are Japanese manufacturing industries, it may be reasonable for them to use

Japanese contractors for constructing their factories, offices and R&D facilities in overseas markets because they can hedge risks by using the Japanese contractual practices familiar to them in the domestic market..

Table 17. Sharing of Projects by Responsible Branches

1990

	Civil Works	Plants	Buildings	Total
Headquarters	12%	2%	32%	46%
Overseas subs.	2%	1%	51%	54%
Total	14%	3%	83%	100%

1991

	Civil Works	Plants	Buildings	Total
Headquarters	24%	1%	22%	47%
Overseas subs.	1%	3%	49%	53%
Total	25%	4%	71%	100%

Source: OCAJI, "Kensetsu-gyo oyobi Sekaiteki na Kigyo no Kokusai-ka, Genchi-ka ni Kansuru Chyosa Kenkyu," 1993.

In 1991, after the burst of the economic bubble in Japan and the country's economy headed into a recession, Japanese foreign direct investments decreased rapidly. Since about 90% of the building contracts had been awarded by the private sector which was especially damaged by the rapid recession, building-related contracts diminished in that year. On the other hand, unlike building construction, which is largely operated by overseas subsidiaries, heavy civil construction, mostly implemented by headquarters, was not affected by the recession because the financial source for heavy civil works was the Japanese government which could grant or lend funds regardless of the domestic economic situation.

2.3.2 The domestic market as an international market

The Ministry of Construction in Japan has stressed that the "Japanese construction market, both private and public, is open to any foreign firm, and its system in no way discriminates between foreign and domestic companies". It has claimed the Japanese construction market as an open market through implementing the Major Project Agreement (MPA), which was negotiated in 1988, amended in 1990, and amended again in 1991 with additional "opened projects". On the strength of the MPA, the Kansai International Airport project, an $ 8 billion facility on a man-made island outside of Osaka,the largest city in western Japan, was begun. U.S.-Japanese trade tensions became critical in 1986 when the Japanese government announced the plan of the Kansai Airport because the Kansai International Airport Company Ltd., the owner of the project and a public corporation, intended to exclude all foreign E&C firms. It insisted that they would not be qualified because only domestic E&C firms had the expertise needed to work with unique Japanese soil and water conditions. This brought complaints from the U.S. and other countries' E&C firms. In this case, despite its promises of an open market, Japan had limited foreign participation in construction projects, citing unique specifications and applying rigid licensing requirements.

The American Chamber of Commerce in Japan evaluated the result of this agreement in its 1993 US-Japan Trade White Paper noting "The 1988 market-opening measures of MPA notwithstanding, the entire domestic Japanese architectural, engineering and construction market share enjoyed by U.S. AEC firms combined in Japan is roughly estimated at 0.02%, hardly a level which can be considered a major success." The paper further recommended a need for American "patience" and "understanding". In April, 1993, in a report to Congress, U.S. Trade Representative Mickey Kantor identified Japan under Title VII of the 1988 Omnibus Trade and Competitiveness Act, which provides identification of countries that discriminate against American firms in their government practices. Identification under the statute requires that negotiations to end discrimination be initiated immediately and, if the ensuring negotiations are not successful, the statute provides for sanctions. Clearly, Japan on the one hand and the U.S. and the rest of the world on the other see the economic issues that separate them very differently.

One of the purposes of this thesis is to identify how the Japanese construction industry is protected, and then what weaknesses, derived from unique opportunities in domestic markets, can be obstacles to international competition.

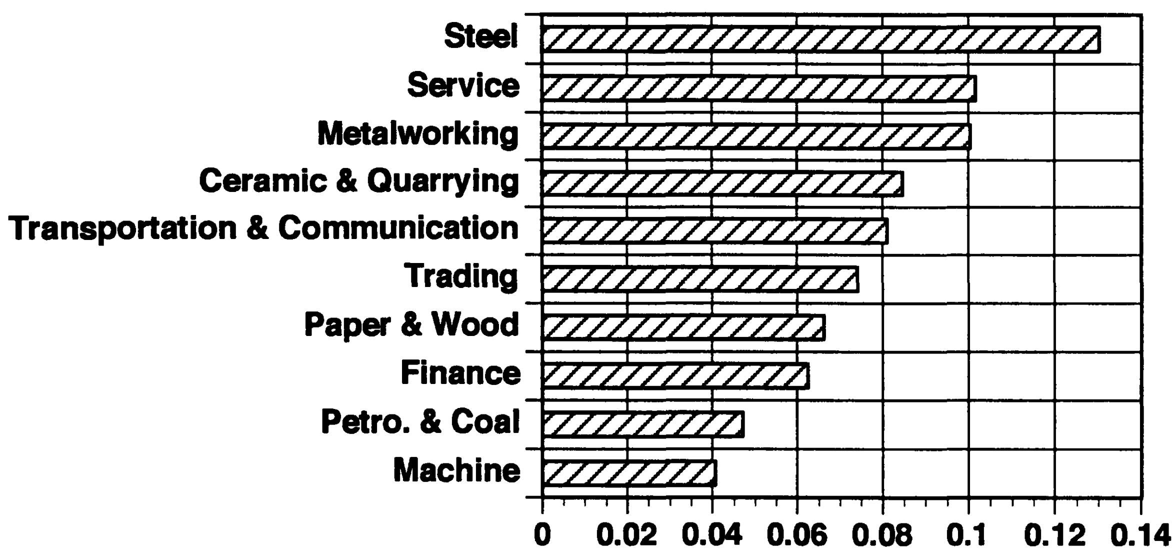
2.3.3 Japanese construction market entry barriers

Every country would prefer to implement its construction activities without importing construction services from foreign countries because the construction industry is essential to a country's economy. Still, a country may be forced to import engineering and construction services when it does not have capabilities in finance, technologies, management skills, and resources. Lee and Walters (1989) identified three major issues found in construction exports: market protection, third-market competition (or, offensive protectionism), and regulatory concordance (both between nations and between federal and local levels of jurisdiction within a single nation).

The importance of construction in a country's economy is explained by its size, its work force, the effect it has on or suffers from other industries, government involvement, and its infrastructure as that country's assets. The value of the final products of the construction industry, including materials, accounted for ¥87,480 billion or 19.3 % of the gross domestic product in 1991. Net output, excluding materials and supplies bought from other industries, accounted for 9.5% of the gross domestic product in that year. Employment accounted for 619 million or 9.6% of the total in Japan. The impact of the construction industry on the economy is enormous (Figure 8), and the economic policy (including the trade policy) and general economy

Figure 8.

Effects of Construction Investments on Other Industries



* Construction investments = 1.00
** As of 1989

Source:JFCC, Nikkenren Handbook 93.

profoundly affect the performance of the construction industry. Generally speaking, because the construction industry is a key industry, developing countries are inclined to promote their domestic construction industry more frequently than do developed countries.

Market protection involves visible and invisible barriers. Visible barriers include currency restrictions, government procurement preferences, government subsidies, investment barriers, domestic requirements, tax discrimination, personnel qualifications, licenses, technical standards and regulations. Table 18 shows the criteria for obtaining construction business licenses in Japan. In 1982, in order to overcome protection barriers in many countries, the U.S. Government started pressing its trading partners in the existing General Agreement on Tariffs and Trade (GATT), to extend this trade agreement to service industries including construction. This effort by the U.S. Government has continued for several years but an agreement has never been reached. Table 19 shows the entry barriers of selected countries.

Invisible barriers include contractual practices, languages, laws, business customs and traditions, union and labor management, pre-qualification incoherence, cultural differences, country risks, legal matters, industrial organization, and safety control. The ENR reported with surprise that fewer U.S. contractors attempted to enter the Japanese construction market than expected by the government officials in both countries. They

Table 18. Criteria for Japanese Construction Business Licenses

	Ordinary Construction Work	**Special Construction Work**
1	At least one full-time board director must have a minimum of 5 years management experience at a construction company in Japan.	At least one full-time board director must have a minimum of 5 years management experience at a construction company in Japan.
2	Each of the applicant's business premisses in Japan must have at least one full-time engineer for each type of construction work to be performed. Each engineer must meet one of the following requirements; (1) Japanese high school graduate with at least 5 years experience, or Japanese university graduate with at least 3 years experience in Japanese construction businesses, both having studied subjects specified in the Ordinances of the Ministry of Construction while in school (2) At least 10 years experience as an engineer in the specific field for which a license will be sought. (3) Anyone qualified in Japan as a supervising engineer, architect, engineer or technician, etc.	Each of the applicant's business premisses in Japan must have one full-time engineer for each type of construction work to be performed. Each engineer must meet one of the following requirements and the applicant wishing to perform civil engineering work, architecture, plumbing, steel structure work or paving work must have an engineer who fulfills the requirement of (2) below or their premisses. (1) The same requirements for "Ordinary Construction Work," plus at least 2 years of experience supervising construction contracts worth ¥30 million or more in Japan. (2) Certified first-class supervising engineer, first-class architect or technician.
3	There must be no possibility that the applicant will violate the terms of the contract, particularly those governing the content and period of the construction work and compensation for damages.	There must be no possibility that the applicant will violate the terms of the contract, particularly those governing the content and period of the construction work and compensation for damages.
4	The applicant must satisfy any one of the following basic financial requirements: (1) own capital of at least ¥3 million. (2) Fund raising ability of at least ¥3 million. (3) 3 years of continuous construction business operations prior to the date of application.	The applicant must satisfy all of the following basic financial requirements: (1) capital of at least ¥15 million. (2) own capital of at least ¥30 million. (3) losses equivalent to no more than 20% of capital, and (4) a current ratio of at least 75%.

Source: Ministry of Construction, Japan's Construction Market, 1991.

might have been reluctant to enter the Japanese market because they found the invisible barriers were too extensive. It seems that these invisible or non-regulatory barriers, which are based on cultural differences, are the real issues that prevent foreign contractors from entering the Japanese market.

Table 19. Entry Barriers in Selected Countries

Barrier Type	Country
Government Procurement	Canada, India, Japan, Mexico, U.S.
Subsidies	Canada, Italy, Japan, Korea, Sweden
Domestic Requirements	Brazil, India, Korea, Saudi Arabia
Personnel Qualifications	Brazil, Canada, U.S., Venezuela
Investment Barriers	Canada, Ecuador, Iceland, U.K.
Tax Discrimination	Brazil, Korea
Currency Restrictions	Iceland

Source: J.R. Lee and D. Walters, International Trade in Construction, Design, and Engineering Services, 1989.

How do we know, objectively, that one country has higher invisible entry barriers than others? Some indicators are the export-import ratio or trade balance in construction (Table 20), the unemployment rate (Figure 9), the profit margin (Figure 10), and the number of firms working in a country (Figure 11).

The export-import ratios have many implications, such as the degree of comparative advantage, the degree of competition, and the degree of market openness. If all contractors competed under the same rule, the higher a country's export/import ratio, the more competitive it would be.

A low unemployment rate may indicate not only a healthy domestic economy but also the existence of barriers, because the prosperity of the domestic industry may be attributed to a protected business environment. A low unemployment rate also implies that the labor market is closed to foreign workers.

Wherever there is less competition, a contractor can enjoy a higher profit margin. The differences in the profit margins between countries indicates that they compete under different rules. Japanese general contractors enjoy high profit margins, as do U.S. engineering contractors. They both may face less competition in their particular markets. The percentage of international contracts of Japanese general contractors is relatively low, compared to that of the U.S. engineering contractors. This may mean that Japanese general contractors have less competition in the domestic market, and U.S. engineering contractors have less competition in the international market. Figure 10 shows not only gross profit margins but also net profit margins. The difference between the gross profit margin and the net profit margin goes mostly to a general administrative fee and tax. The general administrative fee varies from industry to industry, as well as from country to country. The difference in administrative fees between countries is attributed to the each country's specific contractual practice.

The number of contractors working in a country indicates the country's attractiveness, openness, and degree of opportunities. Although the size of the market should be considered, the number itself shows the degree of entry barriers.

Table 20. Construction Export-import Ratio in 1992

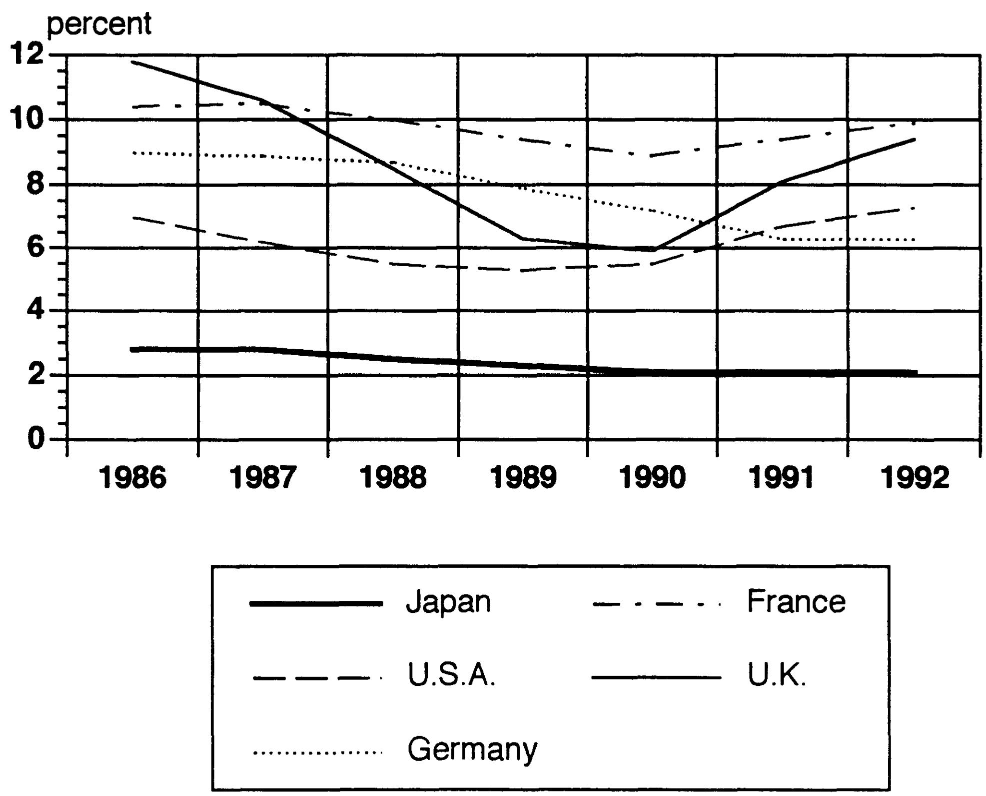
Contractor Nationality	Export ($ mill.)	Import ($ mill.)	Ex./Im. Ratio
U.S.	72,157.3	8,949.1	8.1
Canadian	443.1	4,197.2	0.1
European	52,285.9	34,350.6	1.5
Japanese	12,373.1	190.9*	64.8

* estimated from "Japan's Construction Market", Ministry of Construction, Japan

Source: ENR, The Top International Contractors, Aug. 23, 1993.

Figure 9.

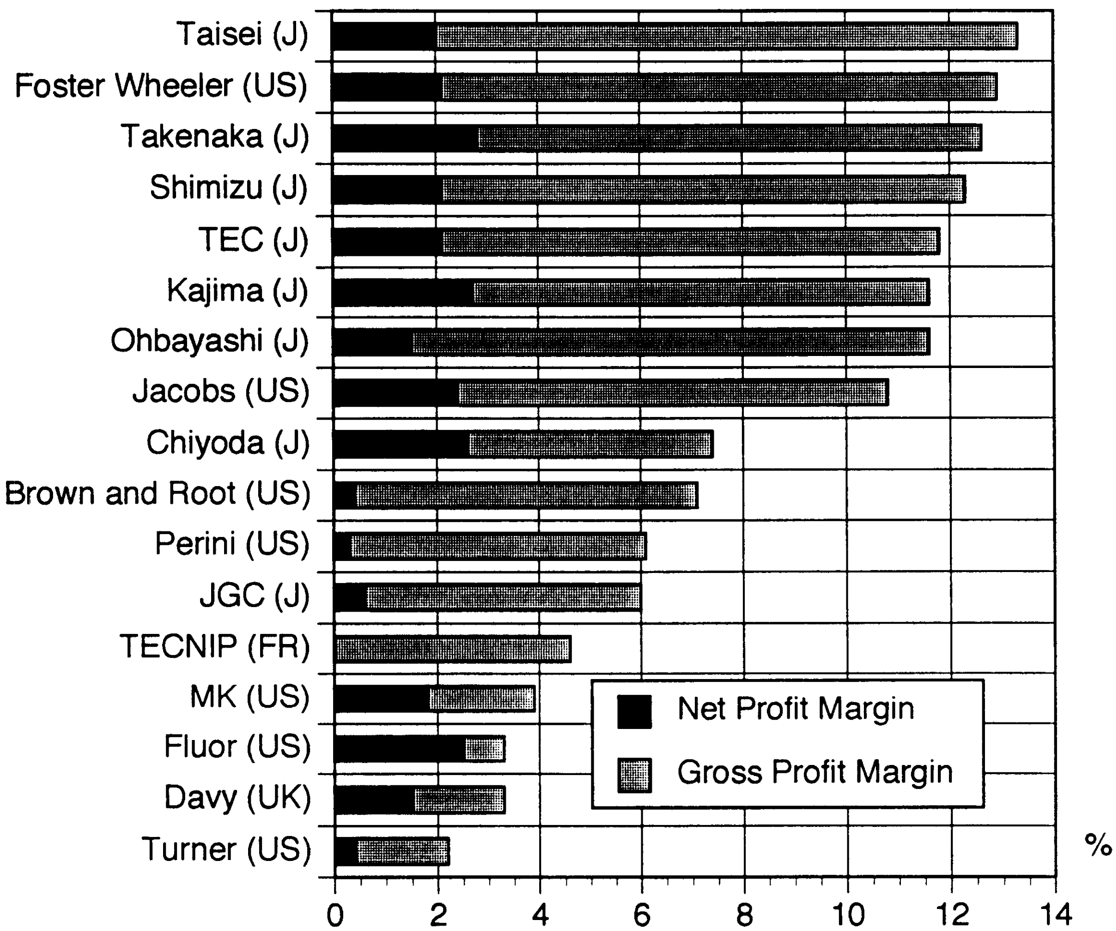
Unemployment Rate in Selected Countries



Source: Keizai Koho Center, "Japan 1993: An International Comparison."

Figure 10.

Gross and Net Profit Margins of Selected Contractors

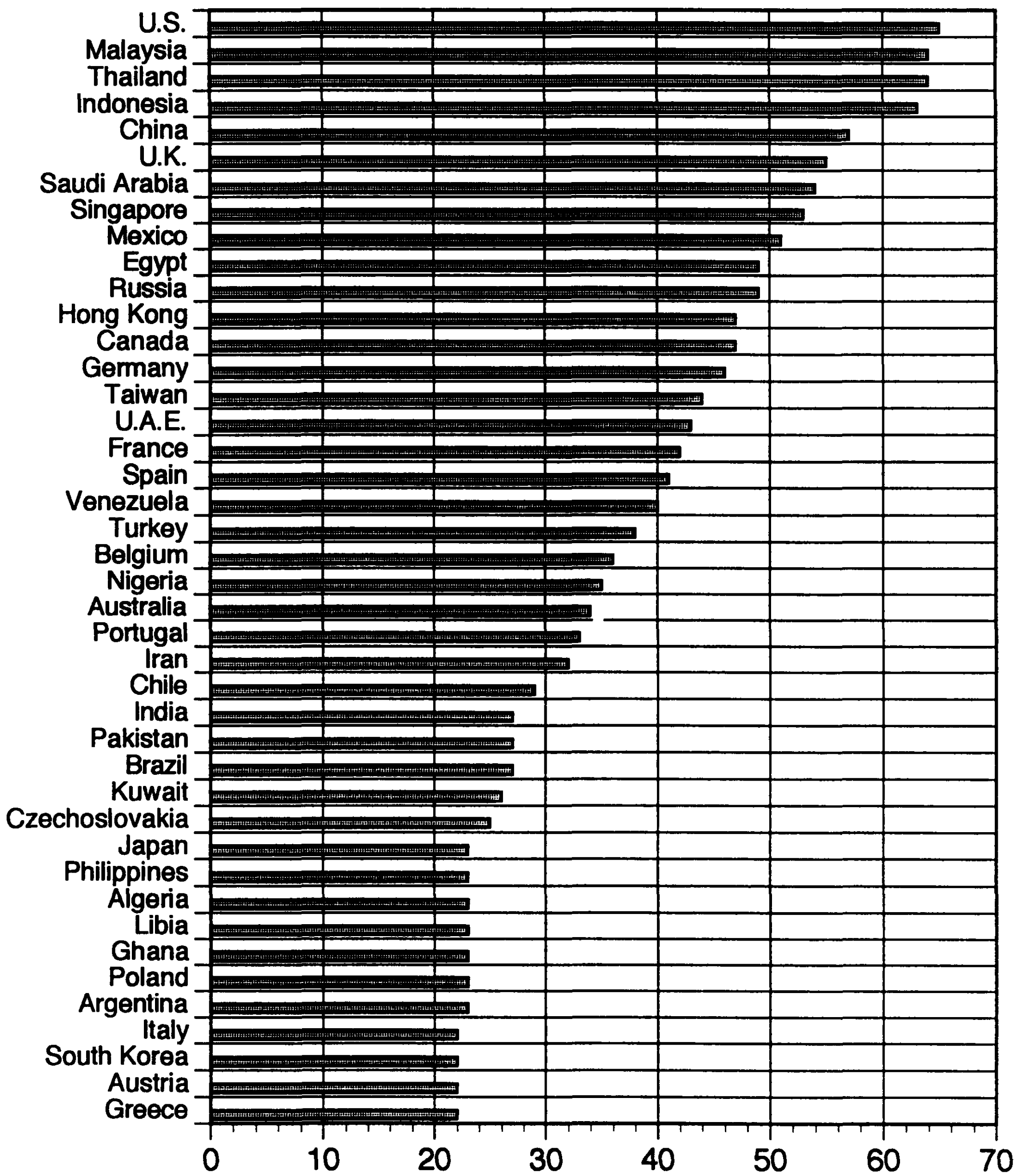


*The net profit margin of TECNIP is not shown.

Source: Annual Reports.

Figure 11.

The Number of Foreign Contractors Working in Countries (1992)



Source: ENR, The Top International Contractors, Aug. 23, 1993.

2.3.4 Foreign Contractors' Performance in the Japanese Market

Since the Major Project Agreement was concluded in 1988, foreign contractors have opened their offices and started businesses in Japan in quick succession. Table 21 shows U.S. contractors who cooperate with Japanese contractors and Table 22 shows the foreign contractors who have been granted construction business licenses in Japan. However, some of them (e.g. Brown & Root, Guy F. Atkinson, and Morrison Knudsen) have already withdrawn from the Japanese construction market. This section investigates the strategies of foreign contractors.

Table 21. Cooperation between U.S. and Japanese Firms

U.S. Firm	Japanese Firm
Overseas Bechtel Inc.	Taisei Corporation
Fluor Daniel Japan Inc.	Obayashi Corporation
Schal Associates Inc.	Dai Nippon Construction
Parsons Construction Inc.	Shimizu Corporation
Turner Construction Company	Kumagai Gumi Co., Ltd.
Tishman Construction Corp. of Japan	Aoki Corporation
Morrison-Knudsen International Co.	Hazama Corporation
Guy F. Atkinson Co.	Toda Construction Co., Ltd.
The Austin Company	Nishimatsu Construction Co., Ltd.
Parsons-Brinkerhof International	Nishimatsu Construction Co., Ltd.
J.A. Jones Construction Co.	Mitsui Construction Co., Ltd.

Source: Ministry of Construction, Japan's Construction Market, 1991.

Table 22.

Foreign Firms Granted Construction Business Licenses in Japan (as of Feb. 1991)

Firm	Head Office or Parent Company	Relation-ship	Date of Approval
Overseas Bechtel, Inc.	USA	Branch	Sep. 1987
Fluor Daniel Japan, Inc.	USA	Corporation	Aug. 1988
Schal Associates, Inc.	USA	Branch	Sep. 1988
Tishman Const. Corp. of Japan	USA	Corporation	Oct. 1988
Parsons Constructors, Inc.	USA	Branch	Oct. 1988
Turner Construction Co.	USA	Branch	Oct. 1988
Samsung Construction Co., Ltd.	Korea	Branch	Oct. 1988
Samwhan Co.	Korea	Branch	Oct. 1988
Hyundai E&C Co., Ltd.	Korea	Branch	Oct. 1988
Dumez Japan S.A.	France	Corporation	Nov. 1988
Dongbu Construction Co., Ltd.	Korea	Branch	Feb. 1989
Ssangyong Construction Co., Ltd.	Korea	Branch	Feb. 1989
Morrison-Knudsen Int'l Co., Inc.	USA	Branch	Mar. 1989
Guy F. Atkinson Co., Ltd.	USA	Branch	May 1989
Henry Walker Group, Ltd.	Australia	Branch	May 1989
The Austin Company	USA	Branch	May 1989
SGS Inc.	Switzerland	Branch	Aug. 1989
Austin Industries, Inc.	USA	Branch	Aug. 1989
Akzo Japan, Ltd.	Netherlands	Corporation	Aug. 1989
Parsons Brinckerhoff International	USA	Branch	Oct. 1989
Dong Ah Construction Ind. Co., Ltd.	Korea	Branch	Oct. 1989
Kuk Dong Construction Co., Ltd	Korea	Branch	Feb.1990
Daewoo Corporation	Korea	Branch	Mar. 1990
J.A. Jones Construction Co.	USA	Branch	Mar. 1990
Hanil Development Co., Ltd.	Korea	Branch	April 1990
YES Homes	USA	Corporation	April 1990
Lucky Development Co., Ltd.	Korea	Branch	Feb. 1991

Source: JFCC, Construction in Japan, 1991.

According to Nikkei Construction (July 23, 1993), Overseas Bechtel Inc. was the most successful contractor in Japan between 1988 and 1993, followed by Schal Bovis Inc. and The Turner Corporation. Table 23 shows the performance of the top contractors in Japan.

Bechtel's average contract value per project was ¥5.4 billion, which far exceeded that of Schal. (¥1.5 billion) Bechtel has not yet tendered a bid alone but has always made joint venture with Taisei in the Tokyo area and with Takenaka in the Osaka area because it does not have subcontractors who know Bechtel's management and heavy construction machines. Despite its success in the Japanese market, Bechtel has been unable to demonstrate its strong points in design and engineering because government engineers do the designing and engineering in Japan. Bechtel has pressed the U.S. government to force the Japanese designing and engineering market open, feeling that it can contract only MPA projects under the present situation.

Schal has taken a different stance toward the Japanese construction market. Unlike Bechtel, Schal has tried to learn the Japanese way of business and to establish a stable base in Japan without causing a conflict. Schal's basic policies for entry to the Japanese market are, first, top management should become accustomed to Japanese business traditions; second, the U.S. headquarters should delegate responsibility as much as possible because of the difference in the contract system, and third, it

Table 23. Performance of Foreign Contractors in the Japanese Construction Market

Contractor	Contract (Construction)	Contract (Other)	# of Staff	Policy
Overseas Bechtel Inc.	¥32.1 bill. (6)	¥3.1 bill. (16)	26 (6)	n/a
Shal Bovis Inc.	¥15.5 bill. (10)	-	15 (7)	Public, Building, Construction
Turner Construction	¥5.4 bill. (3)	-	2 (0)	Building
Hyundai E&C	¥5.1 bill. (4)	-	10 (5)	Public, Construction
Austin Industries	¥3.7 bill. (2)	-	2 (0)	Building, Construction
Morrison Knudsen	¥2.0 bill (1)	-	-	-
Parsons Brinkerhoff	¥1.8 bill. (2)	-	8 (3)	Public, Civil, Design
DUMEZ Japon	¥1.7 bill. (2)	¥400 mill. (3)	7 (1)	Private
J. A. Jones	¥1.2 bill. (1)	-	1 (0)	Private, Building, Construction
Lotte Construction	¥1.1 bill. (1)	-	3 (1)	Construction

Source: Nikkei Construction,"Gaikoku Kigyo 5 nen-kan no Sokuseki,"July 23, 1993.

should not request special treatment as does Bechtel. However, Schal also looks for opportunities in the CM field. It believes that there should be a good CM system suitable to the Japanese construction market.

Korean contractors have to adopt different strategies from U.S. contractors because their experience in the Korean market is not accepted by the Japanese government. The Japanese government accepts only the experience of U.S. contractors; therefore, Korean contractors have to get their results in the Japanese private construction market. Despite this unfair treatment, Korean contractors have become deeply rooted in the Japanese market through steady efforts. For example, Hyundai Corporation works mostly as the subcontractor of Kajima. In addition, Korean contractors send their employees to Japanese contractors to learn the Japanese management system and advanced construction technologies.

Two French contractors, GTM and DUMEZ, have opened their offices in Tokyo. Their primary purpose in maintaining offices is to establish a close relationship and to cooperate in contracting third countries' projects with Japanese general contractors rather than to invade the Japanese market.

chapter 3

GLOBALIZATION

3.1 The Concept of Global Strategy

The basic principles of globalization include how a firm creates competitive advantages through its overseas strategy, and how this strategy reinforces competitive advantages gained at home. The design of an overseas strategy is based on the interplay between the comparative advantages of countries and the competitive advantages of firms. Since patterns of competition differ from industry to industry and from segment to segment, a firm should firmly define who it is, and what business it is in. Porter identifies roughly two patterns of overseas competition, multidomestic competition and global competition. Competition is essentially independent in each country. Some assets that an E&C firm may have in one country, such as reputation, capital, and personnel may have little impact in another. The competitive advantages of multidomestic industries are largely confined to the country in which they compete. On the other hand, a firm's competitive position in one country sometimes affects (and affected by) its position in other countries. Rivals compete against each other on a worldwide basis, drawing on competitive advantages that grow out of their entire network of worldwide activities. Assets such as technologies, management skills, and experience strongly affect an E&C firm's overseas operation. In global industries, firms are compelled to compete internationally in order to achieve or sustain their competitive edge in most important industry segments.

A global strategy in E&C firms is one in which a firm sells its E&C services in many countries, and procures and employs an integrated worldwide approach in doing so. Just being multidomestic does not imply having a global strategy if the firm has freestanding subsidiaries that operate independently in each country. If a firm competing globally adopts a multidomestic strategy, it will likely diminish its competitive advantage and provide an opportunity for competitors to overtake it, as has been the experience of many Europeans and Americans in the manufacturing industry.

3.1.1 Strategic Choices

A global approach to strategy provides two distinctive ways in which a firm can gain competitive advantages or offset domestic disadvantages.

A. Configuration

The first is in the way a global firm can configure activities among countries to gain comparative advantages. In configuring its worldwide activities in an industry, a firm faces two broad choices. One choice is whether to concentrate its activities in one or only a few countries or to disperse them to many countries. The degree of concentration of activities is decided by factors such as, economies of scale and proprietary learning in an activity; the comparative advantage for performing a certain activity; and a close relationship between activities, such as R&D and production, homogeneous product needs, lower transport and storage costs, less nationalistic purchasing. A dispersion of activities is the result of a low level of intensity in these factors. The second choice, a firm faces in its configuration is where it will locate its activities and how many sites it will chose. Activities are usually located initially in the home nation. In a global strategy, however, a firm can choose any nation in which to raise capital, conduct R&D and design, procure raw materials, or even recruit skilled and unskilled workers.

B. Coordination

The second way in which a global firm can gain competitive advantages is via its ability to coordinate its dispersed activities. Coordination refers to how activities performed in different countries are coordinated with each other. It involves sharing information, allocating responsibility, and aligning efforts. Dispersed activities, if they are not coordinated, do not allow a firm to respond to its competitors' global challenges nor to its clients' global needs. Well-coordinated information yields the opportunity to choose where and how to fight against competitors. Although the importance of global coordination is easy to understand, achieving coordination among subsidiaries in a global strategy involves formidable organizational challenges because of linguistic differences, cultural differences, and the need for high levels of open and credible information exchange. Another possible difficulty is that country subsidiaries often see each other more as competitors than as collaborators, and that full and open coordination is the exception rather than the rule in global firms.

3.1.2 The Process

Industries globalize because shifts in technology, client needs, government policies, or country infrastructures create major differences in the competitive position of firms from different countries and make the advantages of a global strategy more significant. In process engineering plant construction, for example, the industry has been globalizing as U.S. firms have gained substantial competitive advantages in technology, global procurement and management skill, as the demand for process plants in different countries has become more similar, and as operating costs have fallen.

Global industry leaders always begin with some advantage created at home, whether it is a new technology, a high level of management skill, a new marketing concept, or a factor cost advantage. The home based advantage then becomes the booster to enter overseas markets. A global strategy can supplement original competitive advantages by locating selected activities in foreign nations and competing head to head to retain a competitive edge. A good example is the Japanese process engineering industry, where firms initially competed with exported technology to meet the needs of Japanese industries. As they began to penetrate the overseas market, they gained newer technology learnt from clients, and management skills learnt from joint venture partners. An increase in contracts then helped to support investment for their own R&D and to achieve proprietary technology. However, once they have globalized, they can sustain their advantage only if they remain competitive and continually upgrade.

3.2 International Trade

3.2.1 Emerging Trade Theory

The most remarkable patterns in international E&C trade are intra-industry trade and intra-firm trade, which are relatively modern concepts and difficult to explain by traditional trade theory. Intra-industry trade is explained as the bi-way trade of differentiated products/services between countries with similar high income levels. This type of trade is often recognized in the international E&C market. In fact, European E&C contractors are always scrambling their markets together. Intra-industry trade occurs wherever demand for variety exists. Intra-firm trade is defined as trade among affiliates of the same multinational enterprise (MNE), and it accounts for a significant portion of the entire trade of U.S. and Japanese firms. Intra-firm trade is important in understanding the globalization of the E&C industry because it coordinates dispersed activities. The emergence of intra-industry in the E&C industry is explained by reduced barriers to entry and lower coordination costs.

3.2.2 International Trade and Multinational Enterprises

Wherever the international trade theory can be applied, perfect competition should exist. The conventional models in international trade have been based on the assumption of perfect competition, therefore any theory of the multinational firm must meet with perfect competition. As Krugman (1986) pointed out, foreign direct investment generally occurs in an oligopolistic market and in response to market failures. Thus, a prerequisite to a formal model of multinational enterprise must be a tractable model of imperfect competition.

