CHINESE MULTINATIONAL CONSTRUCTION FIRMS IN INTERNATIONAL AND DOMESTIC MARKETS: A RE-EXAMINATION OF THE ECLECTIC PARADIGM

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A THESIS SUBMITTED

FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

DEPARTMENT OF BUILDING

SCHOOL OF DESIGN AND ENVIRONMENT

NATIONAL UNIVERSITY OF SINGAPORE

2006

ACKNOWLEDGMENTS

I am thankful to a number of people without whom this endeavor would have been much harder, taken even longer time, or even been downright impossible. First of all, I would like to express my deepest gratitude to my supervisor Adjunct Associate Professor Christopher Leong Hoe Yuen and my Thesis Committee advisor Professor Low Sui Pheng, for introducing me and guiding me in the academic field, and helping me to work on this fascinating research. Prof. Leong's intellectual prowess and his energy have always been inspirational for me. His gentle encouragement and firm guidance have been instrumental in the completion of this work. I would like to express particularly warmest thanks to Prof. Low, for his invaluable guidance, candid suggestions and continuous encouragement. Prof. Low also deserves special credit for always being supportive and constructive for the completion of seven academic papers during this PhD study. Without his diligent efforts on the manuscripts and numerous improvements on them, the publication of these papers would not have been possible.

I would like to thank Professor George Ofori, for many creative ideas in this thesis were inspired and originated from his lectures on international construction. Thanks to Associate Professor Gan Cheong Eng, for his help and encouragement during the earlier stage of this research. Thanks to Adjunct Associate Professor Chow Kok Fong, the president of Equitas Corporation Pte Ltd; he provides great opportunities for me to further understand the practices in the construction industry. I am also grateful to Dr. Cuervo J. C. and Mr. Aibinu A. A. for their valuable discussions with me. Special thanks go to Department of Building, National University of Singapore, and the University, for providing the good research facilities and environment and for granting the scholarship for me to undertake this study.

I would like to express my sincere thanks to my previous colleagues in China International Water and Electric Corporation (CWE), and a number of friends who had been working with me in China, Malaysia, Pakistan, Belize, the US, Sri Lanka, Bangladesh and Peru. Without their help and contribution, the fieldwork of this research would not be completed. Special thanks to Mr. Liu Li, Director of Department of International Economic Cooperation, Ministry of Foreign Economic and Trade of the People's Republic of China (now Ministry of Commerce), Mr. Wang Shaofeng, Vice President of CWE, Dr. Zhao Y. Y., Vice President and Chief Accountant of CWE, Mr. Jin G. M., President Assistant of China Communication & Cable Supply Co., Mr. Sun J. H., Vice President of China Geo. Co., Mr. Qin G. B., department director and General Manager of CWE (Malaysia), Mr. Shi Y. T., General Manager of China Harbor Engineering Co. (Pakistan), and a number of other anonymous directors and senior staffs in Chinese companies. They had either helped me personally, or instructed their subordinates and experienced professional staffs to help me complete the works. I am indebted to all of them for their sincere assistance without any reservations. Furthermore, I would like to use this space to thank Dr. Szymon Wilk in Poznan University of Technology, Poland, for providing the newly developed advanced software – ROSE 2.0. This made it possible to adopt the new technique of rough set analysis in this research.

I also extend my thanks to my friends, Koh Lok Joon, Steven Osakin S., Anny Liauw C. Y., Goh Sui Yong, Low Chin Hwa, Jin Chizhe, Jin Xiaohua and Zhu Haihong for moral support and sharing their time with me during these three years.

Finally thanks to my family. A lot of love and gratitude go to my parents, Jiang Ping and Xu Xiangyun, and my parents-in-law, Zhang Guoliang and Wang Rongsheng. Their encouragement and support made me proud of and enjoyed my life as a PhD student. Special thanks to my father-in-law, Mr. Zhang Guoliang, who after retirement is now the senior advisor in the Ministry of Water Resources of the People's Republic of China, for he had not only offered his heartfelt support to my research, but also provided many valuable information about infrastructure construction in China.

Most of all thanks lastly to my loving wife, Zhang Lu, for every minute she spent with me during the hard time of this work, and for every second which she accepted when I spent working on this research.

Jiang Hongbin

Draft completed: June, 2005, Singapore
Revision completed: September, 2006, Beijing, China

PREFACE

The following publications are part of the outputs of this PhD research during the candidature, and are closely related to this thesis.