There are two types of foreign direct investment (FDI): "horizontal" investment, associated with product/service differentiation, and "vertical" foreign investment, associated with backward integration into raw materials. In a differentiation model, countries want to trade because they have acquired different technologies, taking the form of the knowledge of how to design, mange, construct, and sometimes operate an E&C industry, or how to produce different products in the manufacturing industry. They can trade this knowledge through technology transfer within multinational firms (or licensing), or they can trade it indirectly, through trade in final products, including drawings, systems, and manuals, embodying their special technological advantages. International E&C firms sell their management and engineering knowledge to coordinate labor, materials and equipment, services, and financial capitals sourced worldwide in order to physically create structures in foreign countries. This implies that the E&C industry is knowledge-intensive. An international firm requires significant internal coordination to make maximum use of its dispersed knowledge.

The other important style of multinational enterprises is when the firm is vertically integrated, controlling different stages of a production process that takes place in different countries. By going multinational and integrating backward, the firm can eliminate distortion and appropriate the efficiency gain.

3.3 Theoretical Framework

In globalization, an E&C firm must consider three distinctive elements, geographic, internal, and external. Geographic globalization is associated basically with the geographic market scope of an E&C firm. How a firm organizes and where it competes is tne fundamental decision which must made in order to enter global competition. Internal globalization is defined as the organizational change necessary for a firm to respond to emerging business opportunities and environments. How a firm competes in the international market, based on the advantages gained from the configuration and coordination of its internal activities, is important The degree of configuration and coordination is determined by the extent to which the firm disperses and coordinates its internal activities for gaining overseas competitiveness. External globalization is defined by how a firm competes in the international market based on the competitive advantages gained from the configuration and coordination of external factors, which include machinery and materials input by suppliers, services input by subcontractors, consultants, and partners, and capital input by financial institutions. Compared to geographic globalization, internal and external globalization are associated with the question of how a firm competes. Although a firm's internal and external factors for globalization seem to be general for all international E&C firms, they may respond to these factors in different ways and with various levels of intensity due to other factors specific to each firm, such as the ability and historical style of its management, the historical development of its internal assets and expertise as well as those factors which are specific to a particular segment or nationality.

E&C firms' competition in the international market is based either on the specific factors of a firm or on its competitive advantages, or on factors specific to its home country or comparative advantages. Concrete examples are: decisions as to how widely firms will seek to market geographically, how firms will concentrate or disperse their activities, how well firms will integrate a chain of different but sequential internal activities vertically and horizontally, how firms will concentrate or disperse external input, what completes the value-chain of an entire project, and how firms will coordinate flows of inputs for their geographically dispersed operations.

3.3.1 Value Chain

It is very important to distinguish between strategies based on competitive advantage and those based on comparative advantage. These two advantages determine the answer to the two principal questions in global strategy: 1. Where should the value chain be broken across borders? 2. In what functional activities should a firm concentrate its resources? The concept of the value chain is developed in order to analyze the competitive position of the firm in a global industry. The competitive advantage, as stated above, influences the decision on which activities and technologies along the value chain a firm should focus its investment and managerial resources in applying environmental factors in the business. Although the generic strategies of low cost and differentiation are also effective for the E&C industry, these strategies do not suggest where costs should be cut or how technology/service should be differentiated. Thus, linkages of each activity are important to aggregate cost structure and in understanding how each segment contributes to the total cost. By comparing the costs incurred by each link against competitors, a firm can locate the "critical success factors" that must be addressed. Such a comparison can lead to radical changes in strategy, such as the decision to divest or to acquire new technologies in certain links. By isolating those links that are not currently viable relative to competition, a firm can understand its strengths and weaknesses, its current position in the industry, and the degree of configuration and coordination of its operation.

3.3.2 Competition

The value chain could be applied under two different assumptions. The first assumption is that there is no distinctive technological difference among competitors, but that costs vary because of differences in sourcing. Under this assumption, costs can be readily estimated by incorporating factor costs, which include wages, equipment, and materials, into the estimates of E&C costs. The second assumption allows for differences in technologies and estimates E&C costs when competitors may be at an advantage or a disadvantage in terms of firm-specific assets. By focusing on competitors' configuration strategies and technological advantages, the value chain analysis is fundamental in determining where the value chain should be broken across borders and where new investment should be located. The value chain is also used for designing integrated strategies that address particular national characteristics while exploiting upstream competitive advantages in the value-added chain. The key challenge of a global strategy is to determine which links are to be centralized and which links decentralized.

B. Kogut (1985) suggested three modes of global competition. One mode is based on the dispersion of the links in the chain of comparative advantage among countries. In this mode competition between countries with different comparative advantages is inter-industry with no cross flows of similar factors. It is primarily comparative advantage that explains the pattern of competition between vertically integrated multinationals. A second mode of competition is based on differences in the chain of competitive advantage among firms. If relative factor costs among countries are similar, then competition is driven entirely by differences in the competitive advantages between firms. The patterns of competition between firms with similar factors and FDI for market penetration are called intra-industry and horizontal, respectively. This pattern can be seen in the E&C industry in the forms of licensing, merger and acquisition, or establishing foreign affiliates. The third mode of competition consists of the interplay between competitive and comparative advantages along a value chain. Whereas differences in competitive advantage promote intra-industry trade or horizontal investments in other countries, the combination of comparative advantages generates a complex pattern of the international dispersion of the firm's activities. These activities are conducted internally, for the competitive strength of the firm is based on whether the firm owns specialized processes, technologies, or quality control measures that cannot be bought in the marketplace easily. Competition between firms is based on the relative superiority of their configuration of overseas sourcing locations, competitive advantages, and product/market decisions.

3.4 Theoretical Application of Globalization for E&C Firms

Although the E&C industry has unique features for globalization, this section explores the possibility of applying a theoretical framework to the industry before moving to case studies.

3.4.1 Geographic Globalization

Geographic globalization is the process by which a firm expands its geographic market. It is not concerned with how a firm competes; rather, it is associated with several questions: 1. What competitive advantages, gained from domestic or other markets, are applicable to the particular market? 2. What kind of competition does the market have? 3. Are there comparative or absolute advantages between the exporter and the importer? 4. What are the incentives to expanding business globally?

Under global strategies, in order to create and maintain competitiveness, a firm should choose a principle location for its operation based on a consideration of advantages arising from the location, such as the availability of appropriate personnel with allowable wages, accessibility to the international capital market, and political factors including political risks, rather than choosing a location based on a preference for obtaining projects in the country of the location.

Sugimoto (1990) suggested the following factors as driving forces in globalization:

A. Macroeconomic Factors

The demand-supply relationship affecting the inter- and intra-industry trade aspects of E&C services provides a plausible explanation for the horizontal expansion of E&C firms. The principal asset of E&C firms is their human resources who have a knowledge of engineering and project management, as well as experience in their home countries. Since most of the exporters of E&C services developed in home or industrial countries, they have already experienced economic development and construction booms. Having gained this absolute advantage, they can then export their services to developing countries. Moreover, as these firms accumulate knowledge obtained in their international operations, they gain a new dimension in their absolute advantage. However, for E&C firms to obtain a truly absolute advantage, they must specialize narrowly and continually enhance their expertise. Many such advantages are universal and difficult to diversify among E&C firms in developed countries.

B. Imperfect Market

Since the principal asset of E&C firms is its human resources, a firm should exert a maximum effort to exploit the market to use this asset effectively. However, the more advanced, specific and narrow the technological field, the fewer opportunities the firm has. Therefore, the E&C firm which has a large reserve of human resources must plunge into the international market in order to maintain its resources and continue its business.

C. Incentives

Each firm has distinctive incentives for globalization exerted by its goal, history, experiences, resources, and strategies. These may be clients' needs, competitors' promotions, executives' preferences, fierce domestic competition, or diversification. Examples of overseas market incentives of Japanese E&C firms may include a zero-sum domestic market, higher technologies in some fields, increasing Japanese ODA, extended information networks of Japanese trading companies, Japanese global industries, and learning opportunities.

3.4.2 Internal Globalization

Internal globalization is concerned with how E&C firms disperse various activities geographically and how they coordinate them over geographic distances. Different combinations of configuration and coordination provide different sources of competitiveness to firms while the degree of internal globalization of the firms is determined by the extent of the coordination of internal activities.

What factors influence a firm's decision as to whether its activity should be concentrated or dispersed? As each firm has a distinctive goal, the strategy of configuration varies from firm to firm. However, factors generally favoring a concentration of activities at one or a few locations include economies of scale, proprietary learning, comparative advantage of location, linkage of activities, homogeneous preference, transportation costs, fewer government impediments, and regional economic pacts.

An important task in constructing a globalization model for an E&C firm is to examine what coordination means and how it may be systematically categorized in order to be operative. More specifically, it is essential to analyze where incentives for coordination come from and how a competitive edge is shaped. Again, this is an organizational challenge for global competition. The case studies will show how Japanese E&C firms established their local operation centers and how they organized, and how they verified what the issues were.

3.4.3 External Globalization

External globalization is defined by how a firm configures the locations of input geographically and how it coordinates the flow of input to projects in multiple locations. Compared to internal globalization, which accompanies institutional change, external globalization seems easier and more effective for E&C firms because it is applicable to economic theories. Major factors influencing external globalization are represented by sourcing and trade policy. An E&C firm can gain competitive advantages from adequate sourcing which is derived from comparative advantages. Since global information networks and flexible organizations are a must for competitive sourcing, the relationships or inter-organizational coordination among headquarters, subsidiaries, local offices, and project offices are critical factors in differentiating between competitors. Major trade policy includes the host country's government regulations or entry barriers, the home country's government subsidies, and a third country's intervention. Each case study will examine these factors, which sometimes create competitive advantages in the short term view, and disadvantages in the long term view.

3.4.4 Other Factors for Globalization

Influential factors in determining a country's comparative advantages in the E&C industry are the contractual systems or business traditions, which vary from country to country. Another important factor is domestic competition. Japanese E&C firms tend to compare financial numbers with domestic same-size competitors and ignore those of foreign competitors, even when they are considered to be tough, and Japanese firms are often satisfied with the results of domestic competition. Case studies should explore the significance of how domestic competition influences the globalization of E&C firms.

3.4.5 Lessons Learnt from Sugimoto's Empirical Study

This section summarizes the empirical analysis done by Sugimoto (1990), based on questionnaires sent to ENR's top international contractors.

A. Why Global?

Unlike traditionally understood "legendary" motivations for globalization, Sugimoto's study shows interesting aspects of E&C firms' attitudes toward globalization. The reasons for E&C firms' globalization, such as foreign opportunities and the firm's reputation, which are considered as high motivations, are explained. On the other hand, competitors' attitudes toward the global market, geographical diversification, and stagnant domestic markets had low scores in motivation. Japanese E&C firms, unlike U.S. firms, seemed to evaluate foreign projects as unprofitable, and, though reputable, less technological.

Although the theory designates entry barriers as major impediments to geographic expansion, the study shows that they do not trouble E&C firms too seriously because of the establishment of local subsidiaries which may provide access to a particular market. Engineering contractors ignore entry barriers because they compete on the basis of technology which allows them to circumvent such barriers.

B. Configuration and Coordination

The survey shows that headquarters plays a significant role in such overseas activities as sourcing and financing. Project offices, on the contrary, seem to be responsible only to unskilled labor and bulk materials sourcing. There are some patterns of configuration among groups, for example, the Japanese delegate more responsibilities to their subsidiaries and project offices. Heavy civil and building projects rely more on project offices for sourcing than do engineering projects. Europeans prefer merger and acquisition to establishing subsidiaries in order to expand business into new markets. The U.S. does not. Following the European example, some Japanese bought foreign firms, but after finding this kind of ownership too complicated, they have begun to sell them.

C. Competitors

International contractors often encounter the same competitors for different projects. This is frequently the case with engineering contractors because of their specialized technology, which limits the number of contractors who can have access to this market.

3.5 Summary of the Chapter

U.S. engineering contractors achieve efficient worldwide operations through the rationalization of their activities by integrating several key activities at headquarters, where they perform most of the project management and engineering for local units and coordinate various activities at project offices and for subsidiaries which are dispersed throughout the world. The efficiency of this system contributes to their competitiveness. On the other hand, European firms give their foreign subsidiaries substantial authorization. Their subsidiaries and project offices compete on the basis of their management and engineering expertise and their familiarity with local factors. The roles of the European headquarters are limited to preparing subsidies for projects and negotiating political issues with the governments. Japanese cases will be discussed in detail in the next chapter.

chapter 4

CASE STUDIES

4.1 Introduction

This chapter first studies the historical background and uniqueness of the Japanese engineering and construction industries, then examines their domestic and overseas strategies in the light of how this historical background and unique contractual system have influenced their strategies.

The contractual system of Japanese public construction works has never received more attention than it has today. The U.S. government's market opening pressure, the construction bribery scandals, and the *dango* issue have all combined to press the Japanese construction industry to reconsider its contractual practices. It is generally thought that Japanese contractual practices are unique because of the government's fair distribution policy, and that this policy has made the Japanese construction market stable and well organized, thus contributing to the high employment rate in Japan. However, when one compares Japanese contractors with their foreign counterparts, one finds that they are not necessarily competitive, especially in the international market. In fact, the highly individual organization of Japanese contractors, which is derived from their unique contractual system, makes them weak in the international market. Therefore, it is important to study how the contractual system has eroded the international competitiveness of Japanese contractors. Superficial literature reviews are insufficient because this issue is so complex. The contractual practices were developed by the government contractual policy, in accordance public interest.

This chapter is composed of two case studies concerning general contractors and engineering contractors. Each case consists of the author's experiences, interviews, and questionnaires as well as literature reviews. The study of general contractors focuses on the major general contractor, the Kajima Corporation and the study of engineering contractors focuses on Japan's three largest engineering contractors, JGC, Chiyoda, and TEC.

4.2 General Contractor: Kajima Corporation

The major Japanese general contractors (known as *genecon(s)*, an abbreviated and Japanese version of general contractors) are called department stores of construction; they boast a wide variety of engineering and construction services, from housing to nuclear power stations. They are big businesses, and hold an important position in the Japanese economy as well as in its politics. At first the status of the construction industry was low because of the nature of "contract" industry. Then after Rokuro Ishikawa, the chairman of Kajima Corporation, got the position of the chair of The Japanese Chamber of Commerce, the construction industry was recognized as one of the key industries in Japan. The industry's status dropped again to its former position when Rokuro Ishikawa resigned from his chairmanship in reaction to public opinion against a series of construction scandals.

According to the press, four genecons, Kajima, Shimizu, Taisei, and Takenaka, were ranked by income at the top 30 of all Japanese enterprises in 1992. They were also world class contractors in terms of revenue. (Shimizu, Kajima, and Taisei were the third, fourth, and fifth largest contractors in the world respectively in 1992.) The industry, in cooperation with the government, created unique contractual systems, which were based largely on the industry's unique traditions and rules, and which prevented new entries to the industry both from domestic and from foreign countries. These contractual systems practice a policy of prosperous coexistence while maintaining an exclusive exterior and a tightly banded internal structure. Only minor differences can be found among the *genecon* in terms of the variety of businesses, organizations, structures of revenues and expenditures and holding technologies, due largely to the government "equal treatment" policy which does not allow a firm to have outstanding competitive advantages in such fields as technology and management capability. Each *genecon* accommodates its own traditional groups. For example, for decades the "big five" has meant the above mentioned four firms, Kajima Shimizu, Taisei, and Takenaka plus Obayashi. Once Kumagai-gumi tried to break into the "big five" and turn it into the "big six" by expanding its domestic business with low profit margins and its overseas business with radical strategies. But so far all of Kumagai's efforts have ended in failure and it has lost its reputation domestically due to corner-cutting. It has also been severely damaged by overseas "gamble-like" investments due to a worldwide depression in real estate. Kumagai's experience taught the construction industry that the construction business needs to make a steady effort to obtain not only a stable position in the industry, but also its clients' confidence. It is very difficult to change a firm's status in the industry because of the "designated accommodation" policy which acts as a constraint. If a firm satisfies its designated position in the industry, it can survive without any difficulty. A rebellious firm is ostracized. This is the real reason for the industry's opposition to an open market policy; it is afraid its systematic order would collapse if it were to accept the entry of foreign contractors. Although the construction industry is being urged to change its exclusive nature by domestic *anti-dango* opinion and the pressure of the real opposition party, the U.S. government, it seems very reluctant to abandon its privileges. It is supported by the Japanese government in this resistance.

This section will study how the unique contractual system and the structure of the industry have weakened its competitiveness and explore the future strategy of Kajima Corporation. This case study introduces, first, the unique structure and contractual system in the industry by retracing Kajima's practices. Empirical studies will be used for understanding the actual flow of contract practices. Kajima's domestic and overseas strategies will be studied next, and then, Kajima's overseas operation using KEC, a U.S. subsidiary of Kajima, as an example. Fourth and last, this study will explore future opportunities and issues.

The case study will compare Kajima Corporation with the other top *genecons*, Shimizu, Taisei, Takenaka, and Obayashi, because they have taken the industry's leadership and moreover, they are the very firms which really need to change. Table 24 shows basic data of the five general contractors.

Table 24. Basic Data of The Big Five

	Kajima	Shimizu	Taisei	Obayashi	Takenaka
Established	1840	1804	1873	1892	1610
Capital	¥64.1 bill	¥74.3 bill	¥94.2 bill	¥57.7 bill	¥50.3 bill
Author. share	1,920 mill	1,500 mill	1,200 mill	1,248 mill	100 mill
#of employees	14,384	11,951	13,386	12,020	9,334
Head office	Tokyo	Tokyo	Tokyo	Osaka	Osaka

*The data of Kajima, Shimizu, and Taisei are as of March 31, 1993; those of Obayashi and Takenaka are as of March 31, 1992.
Source: Annual reports

4.2.1 Historical Background

The *genecon*, Kajima Corporation, established in 1840, has always led the Japanese engineering and construction industry. It has taken good advantage of its reputation, large market share, and better profits. Strong leadership is necessary for E&C firms in order for them to take advantage of new market penetration; their operations are always associated with high risk and the need to "go"; thus the strategies mentioned here include future core competency. Kajima has been a pioneer in many fields, such as the construction of high-rise buildings, nuclear power stations, and underground power stations. It is very strong in heavy civil engineering fields where technical expertise is vital. This technical expertise does not necessarily directly affect Kajima's business results, although it certainly influences the contractual practices of public works. The relationship between technical expertise and contractual practices is studied in a later sector of this chapter.

Although Kajima has 45% market share of high-rise building, it has reconciled itself to fourth position after Shimizu, Takenaka and Taisei in building construction. This may be because most clients of building construction are in the private sector and the contracts are often determined by business relationships rather than by technological competitiveness. Only a few types of building construction need the advanced technologies which differentiate Kajima from other contractors. Table 25 illustrates how technical expertise helps to maintain Kajima's large share in the industry.

Table 25. Kajima's Share in Selected Construction Fields

Field	Share (%)
High-rise building (>100m)	45
Dry dock (>300,000t)	68
Nuclear power plant	47
Sea berth	48
LNG, crude oil underground storage tank	40
Cable-strained bridge	40
High-tech building	23
Underground power station	28
Arch dam	25
Crude oil storage facility	29

Source: Kajima Corporation, Kajima Style Book '90

Overcoming many technological difficulties, Kajima constructed Japan's first high-rise building, the Kasumigaseki building, in 1968. It was a landmark in Japan where earthquakes regularly occur and a victory in construction technology. Kajima invited Tokyo University Professor Kiyoshi Muto, the greatest authority on seismic technology in Japan, to apply his theory to the design of Kasumigaseki building. He did so using a supercomputer, the first supercomputer the industry had and one of only three in Japan at that time. Kajima also constructed Japan's first nuclear power plant.

The history and the business environment of the Kajima Corporation will be studied in the following sections in order to understand the unique features of the Japanese construction industry and its leader, Kajima.

A. The Postwar Period

Immediately after World War II, construction firms began to restructure their organization and resume business. The establishment of the Ministry of Construction in 1948 and the amendment of the Contractors Act in 1949 restored the industry. The main role of construction firms in the pre-war period had been to supply the work force; however, learning from the U.S. military forces stationed in Japan in the post-war period, they began to use heavy machines for large scale post-war reconstruction of the country. In 1949 Kajima founded the Institute of Construction Technology, the first research facility in the construction industry, in order to study mainly soil and rock mechanics. This investment immediately bore fruit. Technical expertise greatly increased large scale project contracts, such as iron plants and petro-chemical complexes.

Another new construction practice introduced into Japan by the U.S. in this period was the concept of joint venture. The first joint venture company in Japan was established by Morrison Knudsen (U.S.), Kajima, Obayashi, and Takenaka to construct one of the facilities of the U.S. military base in Okinawa. This practice immediately popularized joint venture companies throughout Japan. However, the advantages of establishing joint ventures were the transfer of technology and fair distribution rather than the sharing of risk and of bringing in capital. Public sector clients began the unique practice of selecting and assigning all joint venture members in order to take advantage of technical transfer and fair distribution in which large *genecons* and small local contractors could participate. Therefore *genecons* such as Kajima had no choice but to include other smaller contractors in their bid, regardless of whether they could handle the project alone or not. The government assigned one major genecon, one or two middle-size contractors and one or several small local contractors to large-scale projects funded by local governments. It has not been possible to apply this practice in the outside world; thus recent pressure from the U.S. government has forced the Japanese government to reconsider this practice.

During this early period, construction firms were struggling to survive, due mostly to high inflation. Although Kajima was not the leading firm in the industry, it laid the foundation for its future growth by learning various new concepts from the U.S. construction industry. Kajima could change its business style to keep up with the trend of the rapidly growing Japanese economy. The then president, Morinosuke Kajima, the restorer of the Kajima Corporation and also a politician, proposed two principles when he became the president: scientific management, composed of budget control and managerial comparison, and strengthened construction capabilities, which made it possible for Kajima to use scale of economy. The following twenty directives he presented when he assumed presidency stimulate Kajima's strategies even today;

1. Abandon the idea that the traditional way is the best
2. Keep trying to improve without saying it is impossible
3. Train capable managers
4. Educate employees
5. Check results
6. Make a time to read books
7. Make salaries as high as possible
8. Be a manager who has subordinates who work hard
9. Make rewards and punishments clear
10. Use as many machines as possible
11. Obtain subordinates cooperation
12. Balance is more important than size
13. Planning should come first
14. Keep adopting new methods and new ways of thinking
15. Complacency leads to failure
16. Avoid yesmen in subordinates
17. Fix defects

18. Do not envy others' success

19. Avoid waste

20. Enjoy your job as you do your hobby

Another achievement of Morinosuke Kajima was to raise the status of the construction industry by adopting claims. For example, Kajima took the unreasonable behavior of U.S. Army, which used unilateral contracts as their excuse, to the military court with the help of Morrison Knudsen. In this case, the fair play of the General Headquarters helped to correct unilateral contracts and to recognize the rights of contractors. Although the parties concerned should have avoided disputes as much as possible, it was important for the contractors to complain against unfairness. It was the first official claim made by a Japanese contractor. Traditional Japanese managers had never made claims against clients; therefore, Kajima's action set a precedent the construction industry.

B. The Period of High Economic Growth

Japan enjoyed a high rate of growth from the late 1950's. The heavy chemical industry took the initiative as a pull cart of the Japanese economy. The petrochemical industry in particular invested in large scale petrochemical complexes one after another. Kajima participated in almost all major complex projects by applying its technological advantages in the fields of soil and rock mechanics. Together with petrochemical complex construction, highway construction, which also required expertise in soil and rock engineering, boomed and was the focus of public attention in those days.

During this period, Kajima expanded its business and established its reputation as the top construction firm in Japan. Its attitude toward new markets was flexible and entrepreneurial; the CEO, Morinosuke Kajima, headed Kajima into new markets which were considered risky at the time, looking for future opportunities and long-term profits.

Table 26. Contracts Awarded to Japanese Big Five in the 1960's

Year	Kajima	Taisei	Shimizu	Obayashi	Takenaka
1960	**73.4**	71.6	66.4	65.6	70.7
1961	**106.8**	97.7	104.1	98.8	93.5
1962	**115.2**	96.9	107.3	93.3	91.2
1963	**124.3**	111.5	109.5	97.7	121.6
1964	**152.9**	145.7	136.1	128.7	138.6
1965	146.0	**146.6**	135.4	127.4	120.9
1966	**152.3**	141.4	140.7	129.2	120.9
1967	**191.9**	163.0	159.7	154.8	154.8

* billion yen
** **Bold** indicates the largest number

Source: Kajima Corporation, (1986), Kajima's one hundred and forty years history, Kajima Press.

According to Table 26, there is no significant difference in accounting numbers among firms; however, It is clear that Kajima was the leading firm during this period. As noted before, through experiencing Japan's rapid industrialization and through collaborating with industries, Japanese construction firms gradually learned competitive advantages such as technical expertise, management skills for large projects, and vertically integrated organizations. The major reason for Kajima's place as the leading firm could have been that, at this time, Kajima had been putting a great deal of effort into heavy civil fields and, as a result, the ratio of the Japanese construction investment to heavy civil construction and building construction was 1 to 1. Thus, Kajima might have been able to dominate the other firms. Today, Kajima still has the greatest capabilities and the most advanced technical expertise in most heavy civil engineering fields. Kajima is seen and known as a heavy civil contractor rather than a building contractor in spite of its larger revenues from building construction. The following tables show Kajima's outstanding position in the civil engineering field:

Table 27. Number of Civil Engineers

Firm	The number of civil engineers
1. Kajima	2,546
2. Kumagai	2,527
3. Obayashi	2,096
4. Taisei	1,744
5. Shimizu	1,726

Source: Nikkei Construction, Aug. 28, 1992

Table 28. Contracts of Heavy Civil Construction

Firm	Contracts (¥ million)
1. Kajima	480,182
2. Obayashi	444,690
3. Taisei	443,176
4. Shimizu	410,902
5. Kumagai	365,785

Source: Nikkei Construction, Aug. 28, 1992

Table 29. Contracts of Building Construction

Firm	Contracts (¥ million)
1. Shimizu	2,045,522
2. Takenaka	1,914,813
3. Taisei	1,777,564
4. Kajima	1,746,591
5. Obayashi	1,413,156

Source: Nikkei Construction, Aug. 28, 1992

C. The Period of Slowdown

The dollar crash in 1971 terminated the era of high growth in the Japanese economy, and the oil crisis in 1973 did further damage to the economy which had grown to rely heavily on the petrochemical industry. Japanese industries groped to streamline management, reorganize, develop new markets, and to internationalize. During this period Kajima was focused on diversification, Total Quality Control (TQC), and on expanding from a contractor into an engineering contractor as its vertical strategies and on internationalization as its horizontal strategy. These were the basic stances all major Japanese general contractors took to survive the depression.

The government's role also changed during this period. Traditionally, the government adjusted its total domestic construction investments to increasing public investments when private investments decreased, and decreasing or stabilizing public investments when private investments increased. This theory, that increasing public investments for the construction industry is the fastest way to recover the economic situation, had been accepted for a long time. However, during this recession, even private sectors were reluctant to invest and the government did not increase its investments for construction because of the tightened budget. For the first time the construction industry experienced a "zero ceiling" situation. What was more, although the above mentioned measures had been devised to deal with this situation in each construction firm, the disparity in the profitability, technical expertise, and managerial skills among construction firms had become wider. Under these circumstances, the strategies of other Japanese industries and private clients were diversification, internationalization and rationalization. As clients' requirements became more diversified, construction firms were required to expand their business.

D. Bubble and the After

A record-breaking construction boom supported by the steep rising prices of stock and land had begun in the late 1980's. The Japanese capital market stands on unreasonably high-priced land mortgages, and this skyrocketing land price pushed up private investments. The larger the firm, the more money the firm invested. Since the largest construction firms had large investors as clients, they profited from this situation the most. But even the big five firms could not relax for long because, in theory, a bubble economy is usually accompanied by a flash burst.

In 1991 a May Day was sent from the Tokyo stock exchange market and the bubble economy or *Heisei* prosperity ended. Today, several years after the bubble economy burst, it is generally thought that the Ministry of Finance, the Bank of Japan, large real estate firms, and the big five construction firms profited the most from the bubble economy. However, Kajima, one of the firms which most benefitted from the bubble economy, has had a hard time cleaning up after the party.

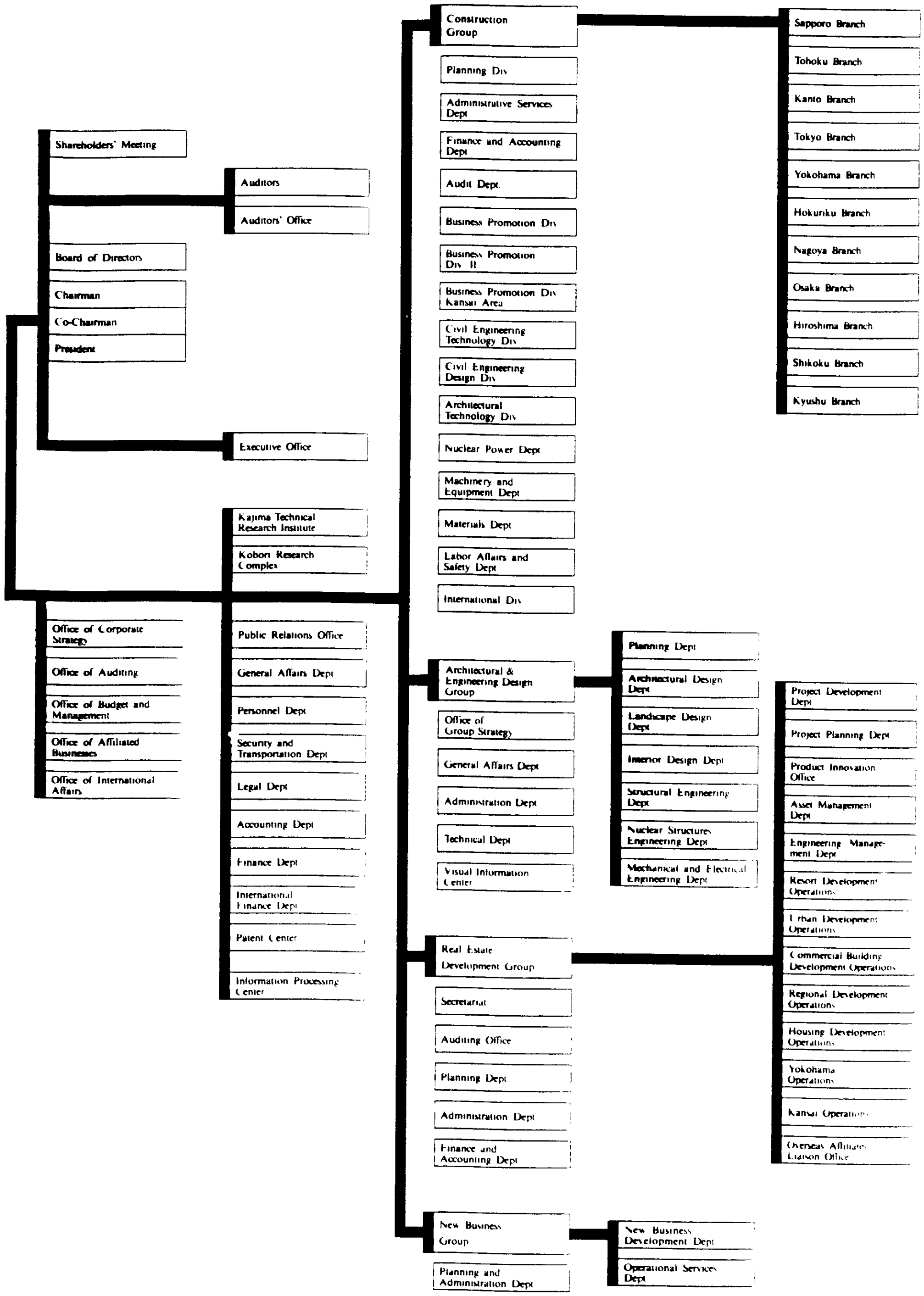
4.2.2 Operational Peculiarity

As department stores of construction, large *genecons* like Kajima have vertically and horizontally dispersed organizations, from their bulky headquarters, R&D institutions, information processing centers, to their overseas offices, and the large number of employees who are guaranteed lifetime employment. Figure 12 is the cooperate organization of the Kajima Corporation. It is not easy to maintain an extended organization and many employees regardless of the economic situation. The vice president of Overseas Bechtel Inc. and its Tokyo office representative, John Moore, pointed out the peculiarity of the Japanese construction industry as follows (Asahi Shimbun, June 30, 1993);

"The principle of the contractual practice in Japan was based on a quota system rather than on competition. A contractor tried to maintain equivalent levels of the sales amount, the number of employees, the technological advancement, and the degree of diversification to its same size competitors. For instance, the numbei of employees of the Bechtel group was about 23,000 in 1993, reduced from 40,000 in 1985. It seemed to be impossible for Japanese contractors to manage such a change because of their corporate cultures. The management systems of Japanese and U.S. E&C firms seem to be totally incompatible."

As John Moore said, U.S. E&C firms are much more rational with smaller headquarters, concentrating on specific businesses, adapting flexible employment systems, and competing on the basis of open and fair contractual procedures. U.S. firms still need to strengthen and continue to center down their businesses in order to survive in one of the most

Figure 12. Kajima's Organizational Chart



Source: Kajima Corporation, <u>Kajima Corporation: Brochure</u>.

competitive and severest domestic markets, as well as in the international market.

This section compares various data of both Japanese and U.S. E&C firms to demonstrate the differences of income, cost structure and productivity.

A. Income Statement

The first table compares the consolidated income structures of the Japanese big five in 1992.

Table 30. Income Structure of the Big Five (1992)

	Kajima	Shimizu	Taisei	Obayashi	Takenaka
Revenues	¥2,200 bill (100%)	¥2,130 bill* (100%)	¥2,029 bill (100%)	¥1,538 bill (100%)	¥1,765 bill (100%)
Gross profit (margin)	¥255 bill (11.6%)	¥263 bill (12.3%)	¥269 bill (13.3%)	¥179 bill (11.6%)	¥222 bill (12.6%)
Gen. & admi. expenses	¥128 bill (5.8%)	¥126 bill (5.9%)	¥126 bill (6.2%)	¥107 bill (7.0%)	¥132 bill (7.5%)
Operating income	¥127 bill (5.8%)	¥137 bill (6.4%)	¥143 bill (7.0%)	¥72 bill (4.7%)	¥91 bill (5.2%)
Income before tax	¥123 bill (5.6%)	¥108 bill (5.1%)	¥122 bill (6.0%)	¥53 bill (3.4%)	¥97 bill (5.5%)
Net income	¥60 bill (2.7%)	¥45 bill (2.1%)	¥40 bill (2.0%)	¥23 bill (1.5%)	¥49 bill (2.8%)

* Shimizu Corporation has opened only non-consolidated financial data to the public.

Source: Annual reports

The Numbers of each *genecon* are similar, as are the structures. In addition, they all have operated more than 90% in the domestic market. These five firms have been in almost the same positions in the industry for decades. At one time Kumagai-gumi seemed about to join this top group, but it dropped away because of the too rapid expansion of its operation, especially in overseas markets. From the above table, it can be said that Japanese major genecons need to have more than a 10% gross profit of the total revenue to make a 2 to 3% net income. R&D expenditures have been high for them. (Table 31) A question arising from the comparison is why are Japanese genecons similar in areas ranging from income structure and organization to holding technologies represented by the R&D budget, or why do they have to pursue an equivalent business style. The answer will be explored in the next section.

Table 31. R&D Expenditure of the Big Five in 1990

	Kajima	Shimizu	Taisei	Obayashi	Takenaka
R&D budget (% of the revenue)	¥19.2 bill (1.13%)	¥16.0 bill (0.85%)	¥12.5 bill (0.81%)	¥12.8 bill (0.96%)	N/A
Full-time staff	417	400	375	335	269

Source: Anthony C. Webster, "Japanese Building Design and Construction Technologies." , Journal of Professional Issues in Engineering Education and Practice, Vol. 119, No. 4, October, 1993.

In addition to its long-term planning activities for private and public sector construction work and the development and implementing of a national building code, the Ministry of Construction also operates two research organizations, the Building Research Institute (BRI) and the Public Works Research Institute (PWRI). Annual budgets are $15 million and $50 million, and the number of full-time staff is 170 and 475 respectively.

The next table shows selected U.S. firms' income structures in 1991.

Table 32. Income Structure of Selected U.S. E&C Firms

	Fluor	Foster W.	Turner	Morrison K.	Brown & R.*
Revenues	$6,572 mill (100%)	¥2,032 mill (100%)	¥2,672 mill (100%)	¥1,980 mill (100%)	¥6,108 mill (100%)
Gross profit (margin)	¥218 mill (3.3%)	¥263 mill (12.9%)	¥58 mill (2.2%)	¥77 mill (3.9%)	¥432 mill (7.1%)
Gen. & admini. expenses	¥57 mill (0.9%)	¥201 mill (9.9%)	¥15 mill (0.6%)	¥45 mill (2.3%)	¥336 mill (5.5%)
Operating income	¥161 mill (2.4%)	¥52 bill (2.6%)	¥43 mill (1.6%)	¥32 mill (1.6%)	¥96 mill (1.6%)
Income before tax	¥228 mill (3.4%)	¥61 mill (3.0%)	¥19 mill (0.7%)	¥58 mill (2.9%)	¥93 mill (1.5%)
Net income	¥164 mill (2.5%)	¥43 bill (2.1%)	¥11 mill (0.4%)	¥35 mill (1.8%)	¥27 mill (0.4%)

*The data are from Halliburton Company, the parent of Brown & Root.

Source: <u>Annual reports</u>

It may be unfair to compare the financial data of Japanese and U.S. E&C firms because businesses are to some extent different. However, the structural differences between them are clearly indicated. U.S. engineering contractors seem to need a higher profit margin, perhaps because they consider R&D the critical factor in having technological competitive advantages. The Foster Wheeler Corporation spent $34.7 million (1.7% of the revenue) on R&D, and Halliburton spent $117 million (1.9% of the revenue). Both the Turner Corporation and Morrison Knudsen, considered general contractors, are struggling with lower incomes in their competitive domestic market. In any case, It is clear that Japanese contractors need a higher gross profit margin in order to make a net profit margin equivalent to that of U.S. contractors. Then the question is how should Japanese contractors spend money in order to keep on track in the business. Section 4.2.3. will focus on the contractual practice in Japan.

B. Construction costs and the productivity

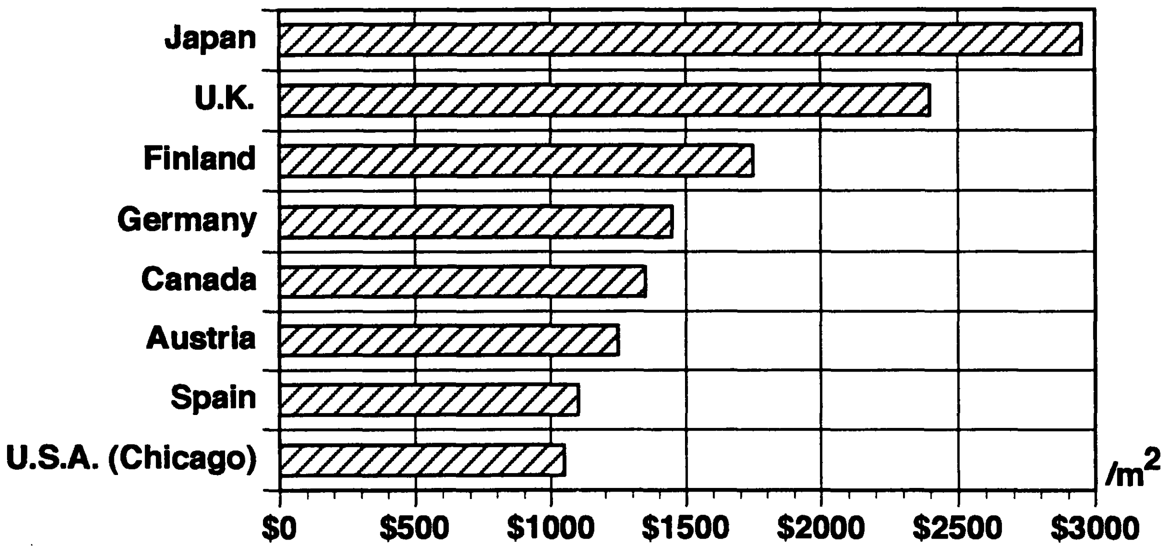
Unlike Japanese manufacturing industries such as automobile, consumer electronics, and semiconductors which are always facing global competition, the Japanese construction industry has lost competitiveness as a result of its governments' "fair distribution" and "prosperous coexistence" policies. In effect, construction costs, productivity, and morale have been sacrificed without competing with foreign firms for a long time.

Reasons for high construction costs may be found in low productivity, the high cost of labor and materials, the complex delivery system, indifference to cost reduction, excessive safety and quality control, the high percentage of sub-contracting and the contractual system in which nobody suffers a loss except the tax payers or silent majorities. In addition, Japan has adopted the lump-sum contract system. Under the lump sum contract, contractors take almost all construction risks, which are often shifted to subcontractors. Figure 13 shows an example of construction costs in selected countries.

Labor productivity in the Japanese construction industry is surprisingly low. (Figure 14) The fact that the majority of the industry consists of small-size firms, may be a cause of low productivity, (Figure 15) but other factors, such as less reliance on pre-fabricated materials, more administrative functions in firms, and a life-time employment system should be taken into account. Compared to U.S. general contractors, which often maintain in-house site crews, Japanese genecons do not directly employ workers. Instead, they hire subcontractors which usually have had a longstanding relationship with certain genecons and have become almost captive subcontractors, working exclusively for them. For example, Kajima entirely controls about 20,000 subcontractors. Table 33 shows the cost structure of contractors. The issue is that these prime subcontractors hire lower-tier subcontractors depending on the worker demand of the genecons. This system of multi-tiered subcontractors has caused many problems, including illegal workers, lower skills, and lower wages. These lower tier subcontractors are used as buffers against economic instability.

Figure 13.

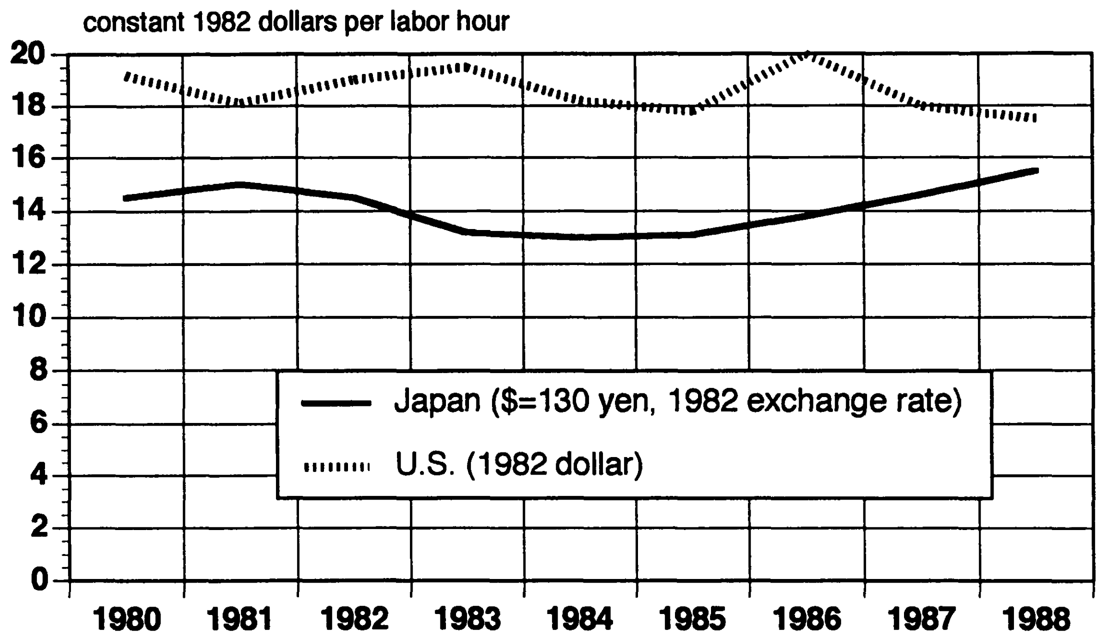
Construction Costs in Small Size Office Buildings



Source: Nikkei Business, Jiritsu seyo Kensetsu-gyo, Nov. 15, 1993.

Figure 14.

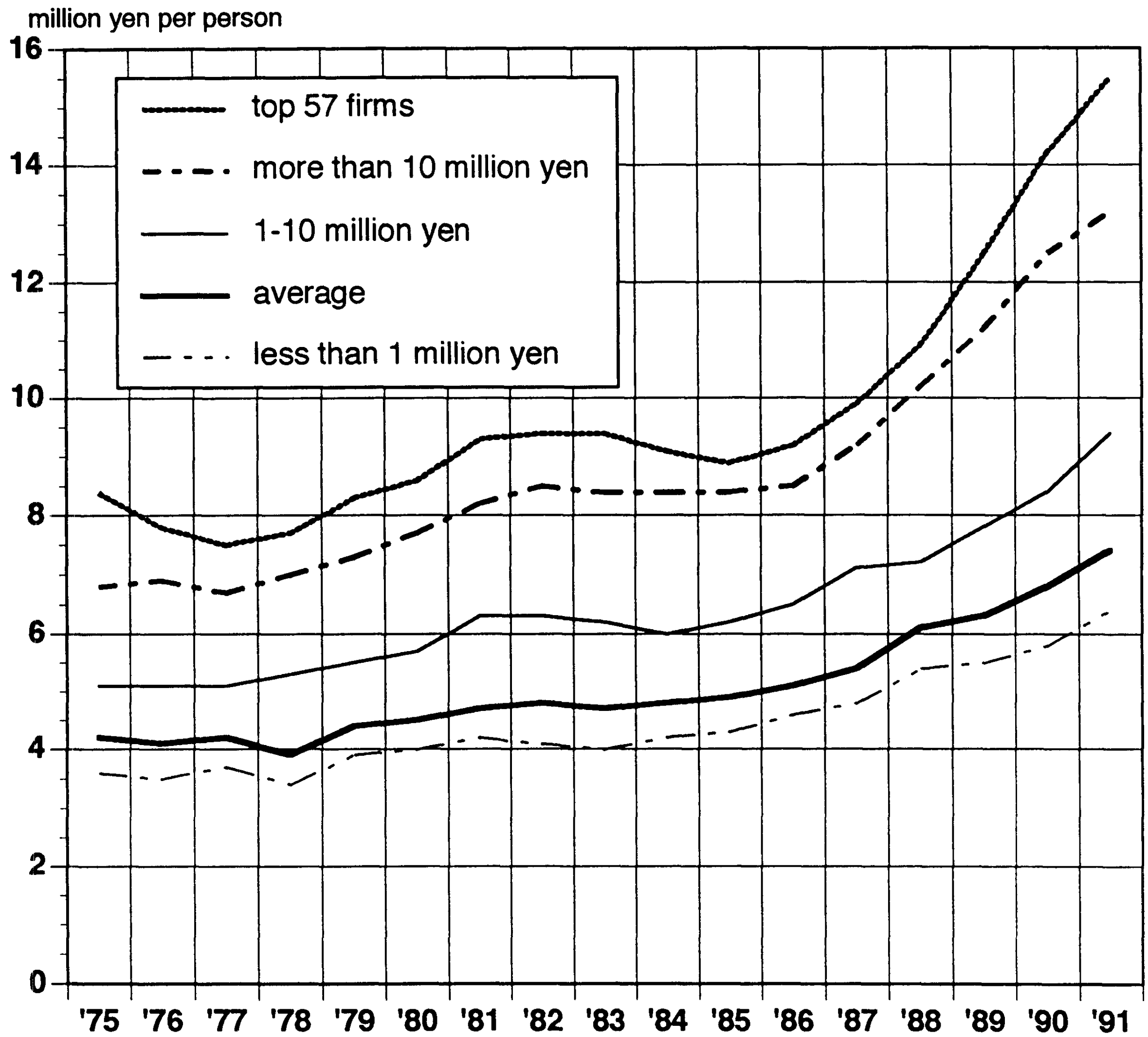
Construction Productivity in the U.S. and Japan



Source: Oyama,K., A Comparative Study of the US-Japan Construction Industry, Unpublished thesis, MIT.

Figure 15.

Value Added Productivity by Contractor's Size of Capital



Source: JFCC, Nikkenren Handbook 93.

Table 33. Cost Structure by Types of Construction

	Large Genecon	Small Genecon	Road	Marine	NTT related	Plant & Equip.	Total
Material	15.4	17.2	43.5	24.5	8.5	36.8	26.4
Labor	14.3	0.8	10.4	1.8	1.3	15.4	10.9
Sub-con.	55.4	69.1	25.6	46.7	63.8	31.3	50.3
Other	14.9	13.0	20.5	27.1	26.5	16.5	12.4

Source: Yoshimitsu Nakamura, Kensetsu Gyokai, Kyoikusya, 1982.

High material costs are attributed largely to the following factors: actual high costs; complicated delivery systems; cartels; and political decisions on "designated" materials. Everything is expensive in Japan. Procuring construction materials from overseas is very difficult both because of high tariffs and because of many non-tariff barriers. Not only the system of contractual practice in the construction industry, but the Japanese economic system itself should be changed in order to reduce construction costs.

The cost indifference of the public sector promotes high construction costs. Governors, bureaucrats, and politicians seem to consider that by offering public works they are returning taxes. There are no incentives to reduce construction costs. The more money a government spends, the more the local economy prospers. This is the basic idea of equal society in Japan.

4.2.3 Contractual Practices

The construction of the Koyama Dam, located in the Ibaragi Prefecture, northeast of Tokyo, Japan, is now in progress, sponsored by Tobishima Corporation, one of the second tier *genecons*. This dam has lately attracted considerable attention as one of the conspicuous cases of construction bribe scandals. Sukemasa Uera, an advisor to Tobishima Corporation, was arrested on suspicion of bribery concerning the contracting of the Koyama Dam. The Asahi Shimbun (daily paper) reported that he gave a bribe of ¥30 million to the governor of Ibaragi Prefecture to get rid of "the favorite" construction firm, Taisei Corporation, and to win the contract as sponsor of the "designated" joint venture. To put it simply, Tobishima overturned the contract with a bribe against Taisei, the contractor which many in the industry had expected to win by the arrangement of dango. At almost the same time, other governors and executives of several top genecons were arrested nationwide on suspicion in cases similar to Koyama Dam. The issue is not whether either dango or bribery is right or wrong; at question is the system itself that allows these practices.

These continuous construction bribe scandals have unique features that do not exist in other industries. First, the main actors were top firms representing the industry; that meant the issue involved the whole industry. Second, prosecutors have revealed that the scandals were considered "daily practices" under the Liberal Democratic Party (LDP) regime. The practice of bribery was closely linked with the industry's other issues, such as an arrangement of dango, a designated bid, and an amakudari (descent from heaven, which means the appointment of a former official to an important post in a private firm to get advantages for contracts). These "unusual" practices are the results of the unique structure and contractual systems of the industry. they may also be the results of the political system in Japan, or even of Japanese cultural consciousness.

This section investigates the historical background and real issues of contractual systems in Japan compared with those of other countries, and explains how the Japanese contractual system has weakened the industry's competitiveness in the international market.

A. Historical Background

It is necessary to trace back to the proclamation of an accounting law in 1900 in order to investigate the origin of the Japanese contractual system. Before the adoption of that law, the then Meiji government had directly employed laborers who worked under the control of government engineers. At this time, the construction industry was the labor supply industry. After the proclamation of the accounting law, anyone who could submit a bid bond might tender a bid which brought a sudden flow of new entrants to the industry. It was a kind of ideal free market situation. Since the primary role of heavy civil contractors was to supply laborers, it was easy for entrepreneurs to start businesses, and traditionally operated firms were caught in fierce cost competitions. The increasing number of new entrants included unqualified firms, which often abandoned a project halfway through or performed very poorly. Thus, the government needed to reexamine the contractual system to select qualified firms. The solution to this situation was the adoption of the designated bid system. This system gave the government tremendous authority through the process of selecting qualified firms. Examples of abuses which result from this tremendous authority include the exclusion of a firm from the list of designations for the next fiscal year if the awarded contractor refuses to sign the contract or even refuses to tender the bid, to accept the "amakudari" official, or to cooperate in supporting an election campaign of the government's favored candidates. These practices will be discussed in the next section.

The major public sectors in Japan are: the Ministry of Construction; the Ministry of Transportation; the Ministry of Agriculture, Forestry, and Fishery; the Japan Highway Public Corporation; the Japan Water Resources Development Public Corporation; forty-eight prefectural governments and municipal governments. The Ministry of Construction has controlled these public agencies in terms of the contractual system and represents the construction industry in fair trade negotiations between the

U.S. and Japan. The structure of the public sector is hierarchical and administrative power is centralized. The budgeting of public works is mostly handled by ministries of the national government or, if a lower level of public agency, prefectural or municipal, is to perform the budgeting, such activity is strictly supervised by the upper level agency.

B. Contractual Process

Because of the difference between the government policy of fair distribution and the winning criteria that is the lowest bid, the contractual process in the public sector is complex. In order to deal with these two conflicting practices, contractors collude among themselves to arrange their turn to win contracts. Table 34 lists the official contractual process and a behind-the-scenes contractual process. It shows that there is considerable involvement by *genecons* in pre-bid activities, including feasibility studies, designs, and estimates. It also implies that there is competition in the pre-bid phase and that the competition finishes before the bidding. These pre-bid activities cost genecons a considerable amount of money. Therefore, the genecons' strategies are based on competitiveness in the pre-bid phase so that they can win a contract. The initial assumption was that the absence of competition had weakened the competitiveness of Japanese contractors in the international market. It is clear, though, that Japanese

Table 34. Contract Procedures in Public Works

Official Procedure	Unofficial Procedure
1. The Government develops the concept of the project.	1.1 Interest groups try to influence the development decision.
2. The government contracts site investigation with a consultant.	2.1. *Genecons* help the consultant investigate site conditions. 2.2. *Genecons* investigate the site conditions and submit their report to the government.
3. The government contracts basic designs with a consultant.	3.1. *Genecons* help the consultant with the basic design.
4. The government staff studies feasibility of the project.	4.1. *Genecons* help the government staff with a feasibility study.
5. The government contracts detailed designs with a consultant.	5.1. *Genecons* help the consultant with detailed designs 5.2. These *genecons* can have important data about the project.
6. The government engineers do the estimates.	6.1. The government engineers consult with *genecon* estimators on costs.
7. The government announces the bid, designates qualified contractors and selects the joint venture participants.	7.1. Interest groups including politicians try to influence the choice of contractors and joint venture members. 7.2. *Genecons* may be told the name of the possible winning contractor by the government. 7.3. The chosen *genecon* can pledge to change a new date of designation until after the disqualification period.
8. The government holds the briefing session for the project.	8.1. The schedule of *dango* is determined. 8.2. *Dango* meetings are held and bid prices are assigned to every designated contractor or joint venture.
9. The government invites bids.	9.1. Every candidate knows the winner before the bidding.

Source: Washimi, T.

contractors compete under a different contractual system from the system used in the international market and in the United States. The difference in contractual systems between markets is caused by the difference in government policy toward public investment. The U.S. government believes that keeping the cost of construction to a minimum contributes to the public good; the Japanese government believes that a fair distribution of public works contributes to the public good. The next section introduces unique contractual practices which are developed because of conflicts between policy and practice.

C. Unique Features in Japanese Contractual Practice

The following items, considered unique features in the Japanese public contractual system, are inter-related and lead to the necessity of *dango* which prevents competition and weakens the competitiveness of Japanese construction firms in the international market.

1. Designated Bid

Kishiro Nakamura, former Minister of Construction, declared in June,1993 that the Ministry of Construction would stick to the designated bid system regardless of the pressure of the U.S. government. However, shortly after this resolution, the Ministry had to change its policy because of continuous construction bribery scandals which were partly caused by defects in the designated bid system. The designated bid system is one of pre-qualification processes adopted in the Japanese public sector: Table 35 shows the bid system of selected countries. A contractor must be designated to participate in Japanese public works. In order to be designated, the interested contractor has to submit a request for nomination on the particular agency's vendor list. Once the contractor is listed, the public agency evaluates its rank based on the data obtained from it; this rating procedure is unknown to the public. According to Levy (1993), each of the datum obtained from the contractor is weighed and becomes part of a formula which produces the ultimate contractor rank (Formula 1). The ranking system varies from agency to agency; thus a large contractor usually submits thousands of requests for nomination every year. Although this system is controversial, it has many good features, such as guaranteeing qualitative work, fair distribution, and the exclusion of unqualified firms. However, these advantages have been biased to favor officialdom rather than the people. In order to be qualified and to appear on a short list, a firm has to be under the public sector's thumb. For example, once designated, a firm cannot refuse to join the bid; if it does, it will lose the right to be designated for the rest of the fiscal year, and this would mean a death sentence. The result was that, after the adoption of the designated bid system, the behavior of high-handed officials became even more impudent.

Most municipal governments have designated bid committees composed only of municipal officials headed by the deputy governor. However, according to Nikkei Business (Nov. 15, 1993), the study reported by the Ministry of Construction indicated that only about a half of the municipal governments opened the criteria of qualification to the public and, to its surprise, 21% of the city governments and 52% of the municipalities had no bidder assignation criteria at all. Arbitrary selections have been common in these public sectors. It is generally thought that to lodge a complaint against governmental decisions would be impossible. In addition, as a unique practice in Japan, the governments often open the designated bidders' names to the public and hold a pre-bid meeting, gathering all designated bidders to avoid repeating complicated bid procedures and to let bidders know who the candidates are. The pre-bid meeting participants immediately understand the officials' implications and then hold a dango meeting.

A study of the bidding process for public works projects has uncovered another unique feature which effectively shuts foreign construction firms out of the Japanese market. (Asahi Evening News, Oct. 27, 1993) Japan's Management and Coordination Agency conducted a study of construction contracts at 160 government ministries and public cooperations between July and September in 1992. It found that 31% of the total governments and public agencies had kept the names of designated bidders and bid results secret. No public sector explained to the excluded firms why they had been disqualified. Seventeen of the 35 government bodies screened construction firms to determine which ones were eligible to take part in the bidding process. In their screening they included criteria of areal factors and local experience, which could have prevented foreign firms from participating In addition, a prefectural government required pre-qualification documents filling 50 cardboard boxes.

Table 35. Bid Systems Adopted by Countries

	Open	Open with PQ.	Desig-nated	Negotiat-ed
Japan	-	-	O	-
Philippines	-	O	-	X
Indonesia	-	O	-	Δ
Thailand	O	X	-	X
Malaysia	O	Δ	-	X
Korea	O	X	X	Δ
U.S. (Federal)	O	Δ	-	-
U.S. (States)	Δ	Δ	-	-
U.K.	-	-	O	-
Germany	Δ	O	Δ	-
France	-	O	Δ	-
Canada	O	-	-	-

O: Major; Δ: Moderate; X: Minor; -: Non

Source: Nikkei Construction, "Yuragu Shimei Kyoso Nyusatsu," Sep. 24, 1993.

Formula 1. Factors in The Contractor Rating System

The formula:

(1)X[(2)+(3)]/70+(4)/40+[(5)+(6)]/55+(7)+(8)+(9)+(10)

The information obtained from contractors and the range of values are as follows:

1. Annual average value of completed construction works in the field of interest to the firm (178-14)
2. Net worth (120-60)
3. Number of staff members engaged in the construction business (60-30)
4. Business conditions (184-0)
    a. Profitability
    b. Liquidity
    c. Productivity
    d. Stability
5. Number of technical staff members (200-26)
6. Number of years in business (50-10)
7. Construction performances (675-300)
8. Experience in special construction (200-0)
9. Safety performance in construction (0-15)
10. State of labor welfare (5-15)

Source: Levy,Sidney M, Japan's big six, 1993.

2. Performance Guarantee

Three types of performance guarantees are authorized by the Ministry of Construction to tender public works: performance guarantor, deposit, and performance bond. The performance guarantor system has been commonly used in Japan because contractors do not have to pay premiums or deposits. The Ministry of Construction has not approved the inclusion of these insurance fees in the estimation, which would result in a higher bid price for a contractor who adopts bond or deposit. The performance guarantor system is considered to be a rational way to reduce construction costs. On the other hand, recent criticism of *dango* has indicated that this practice might lead to the necessity of dango. In this system, if the contractor cannot complete the project, its guarantor, one of the designated contractors for the bid, will take responsibility for it. Contractors guarantee each other's performance. Kajima usually chooses Shimizu or Taisei as a guarantor for its performance but has never asked either of them to take over its responsibility. In addition to the above issue which is related to dango, several other issues have come up as a result of this system. First, it is unnatural that the guarantor who tendered the higher bid price should settle the problems of the lowest bid contractor. Second, it is difficult for new entrants to find a guarantor, especially in regional markets which are regarded as closed markets. Third, a designated bidder breaking away from dango may be refused as a guarantor by other designated bidders. The U.S. government has claimed that having competitors guarantee each other is an unfair practice and for the moment it assumes that the performance guarantee system can exist only under the dango system. The Ministry of Construction is thus faced with having to consider an alternative to this practice.

3. Absolute Estimated Cost

Under present Japanese accounting law, the contract price cannot exceed the estimated cost calculated by government engineers. This practice is a vestige of the era when contractors could not estimate costs and relied completely on government engineers. Today, the situation has changed; there is no longer any confidence in the estimations of government engineers because of new technologies which contractors have introduced, and because of quickly changing market conditions and the fluctuating cost of materials and labor. The estimates of engineers in the U.S. and other countries must also be considered. However, they are usually used as references and cannot bind bid price. In Japan, government engineers do not wish their estimates be merely a point of reference. As a result, they have to consult contractors unofficially about reasonable costs of construction first. The public sector has to re-consider which cost it considers proper, the cost thus estimated by government engineers or the cost derived from bidders' free competition.

4. Joint Venture

The concept of joint venture was first introduced by Morrison Knudsen to hedge risks and supplement limited capabilities for the construction of military facilities in Okinawa. However, the purpose of increasing the number of joint ventures in the public sector has changed from what was originally intended. The unique goals of joint venture in Japan today are for a fair distribution and the sharing of common construction technologies. Under the present system, contractors can tender a bid on the condition that the contractor follow the governments' directions in its joint venture assignments. In Japan, a joint venture company is not made according to the private sector's interest, but according to the public sector's implication. The commonly used form of joint venture is a combination of a large genecon and several local contractors which have been included in order to promote the local economy. Since politicians often intervene in determining joint venture members, this mandatory joint venture practice is a hotbed not only of dango, but also of bribery. The Ministry of Construction is under pressure from the U.S. government to abolish this practice.

5. The concept of "Fair Distribution"

A Councilor, Tetsuo Kutugake, former chief engineer of the Ministry of Construction, recalled that the two most important goals which his superior had taught him again and again in his younger days, were first, qualitative work with minimum budgets, and second, fair distribution. (Nikkei

Business, Nov. 15, 1993) The concept of fair distribution has had priority over that of a fair competition in public works.

For instance, the Tokyo metropolitan government divided a subway construction project into sixteen packages, selected fifty-six qualified contractors and directed joint venture combinations to the bid. For each package, five joint ventures tendered bids and shared the result. This meant that every one of the fifty-six contractors got a contract and no contractor got more than one. It is not officially prohibited for a contractor to contract more than one section package, but, such a practice could break the government policy of fair distribution. As a result, contractors needed adjustments or dango to avoid the double win situation. The Nikkei Business Magazine pointed out that large genecons like Kajima or Taisei are capable of contracting for a whole project, which would surely make the project cost less through effective machine arrangements.

6. *Amakudari*

The *amakudari* system, the appointment of a former official to an important post in a private firm, does not directly relate to the issue of contractual practice. This practice is not unique to the Ministry of Construction; most of the public sector and competent authorities expect post retirement positions in the private sector. It is a practice that is common in Japan and in other countries as well. For example, Bechtel Inc. has invited many former officials including George Shultz, Casper Weinberger, and Carla Hills to join it. In Japan, accepting *amakudari* officials has become indispensable for construction firms to keep good relationships with governments. Contractors regard the amakudari system as a form of insurance, permitting them to get timely and appropriate information concerning new contracts through officials who once worked for amakudari employees. Asahi Shimbun reported that the Ministry of Construction has requested contractors to pay retiring officials the same salary as they were receiving at the time of their retirement and to give them an appropriate position. An official invitation form which includes the date of invitation, position, income, and office location must be submitted. Most amakudari employees, who are connected witn government officials, work for marketing divisions as order takers or trouble settlers.

7. Pre-bid Activities

In Japan people believe that clean water, safety, and service are free. This can explain why the concept of CM (construction management) has had difficulty being accepted by the industry. Designing, consulting and engineering services have never paid well in Japan. Even engineering firms have to participate in procurement and construction to make a profit.

The status of consulting firms is relatively low in Japan because in principle, government officials design and supervise public projects. However, in practice, governments give orders for designs to consulting firms which rely largely on *genecons'* extended expertise in their design divisions. This practice, called marketing design, designing public projects instead of acting as a consultant free of charge, commonly occurs and it can be a strong weapon in the *dango* meeting for the bid.

In fact, the government as well as the consultants ask the *genecons* for many services during the pre-bid period, including a feasibility study, soil survey, structural analysis, and estimation. In order to recover these costs, *genecons* need to claim these services at dango meetings. It may be time now to revise these bad habits and introduce a design-build system, generally accepted in private projects, and an accounting system that makes a pre-bid order possible. Table 36 shows that Japanese general contractors cover many construction phases.

8. *Dango*

Dango, in simple terms, means collusion. In Levy's description in his book, *Japan's Big Six*, "dango is alleged to take place when a consortium of contractors meets in some hidden place to determine whose turn it is to win that next big contract; all contractors participating in this collusive exercise

Table 36.
Degree of General Contractors' Participation to Construction Processes

Process	Category	Japan	U.S.	U.K.	FRG	Korea
Conceptual design	Development	2	4	3	2	3
Project produce	Marketing	2	4	3	2	3
Project planning	Marketing	2	3	3	2	4
Estimate mediation	Marketing	2	4	3	3	4
Tenant mediation	Marketing	2	4	3	3	4
Environmental assessment	Research	3	4	4	3	3
Soil investigation, survey	Research	1	3	1	2	1
Basic and detail design	Design	2	4	2	2	2
Structural calculations	Design	2	4	2	2	2
Estimating	Estimation	1	2	2	1	1
Surround negotiation	Marketing	1	?	1	3	1
Contract and permissions	Marketing	1	2	1	1	1
Financing	Marketing	2	4	3	2	2
Engineering consulting	Planning	4	3	4	1	4
Construction planning	Planning	1	1	1	1	1
Construction management	Management	2	4	2	1	1
Quality control	Construction	1	2	1	1	1
Cost control	Construction	1	2	1	2	1
Scheduling	Construction	1	2	1	1	1
Safety management	Construction	1	1	1	1	1
Procurement	Procurement	1	2	1	1	1
Defect liabilities	Legal	1	2	1	1	1
Layout design	Design	2	4	4	2	4
Facility maintenance	Maintenance	2	3	4	2	2
Facility examining	Renovation	2	3	2	2	2

Note: 1; Always, 2; Often, 3; Sometimes, 4; N/A

Source: JFCC, " The European and U.S. Construction Market Survey", 1989.

receive either a cash payment or a profitable portion of the job when it has been awarded to the predesignated low-bidder."

However, this is not always correct. Not only have contractors benefitted from the *dango* system but the interest groups concerned have too. In addition, contractors are not necessarily able to receive a profitable portion of the job; they sometimes have to contract unprofitable ones under this quota system.

Although it has long been believed that contractors held dango meetings solely for their own profit, construction scandals and criticism by U.S. Trade Representatives have made it clear that governments or bureaucrats played principal roles in dango meetings to keep their authority over the industry through the designated bid system. The Ministry of Construction considered changing its bid system from the designated bid to an open bid in 1982 as a result of a dango scandal in Shizuoka Prefecture. However, the Ministry never carried out its intention because it found that to abandon its authority of designation meant that it would no longer be able to have power over the industry and it would be difficult for its officials to find *amakudari* positions in construction firms after they retired. An OB of the Fair Trade Commission asserted that 80% of the dango were led by the government. These factors - the designated bid system, performance guarantees, absolute estimated cost, joint venture, the "fair distribution" concept, *amakudari*, and pre-bid activities have allowed the *dango* system to exist.

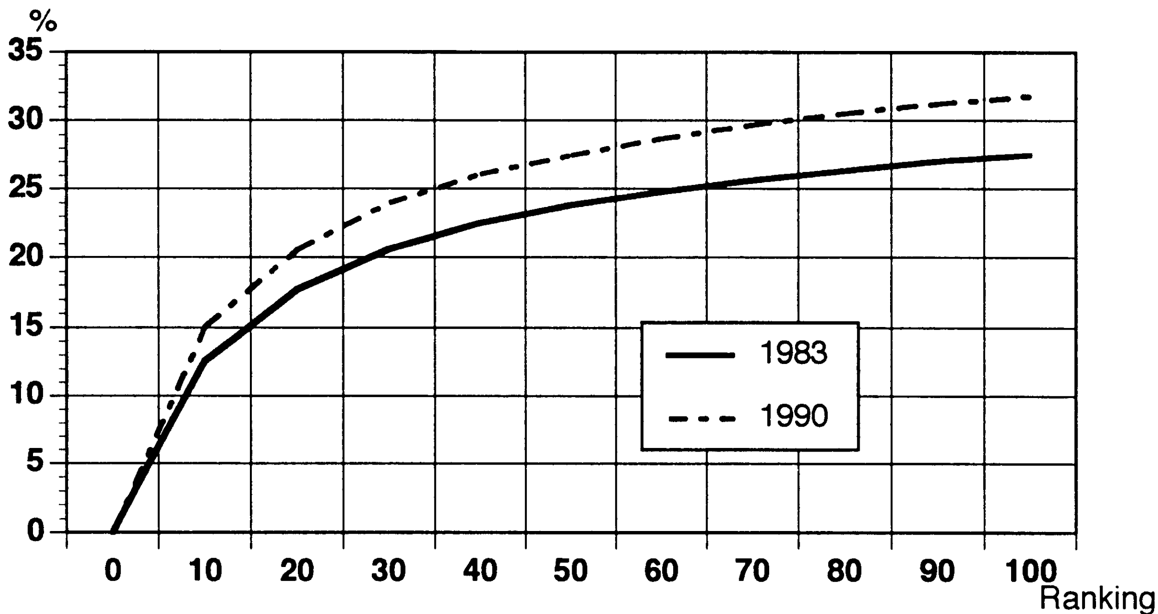
The *Dango* system has been considered a necessary evil partly because Japanese businesses are based largely on the concept of prosperous coexistence or fair distribution, rather than fair opportunity or open competition, on which U.S. businesses are based. This idea may be derived from Confucianism and the national character of islanders, the Japanese.

Regarding market distribution, the opinion that the largest *genecons* can dominate the market is based on their large financial and technological capabilities. Another opinion is that the largest *genecons,* which operate nationwide, and the small contractors, which are closely related to the local community, may be able to survive, but the middle class, which has few specific factors, may not. In any case, firms which have no clear mission or competitive advantages could be candidates for M&A (merger and acquisition). Nomura Soken (think-tank) predicted that the largest nationwide contractors would eventually join to form around twenty firms which would get about a half share of the total construction market. (Today, the top 100 firms have about a 30% share of the total, Figure 16.)

The most important factors are, first the government's attitude and its willingness to accept good change in order to recover the industry's reputation, and second, the breaking up cozy relationships among big businesses, politicians, and bureaucrats, in order to have competitive

Figure 16.

Domestic Market Share of the Top Japanese Contractors



Source: JFCC, Nikkeiren Handbook 93.

advantages applicable to the international market. There are many advantages of the *dango* system which governments have enjoyed. For example, even if a budget is considered lower than the market cost and nobody wants to take it, the *dango* system forces a designated contractor to accept it. This firm may be rewarded with an advantage in the future. Also, the bid for tunnel works using TBM (Tunnel Boring Machine) has often been tendered on condition of *dango* because specially ordered TBMs are used for tunnel projects. In addition, Construction methods, machine designs, and machine construction should start a considerable period before the bid. Without the dango system, project completion would be delayed for as long a period as the design and construction of the TBM machines would need.

A *dango* master mentioned six important criteria in order to win dango deals to the Nikkei Business (Nov. 15, 1993).

a. It is necessary to study the project in detail, to start pre-bid activities earlier than competitors, and to have these efforts recognized by the decision-making manager who is working for the client.

b. It is necessary to have priority in terms of the location and good local connections.

c. It is often necessary for the head of the firm to win the approval of heads of rival firms, especially in large projects.

d. Timely "aimed at reaching a consensus" between the industry and the political circle is important.

e. It is necessary to know more about the client's financial situation and the project detail planning. In addition, the firm should exceed its rivals in its marketing effort and demonstrate this effort to the client, the political world, and the industry.

f. In order to contract one project, the firm needs to concede three to five projects to its rivals. Thus, the firm needs to have three to five times as much information as the others and it also must study them closely in order to convince the other contractors in *dango*.

The *dango* system seems to be just an exchange of quibbling. There used to be order in the industry's *dango* world. However, it has become difficult to achieve a fair and peaceful distribution by *dango* because of the intervention of governors and politicians, and the increasing number of dango-breakers. After the economy's bubble burst, contractors rushed to public works to make up their decreasing private investments. Since it is impossible to compete freely in public works under the present system, these contractors offered bribes aimed at securing orders for new construction to governors. Today, the *dango system* and the industry's business environment prevent competition in the industry, and this has made the industry deteriorate in competitiveness, productivity, and pride. The reformation of contractual practice will encourage the industry to reorganize and become competitive. Unless it introduces the principle of competition in cost, productivity, and technology, which is common in other industries, the Japanese construction industry could become just a sub-contractor of overseas enterprises.

D. The Iron Triangle

Many people inside the industry still insist on the necessity of "adjusting orders." Certainly, a system under which everyone exploits public works expenditures would be convenient, as long as Japan continues to be exclusive and as long as the people do not complain. Under such a system, both large and small firms share profits in a friendly manner, politicians collect secret donations and anticipate electoral support, bureaucrats secure post-mandatory retirement jobs in the private sector in order to "help the industry grow". However, this "Japanese-style interdependence" may no longer be tolerated. First, as the Japan-U.S.

construction talks have indicated, the system itself is not internationally acceptable. Second, as the voters' anger with corruption has shown, it is impossible to fool the people forever, as Asahi Shimbun pointed out.

The MIT political science professor, Richard Samuels described this cozy relationship among politicians, bureaucrats, and big businesses indigenous to Japan as the game of "scissors-paper-rock" in the eternal triangle. This practice is not peculiar to the construction industry; Every industry has its involvement with government authorities and its "in-house" politicians, who create an iron triangle. Each group helps the other within the triangle, ignoring the outside world.

Figure 41 shows the inter-relationships between the three actors. A further comparative study of the politics-government-big business triangles between the Japanese construction industry and the U.S. defense industry will be made in a later section of this chapter.

E. Section Summary

This section introduced the unique contractual system in the Japanese construction industry which has forced structural constraints upon the industry. It has also prevented the cost competition between contractors that exists in the United States. Although cost competition has not been adopted in many developed countries, international contractors need to have cost competitiveness because many of the international construction projects are planned in developing countries which adopt cost competition. Because the differences between bid prices made by contractors are clear from the point of view of cost, cost competition is accepted in the international construction market, even though it is difficult to compare their capabilities, which include quality, services, management skills, and technical expertise. On the other hand, the competitiveness of Japanese contractors is based largely on their total capability in the domestic market, in which the relationships between governments and contractors have been established over a long term. The Japanese government and the construction industry do not fear the entry of foreign engineering and construction firms in the market; however, they are afraid that the contract system peculiar to Japan, which has worked very well inside the triangle, will be forced to change with the opening of the market. The Japanese construction industry has already lost much of its international competitiveness under the unique contractual system. The critical issue is that public sectors have denied open competition with a fair distribution policy. They are now at a crossroad; they must decide whether they will defend their contractual system and be reconciled to the loss of their international competitiveness, which is not easy to accept, or they must reconsider their system and adjust it to the international market. In any case, the industry should be aware that the domestic market must compete under international rules both domestically and internationally.

4.2.4 Empirical Studies of Contractual Practices

Section 4.2.3. described the unique features of the Japanese contractual systems including the designated bid, performance guarantee, absolute estimated cost, joint venture, the concept of fair distribution, *amakudari*, pre-bid activities, and *dango*. Japanese contractors demonstrate their ability in these fields in order to get contracts in the domestic market. However, in other markets, such as the U.S, market, competition by U.S. general contractors is based primarily on cost advantage. The question then is, how does the system really work? And what process does a contractor need to go through in order to claim priority when the industry holds a dango meeting? Within Japan, therefore, competitiveness means using the above mentioned practices to position a contractor so that it is eligible to bid on contracts Although it is very different from U.S. competition, there does exist competition within Japan. In order to verify the peculiarity of the Japanese contractual system and answer the above questions, three of the largest public construction works in progress in Japan, Projects A, B, C, were chosen for an empirical study. The four questions asked were:

1. What was the detailed process for getting the contract?
2. What kind of pre-bid activities were needed to get the contract?
3. What are the competitive advantages of your firm?
4. What will your future strategies be?

These questions were sent to X, Y, Z, the general managers of projects A, B, C, working for genecon XX, YY, ZZ, respectively. The following are their summarized opinions.

A. Project A

1. Description

General manager X responded to questions by describing the background of the project in a general terms in order to preserve confidentiality. His response follows.

Five years prior to the official announcement of the project, the government awarded its basic design to consulting firm B. However, this project was too difficult and too risky in terms of technical expertise and size for B to take sole responsibility for the basic design. Therefore, *genecon* C, which was closely related to B, helped B on most of the design. Then, the sales division of C asked for XX and two other *genecons* to join the group in order to study the project further. The number of participants for project A was determined according to the possible size of the project. Two years later, the details of the design were awarded to consulting firm D. XX and two other *genecons* from the above mentioned four helped firm D with the detailed design. Then, according to the industry's adjustment (described in section 4.2.3), the project was divided into three sections among the three genecons which participated in the detailed design.

2. Pre-bid Activities

In general, in order to be involved in a public bid, a contractor has the following choices.

a. Bribery

This is rare because it is against the industry's rules of fair distribution and stability.

b. Work experiences.

Demonstrating work experience, being geographically close to the targeted project and being related to the project provide strong advantages.

c. Services.

In order to claim priority against other genecons, genecons often help consulting firms with both basic and detailed designs free of charge.

d. New technology.

Introducing new technologies, which may improve safety and quality, and may save time and money, are the most reasonable ways of having competitiveness.

e. Influential persons.

Counting on locally influential persons is often the most effective, but requires some compensation.

3. Competitive Advantages

Advanced technical expertise has lead XX to be at the competitive edge. However, this situation may not last.

4. Future Strategies.

Having advanced technical expertise will maintain XX as the top contractor in the industry; however, the competition will include cost factors in the future and XX should reduce various overhead costs to survive in cost based competition. Future strategies will be;

a. XX should find out about possible problems before its competitors. Then it can be superior to them by suggesting proper solutions to the problems.

b. Regardless of the bid system in the future, it is always important to have not only distinguished technologies but also a superior record in past construction projects, such as in high quality experienced work, a proper completion date, and an absence of disputes. The criteria for selection will be similar to those of pre-qualification adopted for international bids today.

c. A contractor who can propose a specific development for a property will have advantages even in public works because of increasing privatization.

d. Continuing investment in R&D focusing on future technologies is necessary to maintain XX in a advantageous position.

B. Project B

1. Description

General manager Y responded to questions by describing the background of the project in general terms in order to preserve confidentiality. His response follows.

This project is a pioneer work and is considered to be technically very difficult. It required a detailed feasibility study, a considerable amount of structural calculation, and careful estimates. This study cost about $20 million. Only two genecons, YY and WW, were considered able to do such a large-scale feasibility study. These two contractors dominated the design-build construction market during Japan's high economic growth period, and still have large design divisions. For example, YY has five hundred designers solely for heavy civil engineering fields. With such capability, in the industry's traditional system it was only a matter of course that these two contractors got and shared the contract.

2. Pre-bid Activities

There was an official announcement for open bids on this project. However, the procedure was a formality and the bid was actually negotiated because only two contractors were considered to have technical and personnel capabilities for this kind of work. Also, since the preliminary cost was so high, only serious contractors could tender the bid at reasonable prices.

3. Competitive Advantages

Expertise is the most important competitive advantage that a contractor should have. Since it is impossible that a bid price exceed an engineer's estimation under present accounting laws, contractors are forced to bid lower than the government's initial budget even though they might consider that more should be budgeted. During construction, a prime contractor looks for reasonable ways to take advantage of changing orders. In order to change orders without conflict, the contractor uses its technical expertise to persuade government engineers to allow the change.

4. Future Strategies

Future competition will probably be based on cost and quality. However, this depends on the contractual policy of the local, municipal, and national governments. The U.S. government's proposal of "open policy" may reduce opportunities for large genecons in the short term because they no longer will have a cost advantage. Too, the policy may deteriorate the quality of project works. Japanese clients, including both the public and the private sector, have enjoyed receiving high quality work and various supporting services and are accustomed to them. It is doubtful that contractors will be able to satisfy the client with the same quality and service under a policy that considers low cost to be the most important factor. Thus, in the long term, large genecons can still have competitive advantages on the basis of technical expertise if they are able to maintain their level of expertise. Y personally considers the present contractual system the most reasonable and the fairest for the public.

C. Project C

1. Description

2. Pre-bid Activities

General manager Z stated that it was impossible to comment about questions A and B. He responded to questions C and D in general terms in order to preserve confidentiality. His response follows.

3. Competitive Advantages

a. The capability of ZZ's engineering work force.

In the construction industry, clients do not rely on technology itself but on engineering experts who can handle any difficulty with experience, knowledge, and cooperation, using managing tools as well as technical expertise. The most important asset in a construction firm is its human resources, especially engineers.

b. Investment for technological advancement.

Contractor ZZ has traditionally spent a considerable amount for research for every large project in order to advance its technology, which may result in future technological advantages in the similar projects.

c. The size.

Clients often prefer larger contractors because they have greater total capability than smaller ones. ZZ is one of the largest contractors in Japan, which means that clients are assured that the project will be completed without any difficulty.

It is difficult for the government to evaluate the total capability and past performances of contractors because of the uniqueness of large construction projects. Even though structures may be the same, site conditions such as soil, underground water, and the location itself are totally different. Therefore, the government tends to base its decision only on cost.

4. Future Strategies

To be the leader of this industry, the most important factor is reliability. This is a basic human characteristics. Therefore, the firm should always behave so as not to spoil its reputation for reliability. Future competition will be based on cost in the short term and should be based on performance in the long term. ZZ may face fierce competition when the government changes its contractual policy from fair distribution to fair opportunity. This change means that ZZ must change the way it does business and its bureaucratic organization as well. To have outstanding total capability, ZZ needs to provide training in order to have confident engineers.

D. Section Summary

It is clear that such informal but traditional pre-bid activities are important to get contracts. Existing contractual practices in Japan, as mentioned in section 4.2.3, have produced better quality than fair opportunity practices have in the United States.

General managers, although all are civil engineers, believe that technical expertise provides the most important competitive advantage in order to get contracts. Under the existing fair distribution policy, genecons have in-house design divisions in order to support feasibility studies, designs and estimations for the government and consulting firms for public works. Contractors maintain and encourage team relationships between the government and consulting or design firms, so that the coordination of contractors' internal activities is crucial for participation in projects from the early phase to completion.

Changing from fair distribution to fair opportunity may disrupt the industry for the short term. Even if cost becomes more important in future competition, general managers predict technical expertise will be the major competitive advantage of genecons. Also, it would be difficult to terminate the close and cooperative traditional relations which have existed between the parties concerned.

4.2.5 Domestic Strategy

As a result of their unique contractual system, competition in the domestic public construction market is based on the total capability of

Japanese general contractors. Cost competitiveness is not critical; it is only one of the factors. A contractor needs to prove his total capability not only to be designated for the bid as the first step of contract, but also to persuade designated competitors to abandon any further effort to obtain the contract. This total capability can be maintained only by the present contractual system because the costs of a large and capable organization are too high to be supported by cost competition. Through retracing recent business and corporate strategies, this section investigates what strategies have been developed in order to have competitive advantages, and what practices have made Kajima a leading contractor in the public construction market in Japan.

A. Business Strategy

The business strategies developed by Kajima for winning contracts can be categorized in three orderly steps: designation, contract, and construction.

1. Strategy for Designation

The first and most important step in getting a contract of public works is to be designated for the bid. Without being designated, a contractor cannot tender the bid or even join a *dango* meeting. The designation of a contractor is based on the annual contractor rating (Formula 1, chapter section 4.2.3.) evaluated by each government and public sector, by the fair distribution policy, which does not allow a contractor to contract projects in succession, and by some arbitrary decisions . The criteria of this contractor rating system implies two important factors for designation, which are:

a. Size

b. Technical expertise

Kajima's strategies for designation have been established in order to meet these factors. The following is a brief description of important factors.

a. Size

Size is the most important factor in being designated. As Formula 1 indicated, the public sector determines the contractors' yearly rating and its ranking, based largely on size factors, such as the value of completed construction work, the net worth, the number of staff members, the number of technical staff members and experience. Larger contractors have more opportunity to participate in larger projects, which are generally higher value added, more profitable, more reputable and more difficult. Other criteria are also influenced by the size factor of the contractor. In terms of productivity, for example, the larger the contractor, the more productive it is

(Figure 15). On the other hand, under the present " fair opportunity" policy of the government, large genecons have almost no chance to get smaller contracts. For example, the Tokyo metropolitan government divided licensed contractors into five rankings (Table 37). A contractor ranked A has no chance for a project designed for B ranking contractors.

Table 37. Number of Qualified Contractors by Construction Type in the Tokyo Metropolitan Government (1991)

Ranking	A	B	C	D	E	Total
Road construction	86	300	602	387	258	1,633
Bridge construction	115	100	186	89	36	526
River structure	171	246	330	153	55	955
Water supply facili.	108	187	440	340	244	1,319
Sewer facility	211	276	431	227	127	1,272
General civil work	287	408	711	459	420	2,285

*For example, the maximum contract amount per order in road construction is: A - more than ¥200 million, B - ¥200-¥80 mill., C - ¥80-¥30 mill., D - ¥30-¥7 mill., E - less than ¥7 mill.

Source: Nikkei Construction, "Yuragu Shimei Kyoso Nyusatsu," Sep. 24, 1993.

Although large genecons cannot directly contract a project designed for contractors in category B,C,D and E, there are secret paths. A commonly used way is "*ura* joint venture", a Japanese term of secret joint venture, in which a large genecon actually takes responsibility for the project under the name of smaller contractors. It means that the staff of a large genecon wears the uniform and has the business cards of the smaller contractor, and then the smaller contractor earns the commission. Although this practice is very disappointing for the staff of large genecons, it permits large genecons to cover all types of work.

Once Kajima proposed to reduce the number of its employees during the recession period which lasted from the mid 70's to mid 80's. During this period, Kajima hired about a hundred new employees annually compared to the five hundred it hired before and after that period. There were two reasons for this. One was because Kajima wanted to change its core business from contract of implementation to design and engineering, which requires a smaller number of advanced technical experts rather than many "general" managers. The other was that the government's "zero ceiling" construction budget policy had produced a sense of impending crisis for large organizations. However, Kajima noticed that by cutting back it had weakened a scale advantage which it had developed over time with considerable efforts and by spending considerable money.

Today, the government is groping for an alternative pre-qualification system to the current designated bid system. Size superiority may remain important because the great concern of the government is the quality of work, and only a large licensed technical staff seems to be able to suggest qualitative work.

b. Technical Expertise

Although its size factor can differentiate Kajima from smaller contractors, it is not enough when it competes with other genecons. For example, Table 37 shows that there are a hundred and fifteen A class contractors for bridge construction. Technical expertise and experience in special construction (Formula 1, item #8) differentiate Kajima from others. For example, Kajima has always been designated for cable-stayed bridge projects because of its advanced technical expertise. Not only are thirty civil engineers currently working uniquely on the structural analysis of cable-stayed bridges (eight projects under construction in March, 1994), many researchers are also working for R&D in related fields in Kajima. As a result, Kajima hold a 50% domestic share in this field.

Although the contractor is finally determined by bid price, having technical expertise, as in the case of Kajima, is important in order to proceed to the next step. The only possible exception for Kajima is disqualification, which is effected if dango practice is uncovered.

2. Strategy for Contract

Once designated, the bargaining among designated contractors begins. Contractors have to tender a bid regardless of the degree of their willingness to accept the project. On the other hand, under the present "fair distribution" policy, even Kajima cannot contract for more than its share of the projects. As a result, Kajima needs to select favorable projects, and to make an effort to contract them without fail. Since pre-bid activities cost a great deal, as former sections have described, Kajima needs to contract targeted projects in order to recover these costs. Kajima's strategies in the contract phase are as follows:

a. Its vertically integrated organization

b. Its coordination of pre-bid activities

a. The Vertically Integrated Organization

Kajima's head office buildings are located in Akasaka, downtown Tokyo. Here, about two thousand employees work for the headquarters and support divisions. Although Kajima does not directly employ skilled workers and subcontracts nearly all of the work to be performed, it cannot keep its organization small because of the demands of the contractual system. This is why Kajima maintains a large vertically and horizontally diversified organization. Many divisions seem to be irrelevant to the contract practice and construction activity at first glance, but they are indirectly involved in it. In order to fit in with the contractual system and to differentiate itself from others, Kajima has expanded its business fields mostly to technical upstreaming, such as R&D, design, and information technology, where experts are directly involved in the contract practices.

1) R&D

Today, the industry's first R&D institution, Kajima Technical Research Institute (KTRI) leads Japanese construction technologies with highly sophisticated facilities and testing equipment. In 1991 Kajima's corporate R&D budget was $180 million, with $72 million going directly to the KTRI, where 440 full-time employees work. Three major roles of KTRI are: R&D, technical cooperation and consultation, and training and diffusion. R&D programs with broader perspectives and views include various middle and long range fundamental theoretical studies as well as the exploitation of and experimentation with new technology. The R&D results are effectively utilized for actual projects through the company-wide management channel from planning and design to implementation. With this outcome and feedback effect KTRI extends its capability not only for the enhancement of its internal expertise but also for its external consultation. In addition, KTRI continues to train its in-house engineering staff and also handles the publicity concerning Kajima's potentiality at home and abroad. The following are major activities of KTRI.

a) R&D

i) KTRI R&D

Along with the company R&D policy, KTRI leads original research programs to exploit new technologies.

ii) Corporate R&D

By forming a company-wide project team, synthesized production technology for marketable commodities is being developed.

iii) Joint R&D with Outside Organizations

Collaborating with the government and other public organizations, KTRI promotes various joint research programs to utilize professional proficiency.

b) Technical Cooperation and Consultation

i) Finding Solutions to Technical Problems at Construction Sites

By analyzing and solving problems at an early stage, KTRI assures and improves the quality of its design and implementation.

ii) Consignment Research

KTRI involves a variety of research consigned by the public and private sectors.

c) Training and Diffusion

i) Training

KTRI conducts training programs for Kajima's engineers and middle managers.

ii) Lectures

In addition to conducting an annual report presentation, reviewing up-to-date research results and information, KTRI contributes technical training and lectures.

iii) Publicity

KTRI's state of the art R&D is well known through exhibitions and through publications such as research articles published for quarterly and annual proceedings.

These activities have contributed very little to Kajima's international competitiveness, but they have certainly contributed to its domestic competitiveness. The R&D activities pursued at Kajima are similar to those performed by its rivals because it has to avoid falling behind its competitors in any important and potential growth area. Falling behind in a field means that Kajima could develop a weak point in the contract practice of a specific field. It is important for Kajima to give evidence that it promotes construction technology and technical expertise in every field regardless of the degree of its importance for Kajima's immediate strategy.

In addition to its reluctant investment in R&D activities to avoid falling behind its competitors, Kajima takes the initiative in many technological fields, such as concrete material and construction, earthquake vibration control and isolation, membrance structure, great depth excavation, wave energy utilization and environmental control. The incentives for starting new R&D activities originate with Kajima's strategic marketing policy, the government's technological policy and the private sector's inquiries. It is only natural that Kajima should have priority for the bid if it has promoted particular research of a new construction as directed from the government. In addition to construction technologies, KTRI has unique laboratories such as the Marine Science Laboratory (MSL) and the Plant Cultivation Laboratory (PCL). MSL conducts research on the cultivation of fish and shell fish as well as on the preservation of marine ecology, which is effective for proposing marine structures such as a waste water treatment plant for a nuclear power station. MSL researches the environmental impacts of sunlight quantity, temperature and humidity on the growth of plants and lawn grasses and on environmental preservation, and applies this research to environmentally concerned projects.

2) Design

a) Civil Engineering Design Division (CEDD)

The Civil Engineering Design Division conducts the design and structural analysis of heavy civil construction. The first design division for heavy civil engineering construction was established in the KTRI in 1951. In 1963 it became independent from KTRI and became a division belonging to Kajima's headquarters. Today, every branch has its own design division in order to correspond to its regional demands. These design divisions collaborate on design-related work with the headquarter's design division as well as with KTRI and the Information Processing Center (IPC). The two main roles of CEDD are first, to serve large design-build type projects such as underground hydroelectric power stations and concrete cable stayed bridges, and second, to help consulting firms with public work designs in order to gain an advantage over its competitors. This pre-bid activity was described in detail in section 4.2.3. The CEDD has three hundred and fifty civil engineers who are in charge of various engineering and consulting services from investigation and planning to design and after-care.

b) Architectural and Engineering Group (AE)

Kajima's Architectural and Engineering Group is one of the largest and most reputable AE organizations in Japan. It has about 1,250 employees including architects, planners, designers and structural, mechanical and electrical engineers, who offer expertise in the areas of architecture and planning, project development and feasibility studies, space planning, interior design, structural, mechanical and electrical engineering, and other technical services. Performing these services is a constant staff of 750 employees in the architectural design division in Tokyo, and 350 employees in nine domestic branch offices. In addition, 150 employees work for overseas projects. They engage in a broad range of projects and work in close coordination with the headquarters in Tokyo. Kajima's building construction team, including the AE group and the building construction division, has mostly conducted private construction works. Thanks to its AE group, Kajima has the highest ratio (88%) of the negotiated bids in the industry for private building construction. This means that Kajima can expect higher profits from the private sector without involving the unique contractual system in the public sector.

c) Information Technology

Kajima's Information Processing Center (IPC) first began using computers in 1963 to carry out structural calculations for the seismic design of high rise buildings and bridges. The role that its computers now play includes planning, designing, and construction. IPC has not only developed systems to analyze nuclear power plants and off-shore structures and to determine the appropriateness of business and construction planning; it has also expanded to include Artificial Intelligence (AI), Factory Automation (FA), and Computer Graphics (CG) systems.

By gaining the support of technical expertise from these three organizations, and by collaborating with headquarters, the general managers of Kajima have had an advantage over its competitors in the total capability needed for contract awards.

b. The coordination of pre-bid activities

Competition may be the one thing that most differentiates public construction in Japan from other markets. Although the winning contractor is already determined by *dango* before the bid, there is usually fierce rivalry among the designated contractors in order to have priority in the *dango*. The *dango* for public work is a sort of all-out war. A motivated contractor has to convince the other candidates to give up the project by claiming its priority over them. Prioritization is based largely on the degree to which a contractor is involved in the project's pre-bid activities. Other considerations are geographical and experiential advantages. Inferior contractors often use political arrangements to encroach upon the rights of superior contractors. Therefore total capability is important; many interrelated divisions have to be involved in pre-bid activities, from the top management and Business Promotion Division to KTRI, CEDD, IPC, the Civil Engineering Technology Division and finally the estimator, who is expected to be the general manager of the project. These activities should be well-coordinated under the top management in order to include all fields, and appropriate, timely measures should be taken in order to secure a superior position.

3. Strategy for Construction

Kajima, like other Japanese construction firms, is strongly oriented toward a long-term view and takes care to maintain close long-term relationships with its subcontractors, suppliers and stock-holders. An important reason why Japanese construction firms need long-term relationships is that their contracts are based on total satisfaction rather than cost. As a matter of fact, wherever cost is the crucial factor in contracts, as it is in the U.S. construction market, firms cannot consider long-term relationships. Japanese contractors must be extremely sensitive to their clients; if they fall short of their clients' expectations it will be very difficult for them to recover their position of trust. Therefore, in order to get future contracts, it is important for contractors to maintain the quality of their work, the scheduled construction period, safety, the projected budget, and the avoidance of disputes. Kajima's capability in the construction phase is superior to its competitors because its strategies of construction are essentially having capable subcontractors and using its technical expertise effectively.

a. Subcontractors

Kajima's good reputation is based largely on its subcontractors who work for Kajima exclusively. This close relationship has both advantages and drawbacks. On the one hand, the subcontractors know the operation system of Kajima, they never complain about short term loss or unreasonable requests, and they can train Kajima's young engineers. On the other hand, this cozy relationship may deteriorate productivity and create arrogance in subcontractor management. Kajima makes the following efforts in order to secure capable subcontractors.

1) It keeps strictly to the payment period and amount.

2) It keeps on providing contracts. (In case of absence of continuous work, Kajima helps them find jobs.)

3) It promotes their employees' technical training and various construction license acquisitions.

4) It checks and advises its subcontractors' financial conditions.

5) It takes responsibility for all construction accidents. (Kajima has never shifted its responsibility concerning safety onto its subcontractors.)

Kajima's prime subcontractor association, *Rokuei-kai*, is composed of about 20,000 firms including subcontractors, surveyors, R&D institutions and suppliers. These members, who have been carefully screened before their admission to the association, enjoy various privileges including those from financial institutions.

b. Effective application of technical expertise

Since there is no CM (construction management) contract in Japan, genecons are much closer to their clients than U.S. general contractors are to theirs, even though many clients have their own in-house civil engineers. Site-engineers, performing current projects with future work in mind, participate in the marketing efforts of genecons. In order to respond to client expectations, Kajima's construction site offices are closely connected with its supporting divisions, not only the above mentioned KTRI, CEDD, and IPC, but also with its Civil Engineering Technology Division, which is composed of senior technical experts, its Machinery and Equipment Department, which is equivalent to a medium-size heavy machine manufacturer, and its Business Promotion Division, which is in charge of marketing and client service. Kajima also promotes personnel transfer between its construction office and support divisions; for example, its heavy civil project office usually has structural designers, computer engineers, civil engineering researchers, and mechanical and electrical engineers as well as construction managers.

B. The Corporate Strategy

1. The strategy in the 1980's

Although Kajima had not always led in the number of annual contract awards and revenue, it earned the highest income in the industry for a long time because of having the highest percentage of negotiated contracts in the private market, where it could secure a higher profit margin than that of its competitors. However, during the economic downturn of the early 1980, Kajima lost its position of superiority because its major regular clients, heavy industries such as steel, heavy machinery, automobile, and petrochemical, decreased their investments. In addition, the government did not increase its investment as it usually did whenever there was a recession. As a result, the construction industry found itself in a cost war. Every genecon tried to find a means of escape from this situation in overseas markets by preparing for lower profit margins.

Kajima's top management was required to restore the business. First, it analyzed the causes by introducing TQC. (Total Quality Control) The TQC study indicated that the major problems were declining profitability in new contracts, failure to increase the contract amount, and increasing general and administrative costs. As a result, Kajima clarified its goal as one of high profitability rather than contract volume. The phrases frequently referred to in order to restore competitiveness during this period were "Market in" and "Project making".

The phrase, "Market in" referred to the necessity for Kajima to read its clients' needs properly and correspond to those needs, not from a contractor's point of view but from a client's point of view in response to the client's need to keep diversifying. The top management organized strategic technological development meetings in order to develop new technologies which could provide competitive advantages in the future. Members of this meeting included top management and the business promotion, planning, and civil engineering divisions.

The phrase "project making" describes the synergistic effects of the construction business and its related fields as a result of coordinating market needs and Kajima's soft engineering. In short, Kajima expanded its business fields by utilizing its total capability as well as by collaborating with other industries. Soft engineering included business planning, financing, and project management. The goal intended by the top management was to become an engineering contractor rather than just a contractor. The top management believed that Kajima had this capability, but it has not felt the need to take further step.

2. The strategy in the 1990's

Kajima experienced both depression and prosperity in the 1980. Although it developed several strategies to regain competitiveness during this depression, the sudden improvement of the economic situation in the late 1980 made these strategies unnecessary. However, another depression attacked Japan later making Kajima reorganize its structure and reconsider their strategies more seriously than before.

a. Reorganization

In conjunction with the long-range business plan developed by company management, Kajima initiated major restructuring in 1991 with the goal of developing an organization that could "create a truly comfortable and attractive environment." While construction projects have traditionally accounted for the bulk of Kajima's business, changing lifestyles and societal trends - including the greater integration of information technologies into people's daily lives and increasingly borderless economic activity - are altering the overall environment in which Kajima operates. By focusing special attention on developing diversified business opportunities and on future growth, the restructuring allowed the company to be more responsive to these conditions.

Kajima set up four interconnected yet basically autonomous groups in its reorganization plan. This coalition of independently-managed entities consisted of the Construction Group, the Architectural and Engineering Design Group, the Development Group, and the New Business Group. Together with various related subsidiaries and affiliated companies, these groups operate under the overall strategic direction of Kajima's top management. In recognition of the increasing importance of global business activity, they have adopted a two-tier divisional structure to cover both domestic and international operations while cooperating with each other. Their goal is to develop their own specialized capabilities and expertise to the greatest extent possible.

b. Corporate Strategy

Kajima's basic strategy - diversification, globalization, and federated management - may give a misleading impression of the firm. Although Kajima's formation is based on four interconnected but autonomous groups - construction, architectural and engineering design, development, and new business, 95% of the total revenue comes from the construction business, 3% from development and 2% from other businesses. Kajima has invested in diversification and internationalization, but construction still forms the basis of its business.

While problems with diversification and globalization have forced Kajima for the moment to accept a gap between its corporate strategy and its practice, its construction group can set a more practical strategy which includes expanding market shares in weaker fields such as housing and small construction, challenging new fields in private markets, improving employees' capability, improving profitability, promoting R&D and securing capable subcontractors.

On January 4, 1994, Kajima president Akira Miyazaki gave an address concerning Kajima's policy describing its goal as a response "to client needs with fair quality and price through its total capability." He said Kajima "needs to make a sure and steady effort" in order to recover confidence lost by the construction scandals which occurred in 1993. He recognized "the changing public contractual system and continuous low-level construction investment" and defined Kajima's strategy as "client-oriented business promotion, expanding weaker markets, restructuring the construction system, promoting R&D for future opportunity, and simplifying the headquarters" Finally he asked all employees to remember Kajima's principle which is to contribute to creating a better living environment and a brighter future for all mankind.

C. Summary of the Section

The strategy of contractors tends to be controlled by clients' contractual policies. Because Kajima's strategy for public works has been controlled by the government, it has not been allowed to have a corporate strategy, only a business strategy based on the contractual system. All the same, in comparison with other general contractors, Kajima has enjoyed a special position in private construction, perhaps because of Morinosuke Kajima's challenging encouragement of new types of construction when he was the president.

After having been managed according to this contractual-system-oriented business strategy for a long time, Kajima began to develop a corporate strategy of diversification and globalization. It accomplished this recently by moving from being simply a contractor to being an architecture, engineering and construction firm with a vertically and horizontally integrated organization. However, since business strategy concentrates on the traditional contractual system, it is not compatible with this movement to diversify and globalize. Although Kajima cannot ignore the public contractual system, it should develop a new concept of business strategy based on its new corporate strategy.

4.2.6 Overseas Strategy

A. Introduction

Kajima's overseas operation is divided into two styles, indirect operation through overseas affiliates and direct operation through its overseas division in its headquarters. Direct operation is classified into two further contractual practices depending on the sources and the form of financing. Contract practices in the private sector are largely associated with business relationships in Japan, while in the public sector they have unique features. This section introduces the unique aspects of these overseas contractual systems and considers their strategies. There are three types of financing for overseas public works; Japanese tied funds, Japanese un-tied funds and non-Japanese funds.

1. Japanese tied Funds

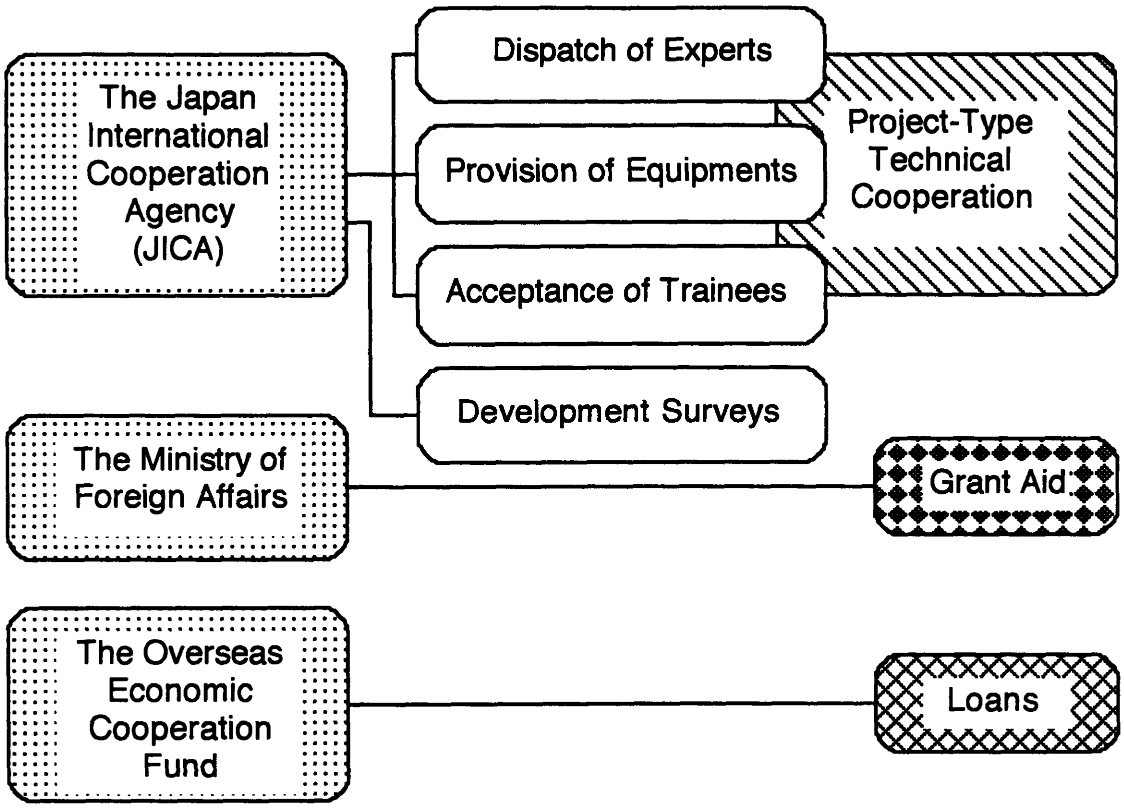
Japan's Official Development Assistance (ODA) has adopted three financing methods (Figure 17): project-type technical cooperation offered through the Japan International Cooperation Agency (JICA), grant aids offered through the Ministry of Foreign Affairs (MOFA), and loans offered through Overseas Economic Cooperation Fund (OECF). The construction industry is interested in economic infrastructure assistance, which is designed mainly for the construction of energy, transportation and communication facilities. Figure 18 shows Japan's high percentage in this type of assistance. Regardless of the financing method, an orderer is a host government. Every grant aid is designed for tied works or intended to contract with Japanese consultants and Japanese contractors. The contract award is determined by arrangements in the industry similar to domestic contractual practice, making strategies for grant works similar to those of domestic works. Here, pre-bid activities are important.

The following are the examples of pre-bid activities that an overseas sales manager mentioned.

a. Cooperation in project finding

Participating in the project finding commission of OCAJI, the staff of a contractor helps with miscellaneous work such as writing reports to the

Figure 17. Japan's ODA System



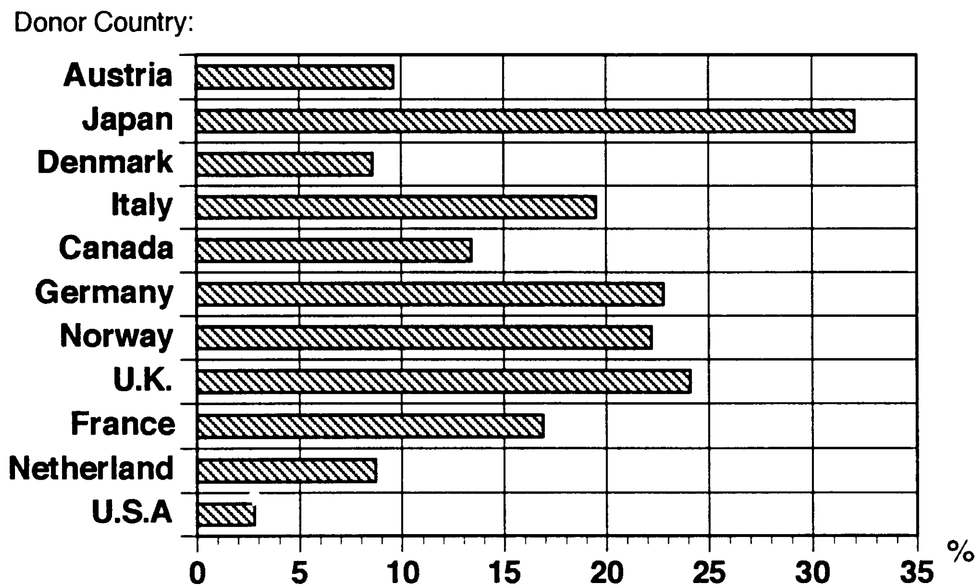
Through JICA, the Ministry of Construction has contributed to developing countries in specific areas such as (1) research and surveys into numerous development projects, (2) the dispatch of experts over long-term and short-term periods, (3) taking the lead in enhancing technology transfer by (a) accepting and training overseas trainees, and (b) by managing overseas centers for research and training to transfer relevant technology from Japan.

The Ministry of Construction also contributes to the promotion of economic cooperation projects covering construction as well as engineering services related to the OECF loans and the Ministry of Foreign Affairs' grant aid projects.

Source: Ministry of Construction, Japan's ODA, 1991.

Figure 18.

Percentage of Economic Infrastructure Assistance



Source: OECD, Development Co-operation: 1992 Report.

authorities of both Japan and the host countries and arranging the term of reference (TOR) for the host countries.

b. Cooperation with consultants

A contractor helps the consultant draw up his basic design and detail design in order to make them favorable to the contractor. The contractor also helps make estimations in order to generate more profits.

c. Making good connections

In order to secure better information for possible projects, the staff needs to form good relationships with information providers such as consultants and government officials. The contractor must also try to advance all participants' interests.

It is clear that the contract is awarded on a basis of arrangements, not on cost competition. Because these arrangements are similar to those of domestic contractual practices, they have also been applied to the strategies used for grant projects overseas.

2. Japanese un-tied Fund

Any pre-qualified contractor can tender a bid and the lowest bidder wins. However, there are still some tricky contractual practices here. Since

Japanese consulting firms always contract design and engineering jobs for the projects funded by Japan, genecons can get detailed information such as design, soil condition, and estimation through cooperation with the consultant. This makes it easier for them to give accurate estimates because they do not have to account for an unnecessary contingency fee. In order to get good and timely information from consulting firms, genecons always show cooperative attitudes toward them.

3. Non-Japanese fund

In this case Japan is considered to have no comparative or competitive advantages except in some niche fields based on technologies. Low cost is the critical factor for success. There seems to be no comparative advantage for Japanese contractors; however, they can have cost advantages through appropriate strategies. The first strategy for cost reduction is geological configuration. Choosing which countries to put effort into is important. For example, Kajima has the cost advantage in several African countries such as Algeria, Tanzania, and Zambia. This is because it has continuously contracted projects in these countries and has the heavy machines needed for construction, so that it does not have to include machine fees, which sometimes account for a large part of the bid price. The second strategy is a construction method based on advanced technologies and experience in the same kind of projects. Since Kajima has a large construction R&D division, it can suggest alternative construction methods suitable to varying site conditions.

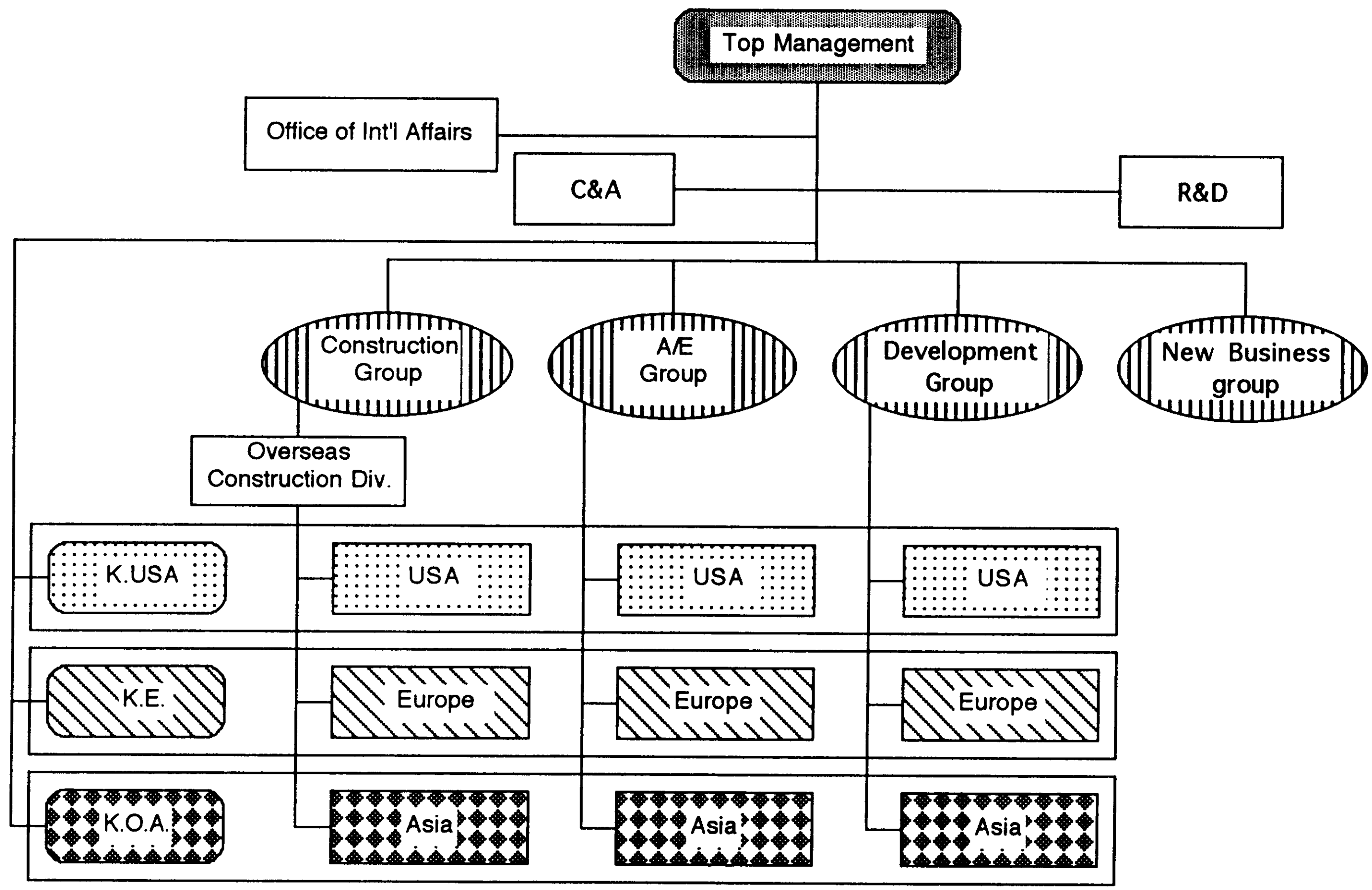
B. Organization

The organization for overseas operations consists of a headquarters and three regional main offices. (Figure 19) The headquarters includes the overseas construction division which principally conducts projects funded by Japan. Before KUSA was established in N.Y. in 1986, Kajima had few long-term overseas perspectives. Since most overseas contracts were awarded from Japanese industries at that time, Kajima's overseas strategy was just to serve its Japanese clients and then to withdraw from the countries after the completion of projects. The purpose of establishing KUSA was not only to administrate U.S. subsidiaries as a holding company, but also to collect information and to understand the American culture, business traditions, and ways of thinking. The U.S. was the best country in which to establish a base camp because it was a world information center as well as the largest and the most advanced market. Kajima established two other regional main offices in Amsterdam and Singapore which covered Europe and Asia respectively.

Compared to the roles of the three regional main offices, which

Figure 19.

Kajima's Overseas Organization



K.USA: Kajima U.S.A., K.E.: Kajima Europe, K.O.A.: Kajima Overseas Asia.

Source: Kajima Corporation, Kajima, Feb. 1993.

operate as independent organizations, those of the overseas construction division are different. First, it operates as a division of Kajima Corporation. Most overseas public works require contractors to submit a pre-qualification application, in which contractors must state their capabilities for the project, such as capital and personnel capabilities, similar work experience, and holding machines. Kajima Corporation has no problem being qualified for overseas public projects with its abundant domestic work experience, but its subsidiaries do have difficulties. Although some public sectors accept the experience of Kajima Corporation as those of its subsidiaries as well, many do not. For example, although the U.S. Department of Transportation (DOT) accepted Kajima's experience as its subsidiary's, KEC's experience, they limit annual contracts from DOT based on the capital capability of KEC. Therefore, KEC is limited to $40 million in DOT contracts in 1994 and will need to make joint ventures with the parent or other contractors if it wishes to contract more. In addition to the PQ issue, the advantage of doing business as Kajima Corporation is that the contract practices of overseas projects funded by Japan are similar to those of domestic public works, which are described in the above section. Meetings for arrangements are held in Tokyo; pre-bid activities are also executed in Tokyo.

The second major role of the overseas construction division is in the function of personnel matters. It administrates the personnel matters of all of Kajima's engineers working in foreign countries. Almost all the Japanese staff is on loan from Kajima Corporation to its subsidiaries. Therefore, the overseas construction division is in charge of exchanging personnel between overseas offices and transferring personnel from/to domestic divisions.

Overseas subsidiaries face severe competition in their markets, so they must shape their organizations to fit their business environments. If Kajima's overseas construction division or even its their domestic divisions learn its subsidiaries' business practices and succeed in introducing their advantages as more competitive models, Kajima may abandon its traditional style of business, a style which makes it lose competitiveness in the international market, and thereby regain its superior position.

C. Strategy

In order to develop a strategy, Kajima should take into account factors in the present situation as well as future perspectives such as economic situation, business environments, clients' needs, comparative and competitive advantages and financial, technical and personnel capabilities. This section will study the ways Kajima applies the advantages it developed in its domestic operation to its overseas operation. The subject will be broken into three segments: policy, issues and strategy.

1. Policy

In the mid-1980's, when the Japanese economy was in a depression and the construction industry was struggling to survive, Kajima planned to increase its overseas share in order to cover the "zero-ceiling" domestic market. However, as a result of being dragged into a cost war in the international market, many projects contracted during this period showed a loss, and the overseas management of Kajima was forced to restructure its organization, policy and strategy.

On April 8, 1991, reflecting upon its 150th anniversary, top management determined that a major organizational restructuring of Kajima was in order to meet the challenges of the next century, and KE 21 (the short form of Kajima Evolution 21) was announced. It projected the formation of four interconnected but autonomous units within the firm. Each of these entities was to be independently managed and operated under the firm's overall strategy and master plan. These new groups, as the previous section described, were the Construction Group, the Architectural and Engineering Design Group, the development Group, and the New Business Group, and they were to act as profit centers working toward Kajima's basic strategy: diversification, globalization, and federated management. The core concept of globalization was expressed as follows: "Individual groups are to look outside Japan's domestic market for new opportunities. They must respond to Japan's emerging open-market policy, which would include increased activity on joint ventures of all kinds within the country. Each group should pursue its own search to acquire subsidiaries and affiliates to reinforce its global position."

As a result of the above experiences and corporate-wide restructuring, Kajima's overseas management determined its policy as follows:

a. Localization

Japanese construction export once just consisted of bringing the domestic organization and business traditions to overseas markets. However, this system had to be abandoned because the domestic organization cost too much and the Japanese way of doing business was incompatible with other business practices. Thus it was necessary to establish overseas operational bases to take advantage of the opportunities in each market. In order to apply Kajima's competitive advantages and Japan's comparative advantages to overseas business environments, Kajima should be neither purely local nor purely Japanese, but a Japanese contractor with a through understanding of local business traditions.

b. Geographical market concentration

Each geographical market has different characteristics. Kajima's method of achieving success in one country does not necessary mean that this method will work in another country. As a first step toward globalization, Kajima should study where it can make maximum use of its competitive and comparative advantages. Then it should make an effort to establish a local appearance firmly in the long term view.

c. Profit first

Kajima's overseas management recognized that unprofitable projects brought nothing but deficit and miserable memories. Unprofitable projects often make sense in the domestic market where long term relationships are much more important than short term profit. However, Kajima should avoid unreasonable contracts awarded through a cost-war.

2. Issues

This section has studied the unique Japanese contractual system. The questions are whether this contractual system has affected the international business of Japanese contractors, and how it has deteriorated their international competitiveness.

Although the three largest genecons, Shimizu, Taisei and Kajima, have been struggling for leadership in the industry for decades, Kajima has maintained its top position in terms of public construction. By so doing Kajima helped to create and maintain the contractual system of the industry, which has in turn further reinforced its leadership in the system. Kajima has structured its organization in order to correspond to the system; for example, large headquarters are maintained for various activities including political matters, the R&D institute was established for maintaining technical expertise, and the largest civil engineering design division in Japan is held for pre-bid activities. Kajima has had to keep high gross profit margins in order to maintain these organizations. This corporate structure is relatively removed from U.S. contractors and does not affect Kajima's competitiveness in the international market, except for Japanese funded projects, where the contractual procedures are similar to the domestic ones.

Many of Kajima's employees attribute the cause of its poor performance in the international market to the fact that Kajima has not been serious about overseas business. In fact, few employees want to work in overseas subsidiaries and construction offices and Kajima has to compensate them for their hardships. For example, Kajima pays $15,000 per month including taxes to an assistant manager (35 years old) who is working for KEC in the U.S. According to him, for that price KEC could hire three equivalent non-Japanese engineers. Although It is difficult to have Japanese employees in a market like the U.S. where contractors compete by cost, this is the Japanese business style. As Lee Kuan Yew, a former prime Minister of Singapore, told Business Week (Nov. 29, 1993), "There is much more transfer of skills, management, and technology with American multinationals than the Japanese. There is only one Singaporean who is a managing director at a Japanese multinational here. But look at American multinationals, and there are any number of them. I think the Japanese will play a role. But I doubt it will be a dominant role." Japanese tend to place Japanese managers in important positions even in foreign subsidiaries. In KEC, the chairman, president and eleven directors are all Japanese and seven of them, including the chairman and the president, have held posts in KEC and Kajima Corporation concurrently since August, 1992. The reason for this practice may related to the idea that mutual understanding (in the Japanese way) may deteriorate if foreign managing directors have power.

3. Strategies

Unlike the domestic market, where Kajima clearly has competitive advantages in public construction work, the international market does not accept its domestic advantages - which have developed under the present contractual system peculiar to Japan - as international competitive advantages. There are three ways in which Kajima might gain competitiveness in the international market. First, it could expand its domestic advantages without changing its domestic strategy. Second, it could modify its organization and business practices if the government were to change its policy to fair opportunity. Third, it could shift its business style to make it totally suitable for international business. Evaluations of and possibilities for these three strategies follows.

a. Expanding domestic advantages

Domestic advantages do not mean such capabilities as in *dango* or the iron triangle, but rather total capability from feasibility studies, design and R&D to construction, operation and maintenance. In addition to such advantages, Japanese contractors can count on the financing capability of Japanese finance institutions and the procurement capability of Japanese trading companies. Therefore, Japanese contractors may be able to demonstrate their total capabilities in large, complex, capital intensive projects, such as BOT (Build-Operate-Transfer) projects. Kajima has been reluctant to join BOT projects because of possible high risks; however, since there is every indication that BOT projects will increase in Asian countries, it has begun to study this method. Kajima's attitude toward BOT projects will be discussed in the next section of this chapter.

b. Modifying its organization and business practices

Many genecons have recently begun to study the modification of their organization and strategy. Although they consider the present system reasonable, they admit that using bribes is unethical. In addition, they expect that pressure from the U.S. government may change the present system anyhow. In this transition period, contractors should study the system carefully because its changes will affect not only their international, but also their domestic competitiveness. In terms of competitiveness in the international market, halfway measures can only mean a loss in the domestic share. On the other hand, because issues in the construction industry reflect Japanese society, rapid and comprehensive change may be difficult. The strategy of modifying its organization and business practices, seems to be the most realistic solution for having some degree of international competitiveness.

c. Shifting business style

Shifting the business style will incur considerable cost and pain. Substantial managerial reform will be required, which may be more difficult in large genecons than in medium and small contractors. However, this seems to be the only way to have a cost advantage. Although it is incredible that competition in the Japanese construction market will be based solely on cost, shifting the business style is a good strategy for small firms in order to differentiate themselves from others. The Daiwa House Corporation, one of the largest housing firms in Japan, has adopted this strategy. According to the Nikkei Business magazine (Nov. 15, 1993), no *dango* meeting is held when Daiwa is one of the designated contractors because it always refuses *dango* based on its cost advantage. Daiwa has pursued a cost advantage by promoting the maximization of the use of prefabricated construction materials. In addition, the standardization of design, equipment and materials has made a shorter construction period possible. Because of this overall rationalization, Daiwa is called "a discounter of the construction industry." Although most of the contracts awarded to Daiwa come from the private sector, it provides a good example of differentiating a strategy through shifting a business style.

D. Japanese Government Policy to Promote Overseas Contracts

The involvement of the Japanese government in the overseas operations of contractors is relatively light. This may be because these operations are outside of the iron triangle, thus the government and politicians cannot control that aspect of the construction industry and benefit little from the international market. Rather, Japan has focused its export policy on the manufacturing industry, which benefits the domestic economy and eases access to foreign currencies. According to Strassmann and Wells (1988), the following are general government policies.

1. Overseas Construction Policy by the Government as a Whole

a. Institutional Financing

Yen credit is provided by the Overseas Economic Cooperation Fund of Japan (OECF). Export and technology suppliers' credit is provided by the Export-Import Bank of Japan.

b. Export insurance

The Ministry of International Trade and Industry (MITI) offers the following export insurances: general export insurance, export proceeds insurance, exchange risks insurance, export bond insurance, overseas investment insurance and technical services supply insurance. The last is the most important for the construction industry.

c. Tax reduction system

Preferential treatment is afforded to Japan's export industries not by tax credits but by the reduction of its taxable income. Twenty percent of the total income of overseas consulting firms is deductible prior to taxation; this is not only to counter high political risks but also to enable them to raise research and development funds and to foster business vitality.

d. Official Development Assistance (ODA)

ODA is administrated by the Ministry of Foreign Affairs on a country to country basis, in the form of a grant or direct loan, or on a multilateral basis, in the form of financial support for international organizations.

e. The Japan International Co-operation Agency (JICA)

JICA's functions include: inviting people from developing countries for technical training in Japan; dispatching Japanese experts and volunteers abroad; dispatching survey teams to help in formulating development plans and projects; providing grants for equipment; extending project-type technical cooperation.

2. Overseas Construction Promotion Policy by the Ministry of Construction

In addition to the above government policies, Strassmann and Wells (1988) describes specific measures undertaken by the Ministry of Construction as follows:

a. The establishment of an overseas construction promotion fund in order to supply low interest credit for pre-bid feasibility studies.

b. A financial guarantee system for overseas construction projects by overseas construction and consulting firms.

c. An 'Infrastructural Facilities Investigation' and 'feasibility studies for construction projects' to search for and to form suitable projects in developing countries, as suggested by Strassmann and Wells.

d. An overseas construction technology development project to develop the appropriate technology of construction in conformity with natural and socio-economic conditions of developing regions.

e. A training system of consultants and project managers in charge of overseas construction projects.

E. Summary of the section

It has been generally thought that Japanese *genecons* have no strategic plans for its globalization and that it looks for overseas opportunities whenever the domestic market declines. However, the situation has changed because the domestic market has become a part of the international market. This section introduced three strategic possibilities for Kajima; it must choose one in order to compete in the international market. Any one of the three will require radical restructuring of Kajima. In order to assess its abilities, Kajima should analyze specific segments of the market such as type of clients, financial status of clients, contract type, geographical position, project type, nature of competition, labor relationships, needed services, and various environments. By doing so, Kajima will be able to evaluate its advantages and disadvantages better. In any case, the operation style of Kajima's domestic division and overseas division should be compatible in order to demonstrate Kajima's maximum total capability.

4.2.7 BOT

The concept of BOT (Build-Operate-Transfer) has been introduced recently to the international engineering and construction market for the construction and operation of infrastructure mainly in developing countries. Because inquiries for BOT projects have increased in recent years, Kajima began to study the possibility of BOT and drew the following conclusions:

A. Overview of BOT

1. BOT covers identifying a need for a project, assembling a team to do a feasibility study, designing, engineering, construction, financing, maintaining, and operating the facility, and, after a certain pay-back period, turning the project over to a local government agency at no cost to the new owner.

2. BOT projects are risky because they need large amounts of initial funding and a certain period to repay with unknown risks.

3. The profitability of a BOT project is estimated from the internal rate of return (IRR) which may change after a period of construction and operation.

4. Many fluctuating factors in an unknown future make BOT a "high risk and low return" business rather than "high risk and high return".

5. Kajima's participation should be limited only to construction; operation should be delegated to joint venture partners in order to hedge risks as much as possible.

B. Description

In order to reduce debt, less developed countries have aggressively adopted the BOT method, which requires a consortium to be responsible for a project from beginning to end. The consortium, which usually includes banks, construction firms, plant manufactures and trading companies, is involved from feasibility studies to design and construction to operation and finally to transfer. However, worldwide recession has made some developed countries such as U.K. and Australia adopt BOT as well. The ultimate incentive for adopting this method is that the government does not need to budget for the project, while the incentive for the consortium may be increased opportunities.

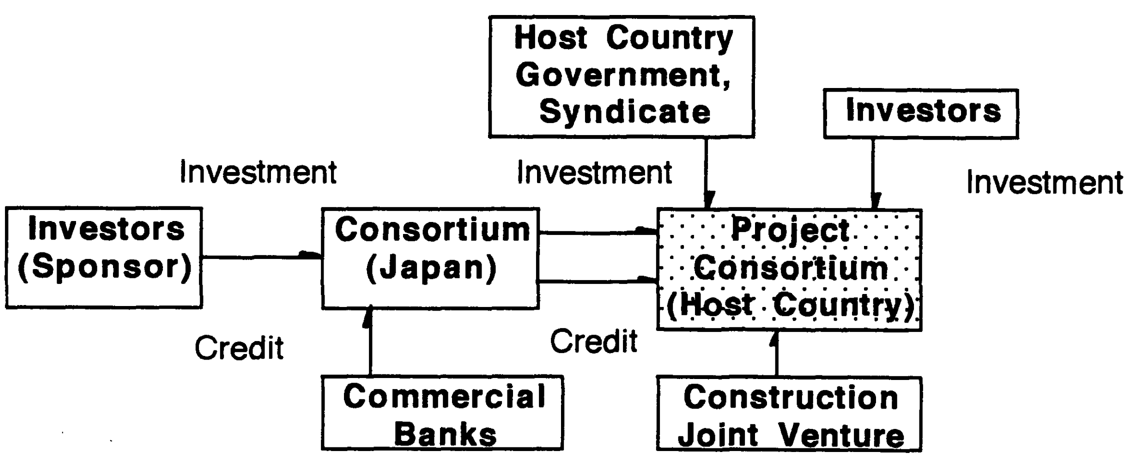
Two important steps must be taken before a project begins; there must be a concession agreement and project financing. The concession agreement concluded between a local government and a consortium determines both the profitability and the success of the project. The consortium should include as many preferred conditions in the agreement as possible. The purpose of introducing project financing is to limit the consortium's financial responsibility. However, the financing syndicates always require higher interest rates for BOT, which the consortium has to bear anyway. In addition, the syndicate closely supervises the project.

C. Case Study

1. The Organization

Usually, Japanese investors, such as banks, trade companies, plant manufactures and contractors, establish a Japanese consortium and host country project consortium, and invest in or finance the host country project consortium through the Japanese consortium. Financing often includes subsidies from the Export-Import Bank of Japan. Figure 20 shows an example of BOT organization.

Figure 20. Organization of a Typical BOT Project



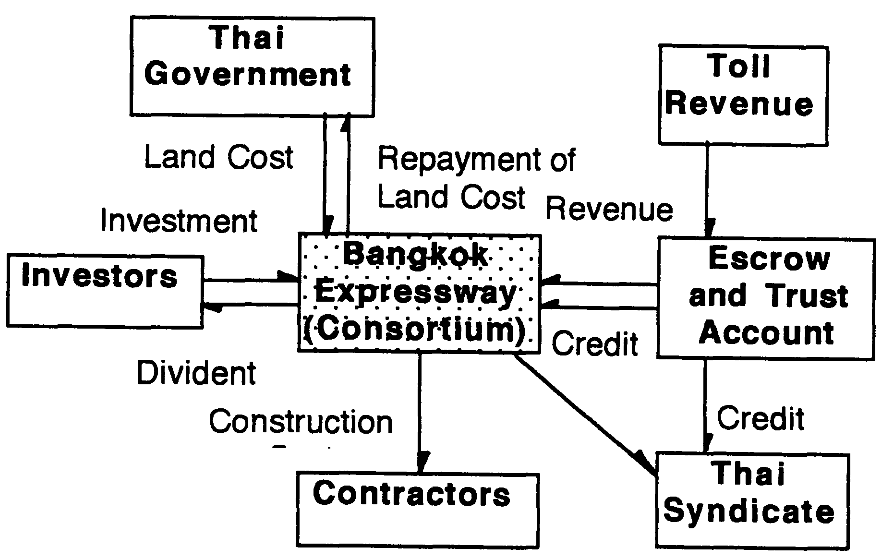
Source: Kajima Corporation, The Possibility of BOT Projects, Unpublished Paper.

2. Case 1: Bangkok Expressway (second stage)

a. Description

Project:	a 39 km elevated expressway
Est. cost of construction:	¥112 billion
Construction Period:	1990 - 1995
Concession period:	30 years (1988 - 2018)
Project company:	Bangkok Expressway
Organization:	see Figure 21.

Figure 21. Organization of the Bangkok Expressway Project



Source: Kajima Corporation, The Possibility of BOT projects, Unpublished Paper.

b. Financing

Capital: ¥27.5 billion (20% of the total cost) provided by the Kumagai Gumi Corp. (Japanese contractor), local contractors and local banks.

Debt: ¥110 billion (80% of the total cost) borrowed by a syndicate consisting of eleven banks including three Thai banks. Borrowed in local currency (baht) in order to hedge the exchange risk.

c. Balance of the project

The toll revenue will be divided between the Thai government (40%) and the Thai project consortium (60%) as stated in the concession agreement which includes an inflation clause. The consortium was guaranteed a minimum internal rate of return (15%) by the Thai government. On the other hand, the project consortium has to buy the land for the construction.

d. Construction

A CM (construction management) contract was concluded between Kumagai and the Thai project consortium. Kumagai expected to secure its profit by using a cost-plus-fee contract. The Thai project consortium expected to hedge construction risks by transferring them to Thai contractors.

e. Evaluation of the project

Although Kumagai initially concluded the relatively advantageous agreement with the Thai government with a detailed feasibility study, after construction began, the government ordered a reduction of the toll fee. In 1993, another toll fee reduction from the Thai government caused the project to be suspended and finally Kumagai had to abandon the project. This was a kind of confiscation, something foreign investors dread. This Kumagai experience shows that even an agreement concluded between a government and a consortium can become a worthless piece of paper because of an unreasonable decision by a government.

3. Case 2: Aryia Thermal Power Station, Turkey

a. Description

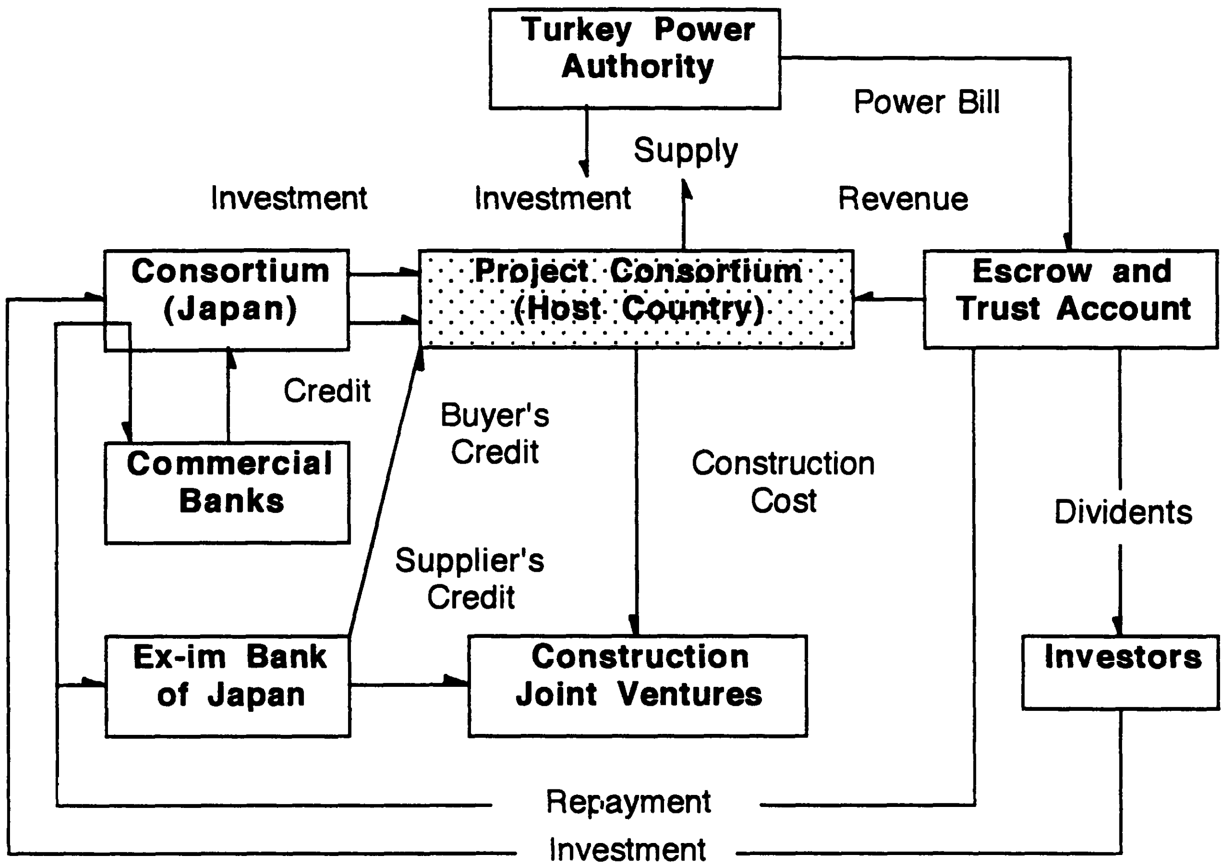
Project:	Thermal Power Station
Capacity:	500Mw X 2 units, 6.2 billion kwh per year

Fuel:	Imported coal, 2.3 million tons per year
Construction Cost:	¥137 billion
Finance:	Capital (¥18 bill.) Japan - 70%, Turkey - 30%, Finance (¥119 bill.) The Export-Import Bank of Japan and commercial banks
Schedule:	Construction - 4 years, Operation - 15.5 years
Kajima's portion:	Initial investment ¥350 million (2.38% of the total) and the power station construction (¥7 billion)

b. Organization

The Japanese consortium, comprised of the Electric Power Development Company, Mitsubishi Corporation, Mitsui Corporation, Hitachi, IHI, Hazama, Nihon Yusen and Kajima, was to construct the power station and sell power to the Turkey Electric Authority under the "take-and-pay" contract. The consortium planned to import coal from Australia, U.S.A. and China. Figure 22 shows the organization of this project.

Figure 22. Organization of the Aryia Thermal Power Station Project



Source: Kajima Corporation, The Possibility of BOT Projects, Unpublished Paper.

c. Evaluation of the project

This project was to be the first Japanese BOT project in Turkey, where BOT was initially proposed. However, a member of the opposition in the Turkish assembly joined with environmental groups to bring a suit against the Turkish project consortium to suspend the project because of possible environmental deterioration. Responding to the suit, the court ordered the project's suspension in 1989. Although the feasibility study indicated that there would be minimal influence on the environment, environmental and political movements forced the consortium to dissolve in 1993.

The cause of this failure may be attributed to insufficient measurement of country risk. It is necessary to investigate the environmental effects of the project and the concerns of local nongovernment organizations.

4. Case 3: Shanghai Exhibition and Hotel Complex

As a partner of the consortium, Kajima participates in the Shanghai Exhibition and Hotel Complex project. This complex has operated since the completion of its construction in September, 1990. It was initially regarded as a development project rather than a BOT; however, there are many similar features.

a. Description

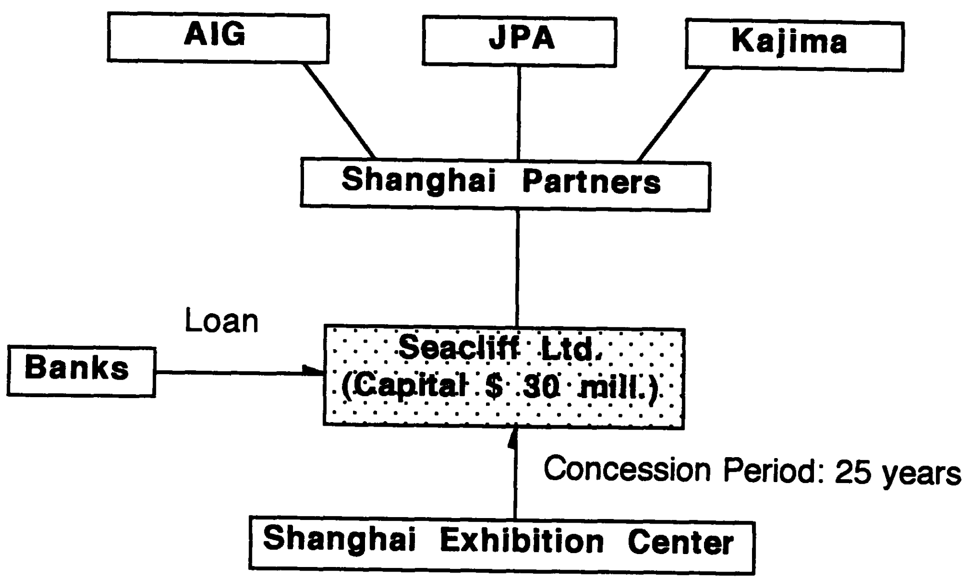
Project:	A complex facility including hotels,offices, an exhibition hotel and residences
Contract:	After twenty-five years of operation, this facility will be transferred to the Chinese government.
Joint venture:	J. Portman Shanghai Associates (JPA), AIG China Real Estate Investors (AIG), and Kajima. They established a project company, Shanghai Partners, in the U.S. and operate through its local subsidiary company.
Construction:	March, 1986 - September, 1990
Cost:	Capital $50.5 million, AIG (57.0%), JPA (21.5%), Kajima (21.5%), Finance by $145 million from syndicate.

b. Organization

In this project, JPA is in charge of designing and total management, AIG is in charge of insurance and marketing, and Kajima is in charge of construction and marketing. Kajima expects $38 million as its share of the profit. Figure 23 shows the organization of this project.

Figure 23. Organization of the

Shanghai Exhibition and Hotel Complex Project



Source: Kajima Corporation, The Possibility of BOT Projects, Unpublished Paper.

c. Evaluation

So far, the revenue, income and room-occupancy rate have been favorable. However, business conditions are uncertain, especially in the real estate market; therefore, Kajima does not know if it will get the projected income for the remaining period.

D. Risk Management in BOT projects

It is difficult to predict the final outcome of BOT projects because of their long term operation and because of unforeseeable environmental changes in a developing country. A consortium needs to include as many risk avoidance measures as possible in the concession agreement with the host government. The following are possible risks and strategies to manage risks:

1. Sources of fuel, power, and construction materials

It is necessary to secure the source of fuel, power, and construction materials in order to avoid suspension of construction and operation. In addition, well maintained and reasonable transportation facilities are necessary for stable supplies.

2. Market demand

The collateral for financing a project is generally thought to be the revenue from the sales contracts itself. In the Bangkok Expressway project, the toll contract was the collateral. In the Aryia Thermal Power Station project, revenue from the sales of power was the collateral. In the

Shanghai Exhibition and Hotel complex project, room charge and rent were regarded as the collateral. However, even if the contract seems favorable for a consortium, revenues will be inadequate without a dependable expectation of market demand. For example, tunnel and highway projects need a dependable traffic volume over the long term. The Aria Thermal Power Station project adopted the take-or-pay contract, which stated that the Power Authority will pay at least 75% of the power supply regardless of actual power demand.

3. Partners

Financing usually depends on the capability of the sponsoring firm of a consortium. Therefore, the sponsor should be keenly aware of its partners' priorities and their attitudes toward their financial condition and technical expertise in order to avoid disappointing its investors. In a joint venture agreement the sponsor should prescribe detailed measures such as the withdrawal of a member, the admission of a new member, rights and responsibilities in case of a member's default, and the settlement of disputes.

4. Performance Guarantee

This is not peculiar to BOT. A sponsor has to guarantee the project completion because it is considered able to handle the construction risk. In its completion guarantee the sponsor assures the principal and interest of loans until project completion.

5. Operational Risk

Although a consortium is established with the intention of constructing and operating the project, it does not necessarily have technical and managerial expertise in all its aspects; therefore it is sometimes necessary to invite an expert in that specific field when the project enters the operational phase.

6. Local Regulation

A consortium needs to follow local regulations and incentives. It needs to ensure that the concession agreement includes provisions in case of changes in regulations and incentives. It should also include a definite promise that the project will not be confiscated.

7. Legal System

Since there are many possible risks which a consortium may face during construction and operation, the legal system in the host country should have a well-established tradition of contract law, otherwise the settlement of disputes is almost impossible. In addition, although many developing countries offer inducements for foreign investors, many communist and ex-communist countries have no such incentives.

8. Infrastructure

It is important to investigate the degree of infrastructure already established, such as housing and facilities for labor, port facilities, roads, railroads as well as transportation systems. The consortium and the local government have to decide who will bear the cost of new facilities if they are needed. Failure to make these cost estimates can result in losses.

9. Other risks

Other important risks an investors should consider are country risk and foreign exchange rate risk. It is difficult to predict situations such as internal political disturbances and wars. Similarly, it is also difficult to exchange local currency for hard currency, especially in developing countries.

E. Evaluation

1. BOT risks last too long

Because it takes decades before initial investments in BOT projects can be collected, it is impossible to forecast the future business environment and the profitability of the project. Kajima should not enter this business simply because other projects seem to be successful today. There is no such thing as a royal road to success because each BOT project is made to order and requires careful measures to be taken which are specific to each project. In addition, the issue arising from corporate management's point of view is who should take responsibility for future profitability and past decisions.

2. High risk and possible low return

BOT is generally thought to be a high risk and high return business, however, many examples in the private sector in Japan show that BOT is very likely to be high risk and low return. In addition, there seem to be no incentives to promote BOT methods using private funds during the present worldwide recession. Kajima's participation should be limited to construction, while operation should be entrusted to partners in order to hedge as many risks as possible.

3. Further considerations

The World Bank (1990) pointed out that the effective use of private investment is necessary to establish infrastructures in developing countries which face crises. Although adopting BOT without careful consideration cannot be recommended, it may be necessary to study further opportunities for the effective use of private funds, and opportunities for project making by combining public and private funds. BOT projects are expected to increase especially in Asian countries, such as China and Vietnam. Although Kajima is not interested in BOT projects at the present time, it will continue to monitor existing projects and watch for change in the business environment of host countries.

4.2.8 U.S. Operations

A. Introduction

The U.S. construction industry was surprised in 1979 when the City of San Francisco awarded the contract for a 3,359-ft, 9-ft-dia sewer tunnel to a Japanese joint venture, Obayashi, one of the largest Japanese contractors, and its overseas subsidiary, the Obayashi America Corporation. The joint venture based its bid, which was nearly $5 million below the engineer's estimate of $17.6 million, on the use of the earth pressure balanced shield tunneling method. This method had never been used in the United States. The ENR (June 21, 1979) reported " The long-preaicted entry of a major Japanese contractor into the American construction scene is at hand". For the U.S. E&C industry, an invasion by Japanese E&C firms into the U.S. private market had not been seen as a real threat because in most cases, Japanese industries had been their clients. In the 1980's U.S. E&C firms began to feel threatened by the Japanese entry into its public market. In 1989, when Japanese contracts accounted for $3.3 billion in the U.S. market, some industry executives were concerned that the Japanese might overwhelm the U.S. construction market as they had the automobile and electronics markets.

Today, two Japanese genecons are making remarkable efforts to penetrate the U.S. public construction market; these are the above mentioned Obayashi, and the Kajima Corporation. Interestingly enough, these two firms have had tremendous control over public project arrangements or *dango* in Japan. Obayashi is very strong in western Japanese public works and Kajima is strong in eastern Japanese public works. For example, all of the major genecon's sales promotion managers get together in the Obayashi Hiroshima branch every Monday morning to discuss the distribution of public works in the Chugoku district. Although this practice, known as *dango*, has been criticized widely and is destined to be abandoned, it is still in effect in eastern Japan where, thanks to the larger market which includes Tokyo, Kajima has held a favored position in public works.

Although Obayashi and Kajima often compete for the same projects, their stances in the U.S. are a little different. Obayashi has its U.S. subsidiary, Obayashi America, which engages mostly in E&C services for Japanese industries, although it contracts public works as Obayashi Corporation, Japan. On the other hand, Kajima operates in the U.S. only through U.S. subsidiaries which include Kajima International Inc. (KII), East West Development Corp., Kajima Development Corp., and Kajima Engineering and Construction (KEC). The subsidiary which conducts public works is KEC. This chapter will examine KEC's strategies in public works. This organization indicates Kajima's intense desire to compete with

U.S. firms in the most competitive construction market in the world, the U.S. market.

Obayashi generally contracts large public projects as a member of a joint venture with a U.S. contractor. Nearly all foreign firms have eased into the complexities of construction in the United States in this way. Obayashi does not mind taking sponsorship of the joint venture because it does not need to show U.S. sales separately. It is not necessary for Obayashi to put its name on the annual contract value ranking list of U.S. contractors. What Obayashi needs is real revenue without risks. It understands the difficulties of U.S. operations, thus its strategy in the U.S. market is to work as a nominal partner in the joint venture, backing it with its large financial capabilities. Takeshi Yamada, assistant project manager of Modern/Obayashi joint venture for the CA/T project in Boston, explained that Obayashi's secrets of success in the U.S. market are, first, making a joint venture with a reliable partner without taking a sponsorship, and second, adapting Obayashi to the partner's way of business. He understands that Obayashi's competitive advantages in the U.S. are its financing capability and its experience in the Japanese market. He believes that Obayashi can compete in the U.S. because it is a large Japanese contractor, not an Obayashi U.S. subsidiary.

On the other hand, KEC is always teaming up with one or several U.S. firms, and insists on taking sponsorship in the team because it needs to obtain as many contracts as possible to put KEC's name on the ranking list of top contractors in the ENR. Shigeru Yasu, assistant general manager of KEC's mid-western regional office says that KEC would develop its competitive advantages by executing all possible projects, from small ones including local contracts to large tunnel projects using TBM, which is the KEC's strength. He believes that this is the only way to put down deep roots in the United States. Yasu's confidence in KEC's advantage in the tunneling field is the result of a great deal of experience and little competition in this field.

Both Obayashi and Kajima were recently awarded subway projects by the Los Angeles city government. Contracts were $65 million for Obayashi and $48 million for KEC. It is difficult to conclude which practice is best: competing as a Japanese giant or competing as a U.S. firm.

B. Case Study: Kajima Engineering and Construction (KEC)

1. Background

KEC, headquartered in Pasadena, California, was established in 1984 as the fourth U.S. subsidiary of Kajima Corporation. The total value of new contracts in 1992 came to $75.2 million, ranking KEC 284th on the ENR survey of the top 400 contractors. The original purpose of establishing

KEC was to respond to the heavy civil engineering related needs of the Japanese industries, which included golf course and resort developments, and automobile test track constructions. Traditionally, Japanese construction firms are divided into two operational divisions, building and heavy civil engineering, which are completely incompatible. Employees in the building division never work for the civil engineering division because the systems of employment are entirely different. Clients also have in-house building engineers and civil engineers who communicate only with their counterparts (building engineers with each other and civil engineers with each other). Thus, although Kajima had KII engaged in building engineering and construction, it needed to have a civil engineering subsidiary in the U.S. to serve its Japanese clients.

There are several reasons why Japanese industries prefer to award contracts to KEC and to other Kajima U.S. subsidiaries. First, because Kajima enjoys an excellent reputation in the Japanese construction market, Japanese industries believe that the headquarters of Kajima should take responsibility for U.S. operations including the quality, cost, and completion periods. Second, Japanese industries are not accustomed to the U.S. contractual system, and have been reluctant to get involved in legal and pecuniary problems. The best way to hedge risks in the U.S. has been to use a Japanese E&C firm as the design and build contractor. However, this situation has not necessarily been good for Kajima's subsidiaries.

Japanese clients have often considered them to be a division of Kajima Corporation and have expected them to operate in the "Japanese way of business". In summary, Kajima's subsidiaries have to take all the risks in their projects both against Japan based clients and against U.S. based sub-contractors. Atsushi Takeuchi, the plant manager of Obayashi America explained this situation:

"They rarely accept claims caused by a change of order or design. We are always torn between a client and a sub-contractor. Sub-contractors make claims according to U.S. construction practice and Japanese clients want to complete projects without claims and litigations. They have told us over and over again that the reason why they had chosen Obayashi was that they wanted to do business in the Japanese way and in the Japanese language. Today, because many of the local managers of Japanese industries have been replaced by Americans who know U.S. business methods, our competitive advantages which were based on the Japanese style of business have been running out."

In addition to the gap created by contractual practices, Japanese foreign direct investments (FDI) have been decreasing recently. Although KEC set the target of its share of public works in the U.S. at 25% of the total at the beginning of 1993, decreasing Japanese FDI brought this number to more than 50%. KEC's strategies in public works are shown in the later part of this chapter.

2. Kajima and its U.S. subsidiary network

KII was the first subsidiary established in 1964 to proceed with the Little Tokyo project in Los Angeles, California. The total of its contracts in 1992 came to $245 million, ranking it 95th in the ENR top U.S. 400 contractors ranking survey. In its early days KII was exclusively engaged in the design and engineering business; this was what Shoichi Kajima, the president of KII and the Co-chairman of Kajima, believed that the Kajima Corporation itself should do in the future. It was a great experiment and had to take place in the U.S. because, first, the status of service including design and engineering are relatively low in Japan, second, success in the U.S. market would prove that not only KII but also Kajima were competitive, and third, Kajima needed to learn many things from the U.S. market and from U.S. firms about the process of globalization. However, by the mid 1970's, with the expansion of its target clients, KII was not only designing and engineering projects but was also constructing buildings to satisfy their needs. Nine years later, the East West Development Corp. was established. Its purpose was to execute the Little Tokyo project, taking it over from KII, so that KII could explore business opportunities more widely. Kajima Development Corp. was established in 1979. As a property owner, it was intended to deal with development projects at its own risk, thus following the trend of Kajima's expanding development business. Five years later, in 1984, KEC was established. One of KEC's purposes was to catch up with and overtake KII's performance. Finally, Kajima U.S.A. (KUSA) was established in 1987 to oversee all its U.S. subsidiaries by holding their stock. KUSA works as a buffer for legal matters in the U.S. and with the home office in getting financing and information from Kajima. It rarely interferes in the subsidiaries' businesses; on the contrary, it raises funds for them. It can enjoy tax deductions by commingling the subsidiaries' profits and deficits in one account. By establishing KUSA, Kajima completed its U.S. network, consisting of its headquarters, buildings, heavy civil engineering, and development subsidiaries. This was the model of Kajima's organizational restructuring in 1991, called Kajima Evolution 21 (KE21). Kajima created its four independent profit centers - construction, architecture and engineering, development, and new business - under this evolutionary strategy, which was conducted by Kenichi Ohmae, the managing director of MacKinsey & Company.

3. KEC's organization

KEC was established as a part of Kajima's horizontal configuration strategy. Because it is a new and growing subsidiary, KEC's organization cannot be considered vertically configured. However, KEC can use Kajima's vertically organized functions such as R&D, design, and technological and managerial knowledge. For example, most of the overseas projects funded by multilateral development banks and governments as well as some large projects in the U.S. require prequalification documents, which must include contractors' work experience, financial statements, personnel, holding machinery, brief descriptions of construction work plans, and technical proposals. KEC can use all of Kajima's advantages in order to be qualified even though the goal of KEC and Kajima's other subsidiaries is to be self-supporting and to maintain their independence.

By following trends of growing shares in the U.S. public market, KEC recently changed its organization and functions. The purpose was, of course, to strengthen its marketing and construction capabilities in the public sector. Today's major revenue sources are golf course and resort development, and tunnel construction. The former relies largely on Japanese private investment and the latter relies on public investment in the United States. The issues which came up recently in KEC were the differences in the contractual system, and in the nature of competition between Japanese and U.S. investments, neither of which were compatible. The KEC staff, which has worked from the beginning with Japanese clients, is reluctant to be involved in public works or in the U.S. contractual system. On the other hand, almost all of the Japanese staff members in KEC's public division have graduated from U.S. universities where they studied construction management and are relatively optimistic about business in the United States.

4. KEC, the public division's new business policy

KEC has gradually increased its public work contracts since it was awarded its first public contract in the U.S. in 1988. It has always established a joint venture company in order to bid for public works. This is in order to ease differences in the ways of doing business between Japan and the U.S., such as labor management, legal procedure, contractual system, language and culture. As the sponsor of a joint venture company, KEC dispatches a civil engineer transferred from Kajima to KEC for every construction site. Because these civil engineers have no experience in the U.S. construction business they work like trainees and learn the U.S. business style from joint venture partners rather than take responsibilities as staff members of the sponsor firm. After the completion of several public works, KEC has learned that it is difficult to find good partners, win contracts in large projects, and make profits. In addition, KEC's internal issues have been coming to a head. The following section will discuss the role and status of KEC's public division and consider its restructuring as a whole.

a. Business environments

In addition to the recent recession in the U.S. economy, the decreasing Japanese FDI has raised difficulties for KEC. It needs to pay more attention to public investments in the U.S. to survive and to look for more opportunities in the public market. Today it has seven regional offices: Hawaii, Pacific, Western, South Central, Mid Western, Northeast, and Southeast; it has four market segment divisions, including Golf Course, Tunnel, Building, and Other Construction. Only the Mid Western regional office and Tunnel division participate actively in public bidding. This is due mostly to a lack of personnel interested in public works. The staff of the public division (Tunnel Div. and Mid Western regional office) is composed of five Japanese employees transferred from Kajima and nine Americans working under KEC's payroll. These employees are dispersed through several construction sites and offices which are operated independently; therefore each site and office is small and inefficient. The tunnel division manager, Noboru Deura, believes that a Japanese employee is necessary for U.S. public works; he believes that at this time the role of Japanese employees should be to establish a stable base for Kajima in the U.S. and then to delegate all responsibilities to American employees as soon as possible.

b. Capability

So far, most public works awarded to KEC have been tunnel related projects. When Kajima decided to enter the U.S. public market, Deura judged that because Kajima's tunnel technology and experience in soft ground were superior to those of the U.S. contractors, these could be competitive advantages even if many handicaps existed. Only a few U.S. contractors specialize in soft ground tunnel works. Deura decided to enter the U.S. public market for tunnel projects using TBM (Tunnel Boring Machine) and intended to expand gradually in to other fields.

KEC tendered 63 public work bids between January 12th,1993 and October 20th, 1993, and won 10 out of the 63; thus the total hit ratio was 15.9% during this period (see Table 38). The average hit ratio was 13.6% in these 63 bids. (63 awards out of 464 bidders) KEC's challenges have been concentrated mostly in the Mid-west, where it has Mid-western regional office, and the West, where its headquarters is located. KEC tendered 17 bids in Michigan with no contract awarded. Yasu explained the reason for this, noting, "Michigan has clearly too many contractors in a limited market. The discount race here is fierce." Indeed, the average number of bidders in MIchigan was 9.5 firms, while in Indiana, where KEC enjoys a higher hit ratio (40%), it was 6.6 firms. The reason for successful bids in Indiana is due largely to the fact that KEC can neglect mobilization costs by having several project offices there, and can cut machinery costs by limiting itself to the same types of works. So far, it seems that KEC needs a U.S. partner to make a joint venture because the total hit ratio of joint venture was 31.3%, while that of KEC alone was 10.6%. It can be said that KEC is learning competitive estimating through checking its estimations with those of the joint venture partners, which have almost always been lower than KEC's estimations.

Table 38. Bid Results by State (Jan. 12 - Oct. 20, 1993)

State	Number	Lowest by KEC	Hit Ratio
MI	17	0	0.00
CA	15	3	0.20
IN	10	4	0.40
AZ	6	1	0.17
OH	5	0	0.00
IL	2	0	0.00
NV	2	1	0.50
GA	2	0	0.00
MA	1	1	1.00
SC	1	0	0.00
UT	1	0	0.00
WA	1	0	0.00
Total	63	10	0.16

Source: KEC, Unpublished Paper.

The size of contracts KEC should focus on became important in determining its future operation and goals, since KEC intends to put down roots in the U.S. market as a U.S. contractor. However, the $48 million contract recently awarded in LA will inevitably push KEC to give a new direction to its strategies in the U.S. public market. Obayashi has taken the course of contracting as large projects as possible either by establishing a joint venture company with large U.S. contractors, or by itself. Yamada explained the reason why U.S. contractors want to establish a joint venture with Obayashi as "the expectation of Obayashi financial capability". This strategy has made Obayashi a reputable contractor in the U.S. construction market, and its policy of contracting large projects has made it possible for Obayashi to attract good U.S. contractors as partners.

Table 39. Bit Results by Amount (Jan. 12 - Oct. 20, 1993)

Amount	Number	KEC	Hit Ratio
Less than $300,000	3	0	0.00
$300,000 - $1,000,000	16	2	0.13
$1,000,000 - $10,000,000	29	4	0.14
$10,000,000 - $50,000,000	13	3	0.23
More than $50,000,000	2	1	0.50
Total	63	10	0.16

Source: KEC, Unpublished Paper.

Although the number of examples is limited, and most are heavy civil projects, Table 39 shows that KEC is better at large projects than at small ones, where it may meet more competition. Large projects usually require technological expertise, financial capability and experience, and U.S. general contractors rarely meet all three of these conditions. Large U.S. E&C firms, which are often all-around players, seem to be reluctant to bid on tunnel projects due largely to high risks and low returns.

Table 40. Bid Results by the Types of Work

Type	Number	Hit Ratio
Concrete Structure	18	0.11
Open Cut Sewer	12	0.33
Tunnel	11	0.18
Building	6	0.00
Road & Infrastructure	6	0.33
Golf Course	2	0.00
Remediation	2	0.00
Other	6	0.00

Source: KEC, Unpublished Paper.

Table 40 shows that KEC's contracts are limited to four fields: concrete structures, open cut sewers, tunnels, and roads. However, it is making steady progress by using technologies which have been developed in the Kajima Corporation.

c. Coordination

Deura recognized that the future growth of the public division as well as KEC as a whole depended largely on coordination between its headquarters, divisions, regional offices, and job site offices. Although the KEC public division is operated independently with a small headquarters, it needs to use Kajima's competitive advantages effectively in order to win contracts. Each manager should recognize his own role and make an effort to establish a well-coordinated communication system.

d. Future Policy

As the above section mentioned, KEC has two major functions: one as a subsidiary of the Kajima Corporation, where it is in charge of Japanese investments; the other as a U.S. contractor, where it is in charge of U.S. public works. The two organizations, with their business styles and their contractual practices, are incompatible; thus it is difficult to establish a corporate policy and strategy. This "existing internal two business style" is almost the same situation that the Kajima Corporation is facing today. If KEC can solve its internal inefficiency and become competitive in both markets, it can be a good example for the Kajima Corporation's organizational shift.

The public division's goal in 1993 was to secure 25% of KEC's new contracts. However, the shrinking Japanese foreign direct investment made possible the public contract share more than 50% of the total. Under these unstable conditions, where miscalculations can occur, it is difficult to forecast the future business environment and establish KEC's policy and strategy.

Still, KEC is making steady progress. It is gradually shifting its status from Japanese contractor in the U.S. to U.S. contractor. KEC's future opportunities may depend on whether it can apply Kajima's competitive advantages effectively to the U.S. public market and whether it can develop its own competitive advantages by learning from the U.S. public market. In addition, KEC should have a clear goal and policy as soon as possible in order to make maximum use of its resources.

4.2.9 The Iron Triangle

While the Japanese construction industry holds many characteristics in common with other members of the "big business" community, its contractors play a unique role in Japanese society. It employs the largest work force including many unskilled workers, relies largely on public works, and is influenced by the economic policy of the country and the economic conditions of other domestic industries. The government not only regulates its activities but serves as one of its best clients. The contractual system has been established and maintained by the industry, the LDP (Liberal Democratic Party), and the government. This close interdependence has made them pacesetters in developing government relations practices that safeguard their interests. However, it has become clear that this cozy relationship between interest groups has deteriorated the competitiveness of the industry. Compared to foreign competitors, the Japanese construction industry has few comparative and competitive advantages in the international market, lower productivity and higher construction costs. Previous sections described how Kajima developed its domestic strategies in order to be competitive in the domestic contractual system. This section investigates the U.S. defense industry which has contractual practices similar to those of the Japanese construction industry, and explores defense contractors' strategies for maintaining their position and market share in the industry.

A. The Japanese Iron Triangle: The Construction Industry

The series of construction bribery scandals and unique contractual practices, which were made known to the public by U.S. government pressure, revealed the strong connections between the three parties concerned, the "Construction Tribe" Diet members, bureaucrats, and big business executives. This triangle does not only function in the construction industry; however, since the share of public works is relatively high in the construction industry, the system is well organized there. This section analyzes the relationships between the three groups.

The practice of *dango* originated among contractors as a means of avoiding excessive competition which might lead to a price war. Over the years *dango* has come to involve the public sector clients in conspiracy as well as the contractors. From the clients' point of view it has the advantage of ensuring that all contracts will be taken up and the work will be done, regardless of how easy or difficult each project may be or how profitable it may be.

It is also advantageous for the public sector or bureaucrats to keep a close relationship with contractors because in so doing they can secure a new position in the private sector after they retire as officials. If a contractor refuses to accept either the unprofitable work or the retired officials, it may be excluded from bidding on contracts or may be starved for information. The designated bid system has made it easier for bureaucrats to maintain these tyrannical practices and to control the industry.

The designated bid system itself is not a unique practice. Most countries adopt some kind of prequalification process in the pre-bid phase in order to secure the quality of the work. However, the *dango* system, together with the lack of openness of the government has twisted the Japanese designated system. Since the system puts so much power in the hands of the bureaucrats who hand out the contracts, it is hardly surprising that politicians, the only people who can exercise any real influence on the bureaucrats, have also joined in the game.

The rewards enjoyed by politicians who do favors for the construction industry are money and electoral support. Table 41 shows the major genecons' annual political contribution to the LDP. The National Tax Administration Agency showed that in fiscal 1991 ¥38.2 billion of spending was unaccounted for in the construction industry, amounting to 68% of the total of unaccounted spending for all industries. It is generally thought that about 10% of unspecified expenditures were being given to politicians and about 1% of the value of the construction was given as gifts in connection with winning contracts, including those in the private sector. At election time the construction industry mobilizes people, materials and money in support of its favored politicians.

Meanwhile, the politicians help out the bureaucrats by campaigning for budget allocations and defending their interests in other ways, expecting in turn to be accommodated when they put in a word for a favored contractor, thus contractors enjoy the benefits of a stable flow of public works contracts, thanks to the bureaucrats and politicians. In this way, the three interest groups are bound together in a tight community of interest which is known as the "iron triangle", shown in Figure 24.

Table 41.

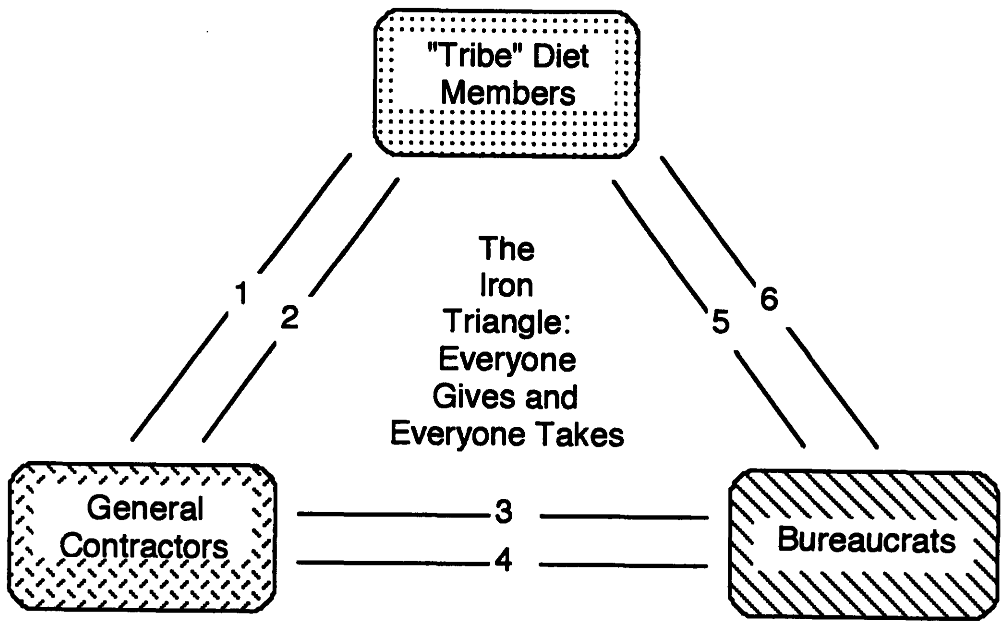
The Genecons' "Official" Political Contribution to the Liberal Democratic Party (LDP)

¥ million

	1988	1989	1990	1991	1992
Kajima	43.2	49.5	55.5	52.0	28.1
Taisei	26.1	40.9	65.7	36.9	24.5
Shimizu	25.9	41.8	55.7	30.1	25.0
Ohbayashi	26.1	51.0	59.0	46.9	25.0
Takenaka	26.0	58.4	47.3	33.6	24.4
Kumagai	33.9	45.7	65.2	29.7	24.3
Toda	17.7	21.8	40.4	27.6	15.6
Hazama	14.7	40.0	39.4	25.1	14.1
Fujita	16.2	15.0	33.7	34.2	25.3
Nishimatsu	14.9	25.2	24.1	16.8	14.3
JFCC 59 firms total	607.8	920.7	995.6	771.8	807.2

Source: The Yomiuri Shimbun, "Jimin Kenkin wo Kyohi," Nov. 14, 1993

Figure 24. The Japanese Iron Triangle



Source: Jun Mamiya, "The Iron Triangle and Corruption in the Construction Industry," Nov., 1993.

1: Helping award contracts.

2: Political contributions and electioneering supports.

3: Fair distribution.

4: Accepting unprofitable deals and guaranteeing jobs to officials.

5: Securing budgets and protecting vested rights.

6: Accepting "tribe" diet members' arbitrary decision and electioneering supports.

B. The U.S. iron triangle: The Defense Industry

This study originated from the questions: How have U.S. defense contractors secured their positions and maintained their market shares in this monopsony situation of the industry? And, what strategies have developed under the unique contractual system based on the government's procurement policy within a strong triangle (Congress - the Pentagon - contractors)? According to the report of the Center for Strategic and International Studies (1989), " The U.S. defense industrial base faces significant challenges, and little is being done to address them. Inefficiency, a decline in capability, steady erosion of global competitiveness, and increasing vulnerability to a disruption of supplies present serious challenges to the national security of the United States." This section first describes the U.S. defense industry and the U.S. and international markets; second, it studies the uniqueness of the procurement process of the government and its contractual system; third, it investigates the structure of the iron triangle; and fourth, it explores U.S. defense contractors' strategies for securing their positions and maintaining their market shares.

1. The Industry and the Market

a. The U.S. Defense Industry and the Market

The Center for Strategic and International Studies defines the U.S. defense industry as "the aggregate ability to provide the manufacturing, production, technology, research, development, and resources necessary to produce the material for the common defense of the United States." The defense industry encompasses myriad industrial activities, from shipbuilding to semiconductor manufacture. Over 38,000 firms provided goods and services to the U.S. Department of Defense in 1987.

According to Kapstein (1992), the U.S. defense industry and the market show the following characteristics through the study of major defense contractors.

1) Concentration

The industry is relatively concentrated; the top 100 contractors do about 75% of the business. Although this is no more concentrated than most segments of the commercial sector, the industry is quite concentrated when it comes to particular military platforms (ships, aircraft, vehicles), and systems (avionics, computers, fire control systems).

2) Cyclical Business

The defense budget has been subject to sharp cyclical increases and declines. This complicates the industrial planning process since commercial firms generally plan on the basis of relatively constant growth or predicted seasonality.

3) Monopsony

The defense market is characterized by one client, the Department of Defense; it establishes the determination of military specifications for all hardware. From the perspective of economic theory, this may suggest that the buyer exercises considerable leverage in the market place.

4) Annual Budget Process

Firms make investment decisions using a long planning horizon and make assumptions about the cost of capital and other input, and about the prices they can expect to receive for the final output. The U.S. government, however, provides funds for defense procurement on the basis of an annual budget process. At any point in time, funds for a given program can be increased, decreased, or cut.

5) R&D-intensive

Concern over U.S. defense technology places pressure on firms to produce "high technology", but at the same time the costs of advanced R&D are rapidly rising. Firms must be prepared to invest a substantial portion of risk capital "up front" if they hope to win defense contracts.

6) Political

The defense industry is intensely political. Firms are heavily monitored not only by their program managers at the DOD, but by various congressional bodies as well, including congressional committees, the General Accounting Office, and the Congressional Budget Office. Since defense contracts are a high-stakes business, members of Congress are active in ensuring that a piece of the pie goes to their local constituents. This means that economically optimal decisions are often set aside for politically expedient ones.

The characteristics listed above suggest that the U.S. defense industry is different from competitive industries in a free market sense. There is no free market in defense, and the industrial structure reflects that fact.

Contractors vary in their dependence on government. Some giants, like Grumman, Lockheed, and Northrop depend almost entirely on government sales. The percentages of contractor sales that come from the government sales for the ten largest contractors are listed in table 42. Obviously, most of these contractors would be in serious trouble without their defense work.

Table 42. Government Sales as Percentage of Total Sales

Northrop	92.2%
Lockheed	92.0
Grumman	90.4
Martin Marietta	85.4
General Dynamics	85.0
McDonnel Douglas	64.5
Paytheon	55.3
Rockwell	47.3
United Technologies	32.0
Boeing	28.3
General Electrics	11.4

Source: Kenneth Mayer, The Political Economy of Defense Contracting, 1991.

b. The International Market

According to the World Military Expenditures and Arms Transfers 1990, total world arms transfers (import and export) accounted for $45 billion in 1989, a new ten-year low, which represented an 18% drop from

1988 and a nearly 28% drop from the 1987 peak level of nearly $63 billion. The former Soviet Union continued to be the export leader of the world. The U.S. exported $11.2 billion in 1989, which accounted for nearly 25% of the world's arms export (see Table 43).

Table 43. Share of World Arms Export (in percent)

	U.S.S.R.	U.S.	Other Developed	Developing
1979	52.2%	18.6%	25.0%	4.2%
1980	47.4	18.1	30.0	4.4
1981	40.2	19.3	33.2	7.3
1982	38.5	19.0	29.6	12.9
1983	38.8	23.2	29.2	8.9
1984	35.6	19.4	31.0	13.9
1985	35.1	22.8	32.9	9.1
1986	42.0	18.1	32.0	7.9
1987	38.8	24.5	26.8	9.9
1988	40.6	27.8	20.5	11.1
1989	43.1	24.7	22.5	9.7

Source: U.S. Arms Control and Disarmament Agency "World Military Expenditures and Arms Transfers," 1990.

Table 43 does not indicate any evidence of deterioration of U.S. competitiveness in the international market. However, Kapstein points out that U.S. defense contractors are nervous about the future of export markets. The reasons are, first, many countries are defecting from U.S. arms, as competitors in Europe and the former U.S.S.R. offer their arms at lower prices; second, the U.S. has lost some important sales because buyers do not want to become embroiled in heated congressional debates over approval; and third, the number of arms producers has increased dramatically in recent years, causing an overall decline in the size of the "off-the-shelf" market. The largest military export item, aircraft for example, has steadily dropped from a 1987 foreign sales peak of $3.6 billion to a 1990 level of $1.4 billion.

2. Procurement Process

The process by which the U.S. government selects and purchases military weapons and supporting goods and services for the armed forces has been subject to public criticism and controversy. Recurring charges of inefficiency, incompetence, and corruption have brought periodic efforts at reform, and each instance has conferred on the process an ever-increasing level of regulation. The acquisition process has, however, remained remarkably resistant to significant or lasting improvement. There are many reasons for this resistance which are long-standing and built into the structure of the U.S. sociopolitical system. The inherent tension between a free enterprise economy and a government-regulated procurement system subject to public scrutiny automatically produces inefficiency.

The arms purchased by the DOD can be placed in two categories: major weapons systems and commercial-type "standard" items. An overwhelming majority of the contract actions involve standard items, but the largest share of the defense dollars goes to a few major weapons systems. In 1985, for example, the Air Force spent 78% of its budget on just 3% of its contracts. Kenneth Mayer (1991) wrote that "every major weapon that one of the armed service buys passes through four stages as it moves from conception to deployment: concept formulation, concept validation, full-scale development, and production." Kapstein explained this process in his book, *The Political Economy of National Security*, as follows:

a. Concept Formulation

The first stage of the procurement process, concept definition, is extracted from either threat assessment, military doctrine, or technological change. Once a military requirement is defined, concept definition can move into the laboratory. Research teams in government laboratories and in the industry work or "paper designs" of a system. Although these teams are operating in a competitive environment in principle, this environment does not encourage realistic estimates of costs and schedules since each team often develops highly overstated requirements and understated costs in order to win the approval from of Defense Acquisition Board (DAB) in the Office of the Secretary of Defense.

Once development funding has been approved by the DAB, funds must be allocated to the program in the defense budget. The program will be listed as a new line item, and congressional approval for the weapon will be required as Congress considers the annual defense budget request. While the budget is being prepared, the new item must be specified in detail.

b. Concept Validation

A program office is established and a program manager is appointed for the execution of the development and testing stages. Potential contractors are, of necessity, involved in the specification process, and they try to influence the design characteristics. This is a critical step in the process because it will affect all future elements in the program, from contracting to final production. The next step was once competition among firms; however, the high pre-bid costs associated with R&D have made this no longer possible, and the most significant competition takes place earlier in the procurement process, often when preliminary research is still ongoing. The competition at this stage is based on specification documents. In order to win a contract, a firm must demonstrate that it will meet the project specifications at the lowest possible cost. Competitions generally end at this stage.

c. Full-scale Development

This is the stage in which the item is completed: it is put through military tests and adapted to meet specification changes and accommodated to new requirements. Design shortcomings are overcome. The item is then prepared for mass production.

d. Production

When a contractor is selected to build an item Congress authorizes and appropriates a certain amount of funds for the program.

Congress is intimately involved in every step of the procurement process. In the yearly budget, the program manager must sell the program to the relevant committees and subcommittees in the House and Senate. This helps to explain why there is an effort by the Pentagon to spread the subcontracts through as many congressional districts as possible.

Since early participation is the most important factor for a contractor to win a contract, it is critical to identify the main actors at in each stage of the procurement process. Activities in early stages of the process are summarized below in the order in which they generally occur.

1) DOD identifies a security threat, military doctrine, or technology change.

2) DOD, usually with assistance from contractors, designs an engineering development program to meet the mission need and draws up a procurement strategy and budget.

3) Congress authorizes and appropriates funds for the program.

4) The administration releases funds for the planned program.

5) DOD and interested contractors develop detailed technical approaches to the program.

6) DOD prepares a contract statement with assistance from contractors.

7) DOD issues a request for proposals (RFPs) to interested contractors and arranges preproposal conferences for bidders.

8) Contractors submit proposals to DOD, where they are evaluated.

9) DOD selects one contractor (or more), and the party (or parties) sign a contract for the development of the weapon system.

10) The contractor begins work under the contract.

11) The contractor delivers items to DOD for testing and evaluation.

The winning contractor is focused on through this process. The Source Selection Authority (SSA) takes the responsibility for selecting a contractor, who is designated by the secretary of military service. The secretary also assigns the members of the Source Selection Advisory Council (SSAC), which convenes the Source Selection Evaluation Board (SSEB) for actual evaluation. After SSEB evaluates contractor proposals, it submits an evaluation report to the SSAC. Then the SSAC prepares a report to the SSA after weighing the information in the evaluation report. The SSA selects the winning contractor(s) based on 1) comparative evaluations of proposals; 2) costs; 3) risk assessment; 4) past performance; 5) contractual considerations; and 6) surveys of contractor capabilities.

3. Competition

As the above sub-section, "Procurement Process," described, a winning contractor is selected early in the project development. Jacques Gansler writes in his book, *Affording Defense (1989)*, "The acquisition of a major new weapon system usually begins with competition for a research and development contract," and "there is usually fierce rivalry for the initial award for the development of a weapon system." Once a contractor is awarded a contract, it usually wins successive development and production contracts. This R&D contract award is based primarily on the projected technical capability of the weapon. However, because of the government's "all or nothing" policy, an R&D competition is a slow and expensive process: as a result, only a few firms have the resources to compete. Since the DOD's goal is to obtain the most effective weapons at the lowest cost, a limited number of bidders is still enough to secure quality and minimal cost, while fair opportunity may cause unnecessary administrative costs and the deterioration of possible contractors' R&D efforts. A contractor may put more effort into its R&D if the probability of winning appears to be very good and make a significantly smaller effort if the number of bidders is large.

Unlike the Japanese construction industry, the U.S. defense industry has never yielded any data to show that there is any form of conspiracy among contractors. Gansler explains the reason for the lack of collusion as follows:

a. The DOD can play contractors against one another.

b. The DOD can bring in other contractors.

c. If no other contractors are available, the DOD itself may enter the market.

d. Public visibility is high.

e. "Custom-designed" products are not substitutable; therefore, there is no market to share.

f. The demand is unpredictable; therefore, it is hard to divide up the market.

g. The "all or nothing" award makes it hard to divide up the business.

h. Awards are very infrequent; 10 or 15 years is too long to wait for one's turn.

i. Competition is on technology rather than on price, and rapid technological change makes it hard to collude.

j. A new leader can emerge at any time; all it takes is a technological breakthrough and a large investment.

4. The Iron Triangle

An iron triangle is a political relationship that brings together three key participants in a clearly delineated area of policy making: the Federal bureaucracy, the key committees and members of Congress, and the private interest. In defense, the participants are the DOD, the House and Senate Armed Services Committees and Defense Appropriations Subcommittee, Congressional members from defense-related districts and states, and the firms, labs, research institutes, trade associations and trade unions in the industry itself.

The structure and the interests among the parties concerned in the defense triangle closely resemble those of the construction triangle in Japan. Defense contractors want to secure more defense work, Congress wants to preserve the jobs produced by defense contracts, and the military wants to protect its pet weapons at all cost; as a result, procurement decisions are based more on political expediency than on national interest. Similar characteristics of the triangle include the cost factor, which is important but not critical, the inefficient procurement process, and the determination of the winning contractor by negotiation rather than by competition. As the largest government organization in the U.S. and part of the iron triangle, DOD officials, like government officials in Japan, have to pursue multiple economic and security objectives. These include the support of domestic industries and firms, the employment of scientists and engineers, funding for research and development, and, of course, the fielding of equipment that meets perceived national security requirements.

5. Strategy

The contractual process in the U.S. defense business implies several strategies a contractor needs to win a contract. The incompatibility of the process with that of commercial business make the nature of competition totally different. The following are the possible business strategies used by U.S. defense contractors for winning contracts:

1) Mastering the procurement process
2) Early participation
3) Technical capability
4) Optimistic proposal
5) Specialization

On the other hand, defense contractors have several options for their corporate strategy, which each contractor has to consider in order to survive in changing environments.

1) Its share of the defense business

2) International sources

3) High entry and exit barriers

4) Vertical and horizontal integration

a. Business Strategy

1) Mastering the Procurement Process

The first step in winning a contract is to become acquainted with the procurement process. In order to maintain the technical and political knowledge that smooths the procurement process, defense contractors regularly hire DOD civilian employees and retiring military officers who bring a wealth of professional experience and useful contacts to the contractor.

2) Early Participation

After funding for a new program is approved, the weapons system must be developed for its specific application. Potential contractors are usually involved in this stage, and they try to influence the specifications of particular design characteristics. After the program is specified, the DOD makes a major decision to build a prototype of the weapon. The single contractor who is selected to build the prototype, almost always takes the program through its subsequent phase. This preliminary stage accounts for a relatively small portion of the program; however, the time and monetary commitment to the program itself begins to become clear. Contractors make an effort to get information on contract competitions.

3) Technical Capability

The initial award for the development of a weapons system is based on the technical capability of the weapon. Since this initial award includes the contract for subsequent development and production, this is a critical factor for winning contracts.

4) Optimistic Proposal

The goal of the DOD is to get the best possible value for the dollar; thus contractors tend to propose overly optimistic and sometimes unrealistic technical goals in order to win contracts. On the other hand, contractors recognize that there are almost no financial penalties for competitive optimism. These are a major cause of the perennial cost overruns and performance shortfalls of weapon procurement.

5) Specialization

The present defense contractors are a "specialized" set of suppliers, working in a regulated environment. This unique environment, which has created high entry barriers, includes government regulations, special bookkeeping, security requirements, and special production procedures. As a result, contractors with long duration government contracts and with associated high overheads, have great difficulty diversifying into the commercial marketplace. Thus there is a mutual dependence between the defense contractors and the DOD.

Since there is no cost competition in major weapon contracts, pre-bid activities are very important.

b. Corporate Strategy

1) The Share of the Defense Business

Although some giants depend almost entirely on government sales, others, like Boeing, United Technologies, and General Motors, are mostly commercial firms with substantial cores of defense work (Table 42). Boeing, for example, has enough orders for its commercial planes to sustain it throughout this century. Because of the changing political and economical environment and the structure of the U.S. defense industry, defense contractors are facing the need for alternative strategies for future growth. Declining profitability rates, increasing risk, and program uncertainty, combined with the above-mentioned environmental change, have caused most firms in the defense business to pursue profits elsewhere. The strategic choice for a contractor includes shifting its business from defense to other industries either totally or partially.

2) International Sources

To meet the government's goal of reducing costs, many prime contractors for the assembly of major weapon systems are forcing their suppliers to cut their costs. One possible alternative is to increase the use of international sources as far as the policy of national security permits. The issue arising from international procurement is that once manufacturing has gone offshore, engineering capability is also lost.

3) High Entry and Exit Barriers

A distinguishing characteristic of the defense business is the presence of extremely high barriers to entry and exit, as mentioned above. The members of the iron triangle have collaborated to create high barriers to secure their own interests. The barriers to entry include a unique environment, high capital investment, brand loyalty, the need for high levels of engineering and scientific capability, the need for large cash availability, specialized reporting requirements (the required knowledge of detailed federal regulations), security clearances, and political considerations. The barriers to exit and/or diversification, unlike the barriers against commercial business, include: government sponsorship of R&D, the large overhead required for defense work; the specialized nature of the capital equipment; the government's tendency to accept low bids rather than quality; the specialization of scientific and engineering labor; the specialized nature of the marketing force, which is incompatible with the commercial market; the "comfort" with military specifications; and patriotism. These barriers have made defense contractors specialize for contracting; they have also prevented them from operating effectively, from moving freely within the major segments of the defense market, and from diversifying to more attractive business. In order to regain or at least keep competitiveness, a contractor should maintain an alternative market at all times by refusing the monopsony situation and reducing barriers.

4) Vertical and Horizontal Integration

Like major Japanese construction firms, competition between big businesses in the U.S. defense industry is based largely on total capability. The standard advantage is technical capability, which makes it possible for a contractor to participate at an early stage of development. Political and managerial capabilities also serve to support the interrelationship between the parties concerned and the smooth procurement process. On the other hand, because of the "specialized" market, the contractors that remain in the defense business will have to work on many different types of defense equipment and/or diversify in order to absorb the high cost of their overhead and still be competitive.

C. Lessons Learnt

Although the entry and exit barriers in the U.S. construction market are relatively low, those of the Japanese construction market are extremely high. This is because Japanese contractors need to accommodate the industry's unique contractual system, which includes a huge capital investment, strong relationships with the government and political world, and the necessity of possessing outstanding technical expertise, while U.S. contractors compete for contracts by cost without any industrial, political or economical constraint. In order to maintain their huge overhead, major Japanese contractors need collusion for securing stable market shares. The U.S. defense contractors are in the same situation. Because of the firmly established contractual system, which excludes outsiders from the iron triangle, defense contractors, which rely largely on defense contracts, cannot compete in other markets, where work is based on other rules.

Many political scientists have described the U.S. defense industry as sick. However, for the past fifty years since World War II, defense contractors, the DOD, and politicians have not changed their nature because they do not want to leave their established concessions. They are criticized because their productivity is lower and their costs are higher than commercial-based manufacturers, because of their complex and bureaucratic procurement procedure, because of their declining international competitiveness, and because of their relationship to the outside world. However, they have no incentive to change their business style as long as they can make money operating as they are. Japanese construction contractors, the public sector, and politicians are criticized for the same reasons, and they too have no incentive to change their business style as long as they do not have to concern themselves with international issues. However, today, as the changing political environment and international power relationships begin to influence the business style of defense contractors, the open market and fair opportunity policies introduced by the Japanese government have begun to force construction contractors to change their business style.

Despite different types of business, (manufacturing and engineering and construction service) U.S. defense strategies and Japanese construction strategies are about the same. They both concentrate on pre-bid activities because early participation is the key factor for winning contracts. The differences are, however, that the Japanese system has collusion or "*dango*" practice, and Japanese politicians intervene directly. In Japan, an outstanding performance is not allowed for a contractor because the benefit of all parties concerned has priority over the individual interest. These differences may explain the differences in culture and business traditions.

4.2.10 Summary of the case study: General Contractor

A. Summary

The construction industry is closely related to regional interests, community, the economy, and social life. These factors vary from region to region, and from country to country; thus the nature of the contractual system, competition, and the business of construction as well as its purpose differ among countries. In terms of public construction, government policy determines the characteristics of the contractual system. The public contractual system controls the nature of competition, and competition shapes the business policy, organization, and strategy of contractors. For example, in the United States, cost is the most important factor for contracting because the U.S. government believes that minimum cost will promote maximum welfare. In the pursuit of lower costs, then the U.S. government adopts a fair opportunity policy. On the other hand, the Japanese government adopts a fair distribution policy because the government believes that the economic influences exercised by public construction investment have priority over cost. The Japanese government also believes that public investment must be returned to the tax payers. Although in Japan, contracts are not awarded according to a fair opportunity, public works are distributed to contractors on a fair basis. A government should probably not complain about the national policy of another government because there is no such thing as a perfect policy. It is true, however, that most developing countries regard cost as the most important factor because low construction costs affect their industrialization process. In addition, these countries often have to borrow construction funds from foreign investment institutions, such as foreign government agencies and multilateral development banks. To obtain funds from these institutions, the host country has to clear a construction process which includes a contractor selection procedure. Competition based on cost is the easiest criterion to use.

This case study makes clear that Japanese contractors have no cost competitiveness in the international market because their competition in the domestic market is not based on cost but on the total capability of the firm. Kajima's policy, organization, strategy and management practices are based on competing in the domestic market. The Japanese domestic market has unique characteristics in its contractual system, competition, and in the structure of its industry, which are incompatible with other markets. Therefore Kajima cannot apply its domestic competitive advantages directly to other markets, and this is why it has created a second organization and separate strategies for the international market. If the international market were to adopt the Japanese contractual system, Japanese contractors could dominate it. There are still some ways to help Japanese contractors to be competitive in the international market, such as by using Japanese financing and specific technology to reduce construction costs, and by applying technical expertise to change construction methods.

At the present time, globalization is the objective of most Japanese general contractors. However, their share of overseas business is relatively small because the domestic market is so attractive that they are not tempted to shift their business to the overseas market. The absence of open competition in the domestic market leaves Japanese contractors without any know-how to compete in the international market. This is why they rarely take measures for globalization. However, they should watch for changes in government policy and take appropriate measures to avoid lagging behind as pressures from the U.S. government increase.

B. Opportunities and issues

The *genecon*, Kajima, has concentrated too much on the domestic contractual system; as a result, in terms of globalization, it seems to be behind its Japanese competitors. Kajima should explore opportunities in the international market. At present the international situation is unstable, therefore, despite opportunities, the international market holds many risks. Section 4.2.6 discusses three strategies for globalization based on the idea that Kajima can advance into the international market by expanding its competitive advantages already developed under the domestic contractual system. Accepting unnecessary and useless risks may force Kajima to withdraw from the overseas market; therefore Kajima should make a strong effort to establish its status as a global contractor.

The Japanese construction industry is facing other issues as well. One is the issue of opening the domestic market, another is the contractual system and *dango* issue, and another is the construction bribery scandals. These issues should be considered separately. First, bribery practices should be abandoned. Second, *dango* practice is indispensable for present contractual practices since it has been a part of government contractual policy. Therefore, it is absurd to believe that only dango is illegal. The industry and the government should consider the real problems in the contractual system. Finally, If the Japanese government wishes to introduce cost competition and abolish the merits of the present contractual system, the government should listen to the opinion of the U.S. government. Otherwise, the Japanese government should request the U.S. government to follow Japanese practices in Japan, just as Japanese contractors follow the U.S. contractual system in the United States. Both governments have to realize that cost competition is not a perfect contractual practice.

4.3 Engineering Contractor

Many firms are categorized as engineering contractors: plant engineering contractors in the fields of petroleum, chemical, refinery, power, iron, and cement; information and communication engineering firms; and general contractors which sell not only construction services but also engineering services. This section focuses on the three major Japanese process plant engineering contractors, JGC (former Japan Gasoline Corporation), Chiyoda and Toyo Engineering Corporation (TEC). In comparison with the general contractors, they are relatively new, small, and oriented toward advanced-technology in specialized overseas businesses. Although the industrial policy of the government is very important for process plant engineering contractors, they have been relatively independent of the contractual system peculiar to Japan and the Japanese construction industry. Since most of their clients are private companies and foreign government agencies, they do not accept the contractual practices used by the domestic construction industry. Technological advantages and business relationships have been the key factors for success in this industry, especially in the domestic market. Although JGC has remained independent from *keiretsu*, a hierarchically arranged group of firms, Chiyoda and TEC are members of Mitsubishi and Mitsui respectively.

JGC, Chiyoda and TEC were originally established in order to introduce foreign process technologies and engineering methods to the Japanese market. This has caused them structural problems because they applied and sold technologies which their U.S. partners developed; as a result, they have always been behind the United States. The cost advantage of these Japanese contractors has also deteriorated because of the U.S. licensing fee. In the domestic market, their business expanded along with other Japanese industries during the high economic growth period. However, after they completed their major projects, they were forced to expand to overseas markets because R&D needs substantial investment; it is the concept of scale in this technology-oriented business, the key which differentiates competitors. On the other hand, factors other than those of technological advantage and the seeking of business relationships for success are also important in the international engineering market. These are cost competitiveness, financial capabilities and overseas procurement Table 44 shows the factors of success and failure in

Table 44.

Factors of Success and Failure
in the International Plant Construction Market

1. Success factors

(%)

	Cost	Technology/ experience	Finance	Other
1970	10	30	50	10
1971	10	30	40	20
1972	5	40	40	15
1973	80	10	10	0
1974	2	80	2	16
1975	7	90	2	2
1976	10	78	0	11
1977	18	68	0	14
1978	13	75	2	10
1979	22	71	1	6
1980	20	73	3	4
1981	22	70	2	6

2. Failure factors

(%)

	Cost	Technology/ experience	Finance	Other
1970	23	30	27	20
1971	37	31	20	11
1972	50	7	32	10
1973	13	0	63	26
1974	78	0	63	26
1975	100	0	0	0
1976	33	0	33	33
1977	38	19	13	31
1978	64	18	0	18
1979	63	6	7	24
1980	34	14	20	32
1981	82	0	9	9

Source: Takaaki Wakasugi & Hideo Takanaka, "Engineering Sangyo," Tokyo University Press, 1986.

international bids. The factors for success were based largely on a firm's technologies, experience, and its financial capability before the first oil crisis; after the crisis, the financial factor was no longer important. It follows that failure was the result of a lack of technology and experience before the crisis, while, cost competitiveness became the critical factor after the crisis. In summary, in order to be competitive internationally, a firm must have technological advantages, be experienced in its field, and be cost competitive. Unfortunately, although Japanese process plant contractors are technologically advanced and have overseas experience, their cost advantage has deteriorated in recent years due mostly to increasing labor costs and the high appreciation of Japanese currency. They have competed in open markets both domestically and internationally and while their way of business, cost structure and strategies may be similar to those of their U.S. counterparts, they still have to deal with Japanese business traditions, such as keeping a close relationship with Japanese industries including *keiretsu*, respecting the government's regulations and policies, conforming to the Japanese lifetime employment system and the seniority system, and accepting the relatively lower status of the service (engineering) industry. In the present business environment, which is gradually changing, general contractors should absorb the experience and strategies of process plant engineering contractors in order to have international competitiveness. This section of the chapter will investigate the competitiveness and the future perspectives of process plant engineering contractors.

4.3.1 Description

A. Historical Background

This section of this chapter gives a brief history of the Japanese engineering industry in order to reveal the process of its evolution and structure.

1. Before 1980

a. Prewar period

Although engineering businesses increased during the rapid industrialization of Japan, there were no plant engineering firms in the prewar period because most industrialists, especially those in the chemical industry and the petroleum industry, had in-house engineers to design their systems of facilities and manage construction. These industrialists relied on technologies transferred from the U.S. and European countries for everything from basic design to detailed design during this period. Until the end of World War II, the refinery industry was considered a military industry, so the process of refining was confidential and there was no chance to establish a refinery plant engineering firm. Although, the Japan Gasoline Corporation (today's JGC) was established in 1928, it was then limited to refining and selling petrochemicals; engineering was not included.

b. Postwar period

The Japanese industry was severely damaged by World War II and many plants and factories collapsed. However, this catastrophic situation provided an opportunity to establish plant engineering firms. After the General Headquarters (GHQ) permitted the construction of a refinery plant in 1949 construction boomed. Responding to the postwar reconstruction boom and the rapid growth of the Japanese economy, Chiyoda broke away from the Mitsubishi Oil Corporation and was incorporated in 1948, while the Japan Gasoline Corporation changed its business from manufacturing and retailing to engineering in 1952.

c. High Economic Growth Period

Japanese refinery, petrochemical, synthetic fiber, chemical fertilizing, chemical, coke and gas industries all actively invested in their plants and equipment during this period. The refinery industry spent ¥620 billion between 1955 and 1964 in order to construct eighteen refinery plants. The capacity of the refineries increased from 230,000 barrel/day to 1,870,000 barrel/day during this period. For the first time JGC and Chiyoda used genuine engineering methods introduced from the U.S. to construct large complexes. These included the Idemitsu Tokuyama Refinery Complex and the Mitsubishi Mizushima Refinery Complex, both completed in 1957. The petrochemical industry also developed rapidly during this period, spending ¥400 billion. These investments promoted Japan's industrialization and trained Japanese engineering firms. Although engineering contractors still had to rely on licensed process technologies and basic system design, they were gradually able to assume responsibility for detail system design. The capacity of the refineries was again increased to 5,660,000 barrel/day just before the oil crisis, three times the capacity of 1964. The export of engineering services increased during this high growth period and began to displace the depressed domestic market after the oil crisis period.

d. The Oil Crisis and the Post-crisis Period

The oil crisis, which occurred in 1973 caused high inflation. Most domestic projects contracted before the oil crisis turned out to be unprofitable. On the other hand, OPEC countries rapidly increased their engineering contracts, backing the leaping oil prices. As a result of this situation, overseas contracts in Japanese engineering firms accounted for $175 billion in 1981, an increase of $136 billion over the contract of $39 billion in 1974. Although this increase in overseas contracts covered the unprofitable domestic contracts, refinery and petrochemical investment were gradually reduced due to the worldwide recession which followed the oil crisis, the governments' energy saving policies, decreased oil consumption, and the stabilization of oil prices at a lower level. After enjoying the brief prosperity caused by the oil crisis, the engineering industry was dragged into a difficult situation both in its domestic and in its international markets by being rushed into price competition. The decade of the 1980's was severe for the engineering industry. Engineering contractors were required to restructure their organizations and develop survival strategies. The strategies adopted by plant engineering contractors in the 1980's will be discussed in a later section of this chapter.

2. The 1980's

Japanese plant engineering contractors, JGC, Chiyoda and TEC, experienced both prosperity and depression during the 1980's. The decade opened with a rapid expansion of business, especially in the overseas markets. The mid-80's were difficult years when engineering contractors needed patience. The world-wide depression caused a rapid decrease of new contracts. Japanese contractors had a particularly hard time because the high appreciation of the yen weakened their international cost competitiveness. They had to restructure their organizations and develop new strategies for survival during this period. However, as the domestic economy recovered in the late 80's, the domestic industries were able to increase their investment in the engineering fields again. Although they had been badly shaken, they prevailed by making strategic shifts in their businesses.

This section examined the environmental changes in the 1980's and engineering contractors' strategies for survival.

a. Prosperous period (1981-1982)

The overseas contracts of Japanese E&C firms had expanded rapidly since they had begun to sell their services to overseas markets. The contracts, which exceeded $100 million in 1960, expanded to $1 billion in 1970, and to 10 billion in 1980. This was the result of efforts to expand overseas contracts after the oil crisis in 1973 when the Japanese recession forced engineering contractors to look for alternative markets. 1981 was an epoch-making year for engineering contractors, when overseas contracts accounted for $175 billion, up from $118 billion in 1980. The backlog of

JGC, Chiyoda and TEC amounted to about ¥600 billion in that year; the ratio of overseas business accounted for 62% in JGC and Chiyoda, and 95% in TEC. However, the influence of environmental changes in the world's economy and politics, such as the Iran-Iraq War and the economic adjustment policy adopted in China, caused the suspension of projects and forced unprofitable settlements to be made often in 1982. According to Engineering Business (Oct. 1, 1991), even though these three contractors had inferred that the trend of business was heading toward a world recession, they had postponed taking measures devised to deal with these issues largely due to optimistic perspectives caused by the huge backlog of hydro-carbon projects, their strongest field.

b. Reaction Period (1983)

In 1983 the OPEC general assembly reached a consensus on the reduction of the price of crude oil from $34 per barrel to $ 29 per barrel, which forced the balance of payments into a deficit in most of the OPEC countries. Many large scale international projects were canceled one after the other although major oil refining and downstream process plants had already been completed. Large scale projects were only expected in the natural gas field. Engineering contractors began to consider their restructuring seriously from this year.

c. Depression Period (1984-1986)

The worldwide depression accelerated in 1984. New contracts in the international market were limited to medium-small size projects. Engineering contractors began to explore alternative funding sources, such as counter-trade, barter-trade and project finance. JGC, Chiyoda, and TEC restructured their organizations in 1985. For example, the strategies for restructuring taken by Chiyoda were to strengthen its marketing promotion and to advance to new markets. Chiyoda also reorganized its structure so that it could deal with small size projects. Strategies adopted by other firms included establishing smaller business units and delegating to them as many responsibilities as possible, as well as giving their operation a short-term orientation. Engineering contractors began to explore new markets, including factory automation (FA), which received considerable attention during the depression period. Every engineering contractor tried to be the first to enter to this field. Today, together with computer integrated manufacturing (CIM) and intelligent manufacturing systems (IMS), FA has become one of core businesses of engineering contractors. They have also entered electric power and nuclear plant markets, which had previously been confined to heavy manufacturing firms and general contractors.

On the other hand, general contractors began to invade the engineering field during this period due largely to the recession in the construction market. *Genecons* already had some experience in the above mentioned FA and CIM related fields because they had become accustomed to these systems through the construction of manufacturing factories. Using this advantage, their plan was to enter one engineering field and to expand throughout the engineering business.

JGC, Chiyoda, and TEC gradually shifted their targeted market from the international market to the domestic market not only because of the world wide recession, but because signs of recovery had begun to appear in some engineering fields, especially in fluid catalytic cracking and in the production of polypropylene and polyester. On the whole, though, the recession continued both internationally and domestically and engineering firms suffered losses during 1985 and 1987.

d. *Heisei* Prosperity Period (1987-1990)

In an attempt to control the recession, the government began to promote public investment in 1987. As a result, domestic-oriented industries, such as the construction industry and the steel industry, rapidly improved their profitability. On the other hand, overseas-oriented industries, such as the engineering industry, recovered more slowly. It was only in 1988 that active investments in domestic industries began to bring back their profitability. Together with the effects of restructuring and the diversification of the business, the strategic shifts that developed during the recession period began to improve the profitability of engineering contractors. In 1989 the overseas contract exceeded $100 billion for the first time since 1982 and the Japanese domestic industry was finally restored.

The international engineering industry underwent reorganization at the same time. One of the top engineering contractors, M.W.Kellogg was purchased by Dresser industries in 1988. ASEC (Sweden) and BBC (Switzerland) merged into ABB in 1988, which later acquired C.E. Lummus Crest.

B. A profile of the major players

Unlike its construction industry, which accounts for 520,000 firms and a considerable work force, the Japanese engineering industry consists of relatively few firms. Most of them are divisions of large Japanese industries: ship builders, heavy machine and a electrical manufacturers, and steel makers. Three engineering contractors, JGC, Chiyoda and TEC, specialize in the engineering business. This section describes the profiles of these three engineering contractors and briefly introduces other players related to the business.

1. JGC (JGC Corporation)

JGC was established in 1928 to manufacture, retail, and export gasoline products made from crude oil. This corporation started with a refinery plant using Dubb's thermal cracking process technology licensed by the Universal Oil Products Company (UOP). Then during the worldwide depression period in the 1930's, JGC abandoned the refinery business due largely to falling oil prices. Instead, it started licensing businesses acquired from UOP. As the demand for high-octane gasoline for aviation increased before and during the war, JGC applied new process technology purchased from UOP to the construction of refinery plants in military bases. This was generally thought to be the first modification engineering implemented by a Japanese engineering firm. After World War II, JGC concluded an exclusive agreement with UOP for various licenses in refinery and petrochemical technologies. The close relationship with UOP from the beginning helped JGC to resume its engineering business early in the postwar period.

The completion of Idemitsu Tokuyama Refinery Complex in 1957 was epoch-making for the Japanese petroleum industry and for JGC itself. JGC had acted as engineering contractor in this project using UOP's technologies and had established its reputation as a procurement, engineering and construction contractor. During the high economic growth period, JGC consistently promoted internationalization and diversification.

Regarding internationalization, JGC first advanced overseas business cooperating with UOP, then expanded its overseas share by cooperating with Japanese trading companies and manufacturing industries, taking advantage of their worldwide network. As time went on, since JGC was a contractor, it had to diversify into many fields in order to respond to clients' needs. JGC has entered various plant construction fields such as nuclear, pipeline, medical, food, and gas. It contracted its first overseas refinery project in Peru in 1965, and followed this with the similar contracts in Argentina and Venezuela. In the same year it contracted engineering service for Japan's first radioactive waste processing plant in collaboration with a French firm.

The dollar crash which occurred in 1971 terminated the Japanese high economic growth period. The oil crisis of 1973 further damaged the Japanese economy, which had come to rely heavily on the petrochemical industry. The strategies developed in this period include: the shift from lump sum to cost plus fee contracts, which was the system commonly used in the international market; the adoption of the self supporting accounting system for independent divisions, which made divisional responsibilities clear; and exploring new markets. JGC called the domestic investment trends in this recession period the "4s": self-financing, specialized, save-what-you-can, and size-down. In order to correspond to these investment trends, JGC made efforts to promote communication between divisions, improve productivity, increase technological capabilities, and find and train new suppliers and subcontractors.

Today, JGC enjoys huge back orders, many of them in new fields such as factory automation, telecommunication, and urban development. However, a shortage in the work force has become an urgent problem and JGC has had to make the most of subcontracting with U.S. and Korean engineering firms.

2. Chiyoda (Chiyoda Corporation)

Chiyoda was established in 1948 as a subsidiary of Mitsubishi Petroleum. It is also a part of joint venture company with Gulf Oil (U.S.) and Mitsubishi. Engineers were first transferred from the parent so that Chiyoda's initial strength was in the petrochemical and refinery fields. As Japan's industrialization expanded in the 1950's and 60's, drawn in the wake of the chemical and petroleum industry, its business expanded. Then, when Japan's inter-governmental assistance increased after the first United Nations Conference on Trade and Development (UNCTAD) was held in 1964, it increased its overseas contracts as well. When the government declared that its policy would be to develop Japan's overseas markets Chiyoda established its reputation as an international engineering contractor.

Chiyoda has been highly motivated to establish global coalitions with host countries, such as Saudi Arabia, Singapore and Nigeria. The Union Carbide Corporation (UCC) has been its partner, collaborating on heavy oil-based flame-cracking technology to produce olefin, and an Australian firm has been in partnership with Chiyoda for the production of fuel oils from oil shale. However, having built up a high ratio of overseas operations in the early 1980's, Chiyoda was seriously damaged in the last half of the decade by the dramatic appreciation of the Japanese yen. Chiyoda successfully gained a domestic share of up to 50% of its total contracts by restructuring its organization and operation through diversification into other fields, such as power, nuclear processing, pollution control, factory automation, information processing, urban development and general construction.

Today, three quarters of Chiyoda's new contracts come from hydro-carbon related fields, although new businesses which Chiyoda invested in during the recession period have also begun to bear fruit and have become part of Chiyoda's core businesses. However, like JGC, a shortage in the work force has become a serious problem and Chiyoda is looking for sub-contracting opportunities in the international market, though this is causing internal controversies.

3. TEC (Toyo Engineering Corporation)

TEC is the newest of these three Japanese engineering contractors. It was established in 1961 as a subsidiary of Mitsui Toatsu Chemicals in order to meet the needs of chemical plant construction both in the domestic and overseas markets. TEC's initial competitive advantage was the exclusive chemical fertilizer process technology inherited from Mitsui Toatsu Chemicals. In addition, TEC concluded a license agreement with ABB Lummus in 1963, which brought TEC further advantages in ethylene process technology. TEC learned not only process technology from Lummus but engineering and project management methods as well. In addition, TEC has taken charge of the detail design of ethylene heater revamping and now dominates this market in Japan. Since its first contract was awarded in 1965, TEC has designed and constructed more than thirty ethylene complexes in the world. TEC also introduced the ammonia process technology which it imported from M.W. Kellogg in 1968. The ammonia process technology, combined with TEC's own urea process technology, has been delivered to fertilizing plant projects in overseas markets.

While JGC and Chiyoda have their competitive advantages in the oil refining technology, TEC has advantages in downstream petrochemical process technologies. TEC's overseas configuration strategy is unique in that it is focused on communist countries, such as the former USSR, Eastern Europe, China and India. JGC makes a strong appearance in South-eastern Asia and Chiyoda lead in the Middle-east. It also leads in factory automation and in the computer application fields.

4. Engineering Related Contracts of Major Firms (1990)

According to the Engineering Advancement Association of Japan (ENAA), the Japanese engineering industry consists of eight types of businesses; these include the above mentioned three major engineering contractors, mid/small-sized engineering contractors, general contractors, integrated steel makers, shipbuilders, industrial equipment and machinery manufacturers, heavy electric equipment manufacturers, and telecommunication and information processing firms. The following table shows engineering related contracts in selected firms.

Table 45. Engineering Related Contracts in Selected Firms (1990)

	(¥ billion)
a. Major Engineering Contractors	
Chiyoda Corporation	245
Toyo Engineering Corporation	223
JGC Corporation	279
b. Steel Makers	
Kawasaki Steel Corporation	202
Kobe Steel, Ltd.	233
Nippon Steel Corporation	301
Sumitomo Metal Industries, Ltd.	145
NKK Corporation	329
c. Shipbuilders	
Ishikawajima Harima Heavy Industries Co., Ltd.	920
Kawasaki Heavy Industries Ltd.	433
Sumitomo Heavy Industries, Ltd.	88
Hitachi Zosen Corporation	210
Mitsui Engineering & Shipbuilding Co., Ltd.	214
Mitsubishi Heavy Industries, Ltd.	1,316
d. Heavy Electric Equipment Manufactures	
Toshiba Corporation	2,687
Hitachi, Ltd.	1,217
Fuji Electric Co., Ltd.	304
Mitsubishi Electric Corporation	2,044
Toshiba Engineering & Construction Co., Ltd.	128
Hitachi Plant Engineering & Construction Co., Ltd	247

e. General Contractors

Kajima Corporation	2,201
Obayashi Corporation	1,928
Kumagai Gumi Corporation Co., Ltd.	1,176
Shimizu Corporation	2,362
Taisei Corporation	2,202
Takenaka Corporation	1,919

f. Trading Companies

	Engineering Related	Plant Export
C. Itoh & Co., Ltd.	3,692	471
Kanematsu Corporation	615	121
Sumitomo Corporation	5,907	646
Tomen Corporation	1,239	405
Nichimen Corporation	869	135
Nissho Iwai Corporation	2,385	662
Marubeni Corporation	4,487	779
Mitsui & Co., Ltd.	4,209	550
Mitsubishi Corporation	4,150	600

Source. Engineering Business, "Kigyo-betsu Engineering Kanren-busho Uriage Juchyu, Juchyu-zandaka," August 1 and 15, 1991.

In addition to the above mentioned engineering related firms, many Japanese enterprises have their own in-house engineering divisions. Although they are not considered engineering firms, their in-house engineering division often performs the duties of engineering contractors. Indeed, their engineering capabilities are regard as equivalent to those of engineering contractors. For example, the Tokyo Electric Power Corporation (TEPCO), Nihon Telephone and Telecommunication (NTT) and

Japan Railways (JR) are typical firms which have a certain number of civil engineers. Table 46 shows the basic data of the three Japanese engineering contractors.

Table 46. Basic Data of the Three Engineering Contractors

	JGC	Chiyoda	TEC
Foundation	1928	1948	1961
Capital	¥7.2 bill.	¥14.8 bill.	¥12.2 bill.
Net Sales	¥400.2 bill.	¥411.6 bill.	¥165.0 bill.
Net Income	¥5.9 bill.	¥10.8 bill.	¥3.5 bill.
#of employee	2,514	2,873	1,510
Head office	Tokyo	Yokohama	Tokyo

Source: Annual Reports, 1993.

4.3.2 Overseas Strategy

Unlike the Japanese public contractual policy, where economic theories rarely work, the private contractual policy should be defined according to economic rules; that is, clients usually require the most advanced technology at the lowest possible cost, otherwise they cannot be competitive in their industry. Competition is clear since contracts are competed for on technological and monetary grounds. In the engineering industry clients always look for the latest technology and for capable engineering contractors who can realize their plans with this technology and at lowest cost without deteriorating qualitative criteria. As long as the contractor meets the requirements, clients do not care about the nationality of the contractor or of the plant components. Because he himself does not have to belong to a particular country, an engineering contractor can hire engineers and managers regardless of their nationality and procure plant components from worldwide sources. This section explores the overseas strategy of Japanese engineering contractors by studying the contractual system, comparative advantages, and the international market environments.

A. Contractual System

Japanese engineering contractors are more globalized than Japanese general contractors, although they still have an internal gap between domestic and global business. This section introduces the contractual system in both the domestic and international markets.

1. The Domestic Market

The private sector is the only client in the Japanese engineering market. Therefore, engineering contractors follow the contractual practices peculiar to Japanese commercial business. A client asks an engineering contractor to join the project development, technical assessment, feasibility study, and basic design without signing a contract. The selection process depends on the clients; for example, power corporations adopt a fair distribution policy like that of the public sector. It is generally recognized that there is collusion among contractors under this policy. On the other hand, since oil companies regard experience and technical expertise as important, there is no collusion for refinery and petrochemical plant construction. In either case, business relations are important. According to Masatoshi Kano, a chief engineer of JGC, even if a project is suspended during these project development phases, contractors do not claim compensation for their efforts because they believe that long-standing relationships help contractors to be chosen for the next project.

2. The international market

The international contractual process is easier to understand. There are three information sources for new projects: in-house business promotion divisions, Japanese trading companies, and invitations to bid (ITB) received directly from clients. Japanese engineering contractors often rely on Japanese trading companies' information network, especially for foreign public projects. Trading companies, *sogo shosha* in Japanese, enjoy a strong position with excellent ties to key private as well as governmental financial institutions. Their advantages include a global procurement network, bargaining power with foreign governments, financing and coordinating capabilities as well as an information gathering capability.

Contractual processes vary from project to project. The general procedure for a lump-sum contract begins with a feasibility study and prequalification. The criteria of prequalification generally include project records, technical capabilities, financial statuses, key personnel resumes, company and project organizations, procurement capabilities, and present work loads. It is necessary for contractors to be qualified to join the bid, and Japanese contractors rarely fail. Once prequalified, contractors submit proposals (commercial, technical and alternative) responding to the inquiries of the client. The next step is cost evaluation. The lowest bidder is not always the winner. Although cost is an important factor, since each contractor uses a slightly different technology from the others, it is possible for contractors who cannot offer the lowest bid price to turn the tables by using the client's favorable technological applications. The client takes all aspects into consideration and makes a reasonable judgement. The contract is finally awarded to the contractor who comes to an agreement with the client by means of commercial negotiations. At the commercial negotiations, the clients and the contractor often fail to come to an agreement on the conditions of the contract, which is usually complex and unilaterally for the contractors. Therefore, a contractor should study carefully not only the conditions offered by the client but also why lower bidders have declined to accept these conditions.

B. Comparative Advantages

1. The Business Style Suitable for Full-Turn-Key Contract

Recently, clients of large international projects, especially government agents in developing countries, have tended to prefer the full-turn-key contract to the cost-plus-fee contract, because in this way clients can hedge construction risks. As a result, international contractors are being forced to accept this contract method, giving Japanese E&C contractors an advantage. It is a common business practice in Japan for firms to have a certain amount of internal reserve to serve as a buffer for risk acceptance. The buffer can absorb a short-term loss from a certain project, thus Japanese E&C firms do not have to add unreasonable contingency and risk fees. In addition, Japan adopts the lump-sum contract instead of the cost-plus-fee contract for most construction projects, which makes it easy for the Japanese contractor to accept the full-turn-key contract, as the full-turn-key is based on lump-sum contract method. The reason why Japan has adopted the lump-sum contract is because it does not recognize service or engineering is as separate concepts; as a result, contractors cannot make individual profits in the engineering business, and all construction risks are accepted by the contractors, while people tend to consider the U.S. cost-plus-fee contract as a method used to avoid responsibility. On the other hand, Japanese contractors are weak at cost-plus-fee contracting largely due to their lifetime employment system; they have to maintain a certain number of employees regardless of annual contracts, and the cost-plus-fee contract which is based on man-hours, limits the number of employment. Therefore, Japanese construction firms are internally organized to accept the full-turn-key contract. Their financing capability also helps Japanese contractors to accept this contract method.

U.S. contractors have practiced cost-plus-fee contracting both in the domestic and in the international market. Therefore, they are internally organized for risk avoidance. In addition, they regard dividends to stockholders as very important, so they cannot have internal reserves as a buffer. These factors make it difficult for U.S. contractors to accept full-turn-key contracts without a certain amount of contingency and risk fees.

According to Engineering Business (Nov. 15, 1993), Chiyoda was awarded the full-turn-key contract of the LNG plant construction project from Qatar in May, 1993. The contract amount was $1.4 billion, which was $100 million less than the second lowest offer, which was made by JGC-Kellogg joint venture. Since Kellogg did the basic design and has a long-standing relationship with the Qatar government, a JGC-Kellogg joint venture was expected to contract this project. However, Kellogg could not reduce its contingency fee because it had to hedge as many risks as possible especially for such a large scale project. As a result, despite the efforts of JGC, the joint venture lost the contract.

2. Domestic Business Relations

Japanese engineering contractors have an advantage in the full-turn-key type contract, as mentioned above. However, it requires a wide variety of activities which include non-engineering businesses, such as financing, procurement, negotiation with host governments, general construction works. Engineering contractors can hedge risks associated with these activities by using Japanese trading companies and general contractors.

Japanese general trading companies or *sogo shosha* do much more than simply buy and sell goods; they are coordinators of product systems. The specific role played by a *sogo shosha* varies with the circumstances of the product system. But in all product systems their activities cover multiple stages, from raw materials through finished products, and many functions, such as logistics, finance, marketing, technology scanning, give it the broad perspective and formidable organizational and bargaining power essential to the role of coordinator. In terms of engineering and construction exports, complex and high-value added projects, such as large-scale turnkey plant construction, are attractive to *sogo shosha* because they can participate in more stages in large complex projects than in small ones. Such projects can provide them with the additional advantage of enhancing their presence in host countries. Japanese engineering contractors and other plant exporters generally team up with trading companies in order to explore new opportunities and hedge financial and political risks associated with international full-turn-key type projects, and when host countries require counter-trade as a condition of contract, cooperation with trading companies is indispensable. Counter-trade has become popular in the former USSR and in Eastern Europe where international debt has increased. Commonly used forms of counter-trade are counter-purchase, compensation, barter trade, and switch trade.

In civil engineering works engineering contractors can hedge construction risks by using Japanese general contractors. The construction of plant foundations is extremely difficult because of unknown site conditions and environments, and changes in designs and orders commonly occur. Although Japanese general contractors usually cost much more than those in host countries, they guarantee completion without delay and within the budget. This is essential, for any delay or problem which occurs in this period could affect the completion dates, quality, and labor relationships of following construction activities, which may lead to the loss of the total project. The percentage of civil engineering works accounts for about 10% of the total.

3. Advanced Technology Derived from Domestic Requirements

The Japanese economy depends completely on imported natural resources, and the oil crisis reminded Japanese industries to use these resources as efficiently as possible. The energy-saving policy of the government has forced energy-related industries to use the most advanced technology for their businesses; as a result, engineering contractors compete fiercely in developing new technologies. These R&D efforts of Japanese engineering contractors in collaboration with energy-related industries have pushed up their technologies' competitive edges in the energy fields.

Japanese engineering contractors have also become competitive in the environmental field. Japan has adopted the strictest environmental regulations in the world, as can be seen in its antipollution ordinance and exhaust emission standard. This competitive environment has encouraged environment-related industries to have advanced environmental technologies. Although other countries do not always require the same level of environmental technologies, Japanese engineering contractors try to apply them to environmental projects not only to have technological superiority over their foreign competitors, but also because they have to spread these costly technologies over as many projects as possible in order to recover R&D investments.

C. Environments and Conditions of Globalization

1. Environments

This section investigates conditions of globalization by studying the various environments which besiege Japanese engineering contractors.

a. Incentives

The globalization of the engineering market stimulated the globalization of engineering contractors. In 1964, the first United Nations Conference on Trade and Development (UNCTAD) brought up the North-South issue. The conference stressed the need for developed countries to provide developing countries with economic cooperation and development aids. Many countries had declared their independence and were making efforts to achieve economic independence through industrialization. Developed countries began to support this industrialization by exporting industrial plants, which they considered the most influential method of economic cooperation. In this way Japanese engineering contractors started their overseas businesses in developing countries with the aid of official development assistance.

In addition to the government policy of foreign assistance, the following factors encouraged Japanese engineering contractors to lead the international market.

1) The limited domestic market

Although the Japanese market is relatively large, market volatility often forced engineering contractors to diversify into the international market.

2) Gaining technical expertise

Initially, Japanese engineering contractors introduced engineering technologies through licensing. However, after they assimilated licensed technologies, they developed technologies that were more advanced than the original licensed technologies. As a result, they often have technological advantages over licensors, and thus achieve the international market advancement.

3) Cost competitiveness

The Japanese manufacturing industry has raised its productivity since the end of the high economic growth period. Since the productivity improvement rate exceeded the wage increase rate, the industry could reduce its relative costs and reinforce its competitiveness in the international market. Although the recent high appreciation of the Japanese currency has weakened the industry's cost competitiveness, high-value-added products supported by advanced technologies are still competitive in the foreign market.

b. Financing

As engineering markets globalize and operations spread over the world, financing activities globalize. In addition to receipts and payments in foreign currencies, engineering contractors need to enter into other financial activities peculiar to the engineering industry, such as preparing financial resources and hedging foreign exchange risks.

Besides yen credit, there are three commonly used financing forms: supplier credits, buyer credits and bank loans. In the case of buyer credit, the Export-Import Bank of Japan grants credit directly to the buyer who then pays the supplier; in the case of bank loans, Japanese commercial banks provide financing to the banks in the host country. Both these financing forms are risk free for engineering contractors. Supplier credit, however, is accompanied by financial risks, especially when the financing is prepared in foreign currencies. In this case, the exporter has a credit in foreign currencies, which often influences the final balance of the project.

Foreign exchange risks are commonly hedged by using forward exchange contracts and exchange risk insurance. The exchange risk insurance covers the fluctuation in exchange rate between 3% to 20%. Thus, contractors should carefully determine the reasonable percentage of the host and hard currency receipts.

c. Global Configuration and Coordination of Activities

Plant exports require global configuration and coordination of activities based on each exporter's competitive and comparative advantages. Global operation and procurement, and forming a global consortium are concrete examples of global configuration and coordination.

1) Global Operation

Engineering contractors rarely employ labor directly; instead, they subcontract with many second tier contractors. In a large full-turn-key project, a prime engineering contractor may contract with more than a hundred subcontractors, among which are many foreign contractors and suppliers. Today's circumstances have forced Japanese engineering contractors to subcontract not only construction but also design and engineering to international contractors.

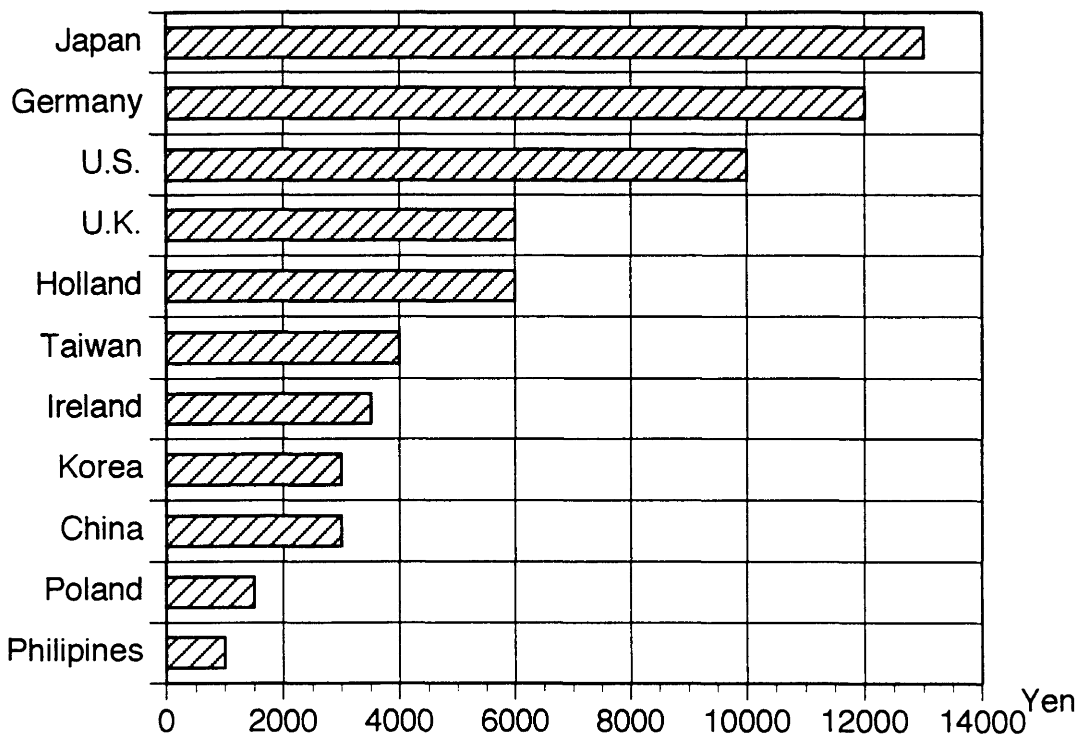
2) Global Procurement

Because of relatively declining international cost competitiveness, Japanese engineering contractors have promoted the overseas procurement of plant equipment. Today, they source about 30% of the total procurement in overseas markets. In 1992 the largest suppliers were the U.S. ($700 mill.), U.K. ($270 mill.), and Holland ($115 mill.). Although at first Japanese engineering contractors procured equipment from industrializing countries, non-price problems, such as quality, performance, delivery date, standard difference, and guarantee made them shift to industrialized countries.

A serious concern for Japanese engineering contractors is the mounting personnel expenses of engineers. Figure 25 shows the average engineering cost per hour in selected countries. In order to have cost competitiveness, they often have to subcontract engineering to foreign engineering contractors.

Figure 25.

Engineering Man-hour Fee in Selected Countries



Source: Engineering Business, <u>Nihon no Plant Yusyutsu no Kyosoryoku wo Kensho suru</u>, Oct. 15, 1993.

3) Consortium

It became difficult for engineering contractors to contract large projects without making a consortium because of huge initial investments, widely ranging contract conditions, and complex business environments. Therefore, they established temporarily a complementary relationship with other engineering contractors and, other, with a trading company. A consortium can be divided roughly into four categories: parallel contract, main-sub contract, joint and several contract, and the establishment of a new corporation.

Consortiums are formed in order to avoid excessive competition, and complement permits contractors to share costs, risks, political correspondence and opportunities.

d. Global R&D

In its early days the Japanese engineering industry applied imported licensed technologies to its domestic market because it could not expect the limited Japanese market to recover its R&D expenses. Today, because huge investments make it difficult for any single contractor to develop new technologies and because Japanese engineering contractors have become technical experts who are often counted on by foreign firms, international joint research and technical cooperation has increased. In this way technologies and R&D expenses are shared and opportunities are increased.

e. Global Management

Japanese engineering contractors have adopted the U.S. type of project management system because they had no example in the Japanese management system that they could follow in the international market. For example, a Japanese management practice, based on mutual understanding, often allows contractors to start a project without a contract; a verbal promise often has priority over a documented contract in Japan. The U.S. type of management system, today's international standard, could not be more different; it forces parties concerned to follow the doctrine of contract for contract's sake. These differences in contract types between Japan (lump-sum) and the rest of the world (cost-plus-fee) have made it difficult for Japanese engineering contractors to maintain the Japanese management system. (However, a recent trend of shifting contract types from cost-plus to lump-sum is pushing them back to the competitive edge in some markets.) In any event, they still have to use the Japanese management system for their Japanese clients, thus the arrangement of this managerial gap has become a vital issue for them.

2. Conditions

a. Strengthen International Competitiveness

Having global competitiveness is a must for globalization. In order to be globally competitive, engineering contractors have to examine carefully the comparative and competitive advantages in each overseas market. These advantages can usually be divided into cost and non-cost factors. Many contractors compete with combined advantages depending on client needs, maximizing their advantages by applying themselves to client environments. Although Japanese engineering contractors are considered to have non-cost competitiveness, they are still weak at pre-bid activities such as feasibility studies and consultation. While they can develop competitive advantages by themselves, they can do little to change their comparative advantages.

b. Promoting Global Capabilities

In addition to meeting the conditions of globalization for other industries, such as the manufacturing industry, engineering contractors need to meet conditions peculiar to the service exporting business. First, they need a problem settlement capability. Since engineering contractors are not just contractors who can wait for directions from the client, they must team up with a good problem settlement organization. Second, they need the ability to create good international relationships with the countries concerned. Third, they need to promote an international interchange of personnel and to train globally-minded engineers, as engineering export is based on a reliable corelationship between the countries concerned. Fourth, they need to establish their own project management methods applicable to the international market and to train project managers who can handle them. Fifth, the industry, collaborating with the government, should establish an export promotion system in order to create a favorable environment for engineering contractors. Many European countries have strong export promotion systems supported by their governments which work very well in the international marketplace.

4.3.3 U.S. Engineering Contractors

The major U.S. engineering contractors are far more diversified than Japanese engineering contractors both horizontally and vertically. Horizontally, they conduct not only refinery and petrochemical plant construction but other constructions as well, including industrial facilities, infrastructure, power stations, buildings and housing. Vertically, they offer engineering consulting, trading services, construction, maintenance, related technical service, and operation in addition to engineering service. They have a relatively small number of well-trained project managers who are in charge of a project from the beginning to the end. On the other hand, Japanese engineering contractors, such as JGC, Chiyoda, and TEC, conduct mainly refinery, petrochemical, and chemical related plant construction (70~80%). Their business is limited to engineering, procurement, and construction and they rarely do the upstream and downstream businesses such as consulting, management, and operation. The horizontally and vertically configurated operations of U.S. contractors, based on their cost-plus-fee contract method, permits them to minimize their risks and thus be involved in a variety of fields. As the former section described, though, the contract method in the international market has shifted from cost-plus-fee to lump-sum fixed price; thus U.S. engineering firms face restructuring of their organization as well as their business style.

Both the Japanese engineering industry and the U.S. engineering industry had a hard time during the 1980's, due mostly to the fall in oil prices. In addition, the depression in which the U.S. market was caught during this period forced U.S. engineering contractors to restructure their organizations and businesses. According to Syunichi Hiraki (The Engineering Business Oct., 15, 1993), this restructuring practice made it clear that there were three types of U.S. engineering contractors which should be considered separately.

The first type includes Fluor Daniel, Foster Wheeler, and Stone & Webster, which were able to maintain their listing in the N.Y. stock market. Although their contract values decreased and profitabilities deteriorated during that period, they survived by diversifying, globalizing, and expanding their businesses through the acquisition of a consulting firm. Their positive measures were effective enough to improve their performances today.

The second type includes Bechtel and Parsons, which are not open to the public. Bechtel decreased its family's share-holding ratio to less than 50%. Its partners now hold more than 50% of its shares and have begun to influence its mission, strategy and policy.

Parsons bought back all its shares and became a employees' stockholding firm. This gave incentives both to the firm and to its employees. Parsons can expect long-term employment while its employees can see their efforts reflected in their stock price.

These firms can take a long-term view without being interrupted by outsiders, although they still need to clear their balances. Since they cannot issue corporate bonds and commercial papers, they need to maintain a good relationship with financial institutions in order to rise funds.

Both the above mentioned types of engineering contractors have promoted diversification in order to meet the needs of as many kind of clients as possible. They have also been positive about entering new businesses. On the other hand, they usually just buy licensed technologies for their clients and are reluctant to spend money for R&D.

The third type of U.S. engineering contractor includes Kellogg and Lummus, which were targeted by M&A. Since they specialize in the refinery, petrochemical, and chemical fields, their performance can easily be influenced by economic fluctuations, making them similar to Japanese engineering contractors. They are technology-oriented firms and rely largely on the licensing business. They can remain successful if they make themselves recession proof by securing new markets and promoting globalization.

Forced by a severe business environment, U.S. engineering contractors strengthened their competitiveness through radical restructuring. The Bechtel group reduced its number of employees from 40,000 in 1985 to 23,000 in 1993. Today they have expanded their sales in the international market again, leaving behind Japanese engineering contractors who have made little progress from their restructuring.

One of the greatest risks U.S. engineering contractors took was to shift their system from cost-plus-fee contract-oriented to lump-sum contract-oriented; this demanded a complete organizational change. They made this effort not only because they understood this trend was strong in the international market, but because they realized, too, that with appropriate management the lump-sum contract can bring greater profits. Today, they seem to hedge the risks associated with the lump-sum contract method by collaborating with Japanese engineering contractors; however, once they have learned the keys for success, U.S. engineering contractors will be able to dominate the international market again.

4.3.4 Summary of the Case Study: Engineering Contractor

Japanese general contractors (e.g. Kajima) and engineering contractors (e.g. JGC) are often confused with each other and called Japanese E&C firms, and the primary business of both is engineering and construction, but their business practices are incompatible in many respects. General contractors have a huge domestic market, which makes them reluctant to expand their international market. Engineering contractors, on the other hand, have to enter the international market in order to cover the domestic market's fluctuating business conditions. In other words, engineering contractors are more globalized because they have to be.

U.S. engineering contractors once dominated the international engineering market; however, rapid environmental changes and technical advancements have made it impossible for a specific engineering contractor to take the leadership in every engineering field. In order to compete globally, an engineering contractor has to first identify the specific needs and preferences of the client, and then endeavor to assemble the necessary factors to meet them. Today's complex situations require engineering contractors to form international coalitions with partners in order to strengthen their total power. The selection of which types of coalitions and partners depends on the types of projects, the technologies involved, financing, countries and degree of experience. The alliances may take place vertically, covering everything from R&D down to field construction, and horizontally, going beyond the industry to collaborate with financial institutions and trading companies.

For example, JGC has made a long-term alliance with Stone & Webster since its introduction of ethylene production technology, and it has also formed a close relationship with M.W. Kellogg in natural gas technology. TEC cooperates with Kellogg in ammonia production technology, with Lummus in ethylene technology, and with Stone & Webster in nuclear technology. These examples show that a subtle combination of competition and coalition plays a crucial role in the current global strategy. In order to make the coalition as perfect as possible, an engineering contractor should develop and promote its advantages to attract partners while establishing a global network.

chapter 5

SUMMARY AND CONCLUSION

5.1. Summary

This thesis first described the characteristics of the international market, then investigated overseas strategies by focusing on Japanese engineering and construction firms. Today, the U.S. seems to dominate the international market due largely to its large share of petroleum and industrial plant construction. This is the area where U.S. contractors can demonstrate their competitive advantages best, and U.S. engineering and construction firms rely on this international market. As for Japanese firms, compared to their domestic construction market, the international market is relatively small, more competitive, and risky. Although most Japanese engineering and construction firms regard globalization as a core strategy, their incentives for globalization are few. As long as Japanese general contractors can share their huge domestic market, they will not have strong incentives to advance into the international market. The domestic market is doubly attractive in that, thanks to the government's fair distribution policy, Japanese general contractors can secure their market shares and maintain their organizations without difficulty and without being involved in a price war. Thus, it is natural that the Japanese construction industry regard the domestic market as important and the international market as secondary. Although it may be strategically important for the Japanese construction industry to shut out foreign contractors from the Japanese market, Japanese general contractors are not worried about being invaded; they are concerned, though, that not only the domestic contractual system but that the government's fair distribution policy can be forced to change in the process of the market opening.

According to Nikkei Construction, U.S. contractors are confident that they can reduce Japanese construction costs by introducing U.S. construction management methods. This may be true if the government adopts the U.S. type of contractual system; however, as section 4.2. shows, by accepting a higher cost of construction, Japanese clients avoid construction risks and having to hire industrial contractors, such as designers, consultants, construction managers, construction firms, surveyors and suppliers separately. In Japan general contractors do everything and take almost all responsibilities. Therefore, there are differences between Japan and the U.S. both in the concept of construction and in the role of contractors. For example, Bechtel Overseas Inc. refused to accept a loss in public works by making a claim against the government, (Nikkei Construction, July 23, 1993) but the Japanese contractual system does not permit this kind of claim. Japanese engineering contractors, such as JGC, increased their overseas contracts by using the comparative advantage in the lump-sum contract method, which is commonly used in Japan. Differences in business traditions confuse and mislead not only the international contractors but the two governments as well.

5.2. Conclusion

When one plans to expand one's business into a new field, one should know the competition in the new market. Michael E. Porter said in his book, Competitive Advantage (1985), "Competition is at the core of the success or failure of firms. Competition determines the appropriateness of a firm's activities that can contribute to its performance, such as innovation, a cohesive culture, or good implementation." In the construction industry, due mostly to its "contract" type of business, the nature of competition is controlled by its contractual system. Japanese contractors cannot demonstrate their competitiveness in the international market because the contractual system in Japan is different from that in the international market. The difference in the nature of competition creates different types of organizations and business practices. Thanks to similar contractual practices, U.S. contractors can enter the international market without difficulty. This may be the main reason why U.S. contractors dominate the international market. Understanding this, U.S. contractors push the U.S. government to convince the Japanese government to change its contractual system and its fair distribution policy rather than to make a steady effort to establish competitive advantages which could be applicable to the Japanese market. Although this pressure seems unacceptably high handed at first glance, the inconsistencies and inefficiency of the U.S. defense contractual system has shown both the clients and the contractors in the Japanese construction market that the present Japanese contractual system is also full of inconsistence and is inefficient from the point of view of free competition. Although it is difficult to say which construction policy and contractual system is best, it is necessary for both parties concerned to find the best contractual system in the present situation and business environment.

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