I. **Internationalization of Chinese Construction Enterprises**
Low, S.P. and Jiang, H.B.
Journal of Construction Engineering and Management, December, Vol. 129, No.6, pp. 589-598 American Society of Civil Engineers (ASCE), U.S. (2003)

II. **Estimation of International Construction Performance: Analysis at the Country Level**
Low, S.P. and Jiang, H.B.
Construction Management and Economics, 22(3), pp. 277-289, London, UK. (2004)

III. **A comparative study of top British and Chinese international contractors in the global market**
Low, S.P. and Jiang, H.B.
Construction Management and Economics, (September 2004) 22, pp. 717–731, London, UK. (2004)

IV. **Domestic issues, international construction and lessons in international project delivery systems for Singapore**
Low S.P. and Jiang H.B.
Keynote Paper, *In Proceedings of the 20th Symposium of Building Construction and Management of Projects,* Shuzo Furusaka (Editor), organized by the Research Committee on Building Economics, Architectural Institute of Japan, Kyoto, Japan, 22-24 July 2004, pp.65-74. (2004)

V. **Chinese Connections in International Construction: The Past 100 Years**
Jiang, H.B, Low, S.P. and Leong, C.H.Y.
In Proceedings of CIB W55, W65, W107 International Conference of Knowledge Construction, 22-24 October 2003, Singapore, pp.352-367. (2003)

VI. **Measuring International Performance: Case Study of a Chinese Construction Multinational Corporation (MNC)**
Low, S.P, Jiang, H.B. and Leong, C.H.Y.
In Proceedings of the CRIOCM International Conference of Advancement of Construction Management and Real Estate, Dec. 3-5, 2003, Macau, pp. 133-155. (2004)

VII. **Analyzing Ownership, Locational and Internalization Advantages of Chinese Construction MNCs using Rough Set Analysis**
Low S.P. and Jiang H.B.
Accepted for publication by *Construction Management and Economics,* London, UK. (2005)

CONTENTS IN BRIEF

TABLE OF CONTENTS

SUMMARY

Chinese construction multinational corporations (CMNCs) are relatively new contenders in the international construction industry. Although the increasing involvement of Chinese contractors in the international market and the fast growing construction sector in China have received some attention, the studies on Chinese CMNCs' performance, their competitive advantages and the various factors which they encountered remain very limited. Dunning's eclectic paradigm, as one of the most important internationalization and MNCs theories, has been applied to various economic sectors mostly in the contexts of developed countries. It is timely to re-examine the theory in the context of Chinese CMNCs' international operations and to extend the theory to China's domestic construction market. This research studies various aspects, in terms of ownership, location and internalization (OLI) advantages of Chinese CMNCs in the international construction market, and extends the theoretical framework to China's domestic contexts. This not only draws theoretical significance, but also provides implications and suggestions for practitioners in international construction industry and in China's construction market.

Part I presents the theoretical background for the research, and concentrates on Dunning's eclectic paradigm and its applications. It intends to analyze the economic nature of the theory and its relevance with international construction, thereby offering the basis on which to extend the theory. In this part, international construction industry and construction MNCs are also studied, and these include their basic characteristics, and the economic nature of the international construction industry. In addition, this part completes the creation of OLI+S model and the formulation of two

transaction chains in international construction, which are further tested, examined and applied in various sections in this thesis.

Various economic methods are adopted to analyze the development, overall performance, economic perspectives, industrial and organizational structures of Chinese construction industry and construction MNCs. This reveals the general status of Chinese CMNCs in international and domestic construction market. Their OLI advantages in both markets are then identified and examined using the OLI framework. The significant ownership, locational and internalization advantages and disadvantages, and the relevant exogenous and endogenous factors of Chinese CMNCs in international and domestic construction market are studied, and their variations and correlations are also investigated. This is complemented with a variety of analysis based on case studies. Furthermore, the newly advanced technology of rough set analysis is applied in the study, in order to establish causality relationship between various factors. This also brought a number of practical decision rules for reference by practitioners in the construction industry.

In addition to the data collected from survey works, three case studies involving information sourced from 6 Chinese construction firms, 7 non-Chinese construction firms and 9 construction projects are utilized in this research. Two comparative studies as implications of the research are conducted. Various theoretical and practical conclusions and implications for policy makers are offered in this research. It is argued that extension of OLI paradigm to domestic context is valid. It also suggests that, while significant OLI advantages and factors should be strategically managed by

CMNCs, they also should be examined on an integrated and dynamic basis to cope with the changing business environment and globalization.

Keywords: China, internationalization, construction, ownership, location, internalization

LIST OF CASE STUDIES

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

AICs	Advanced Industrialized Countries
BCA	Building and Construction Authority
BOO	Build-own-operate
BOOT	Build-own-operate-transfer
CIDB	Construction Industry Development Board
CMNC	Construction Multinational Corporation
D&B	Design and Build
DBFO	Design-build-fund-operate
ENR	Engineering News-Record
ESP	Environment, System and Policy
ETA	Economic and Technical Aid
FATA	Foreign Assets as a percentage of Total Assets
FDI	Foreign Direct Investment
FSTS	Foreign Sales as a percentage of Total Sales
GNP	Gross National Product
H-O	Hecksher-Olin Theorem
H-O-S	Heckscher-Ohlin-Samuelson model
IDP	Investment development path
IIR	Intermediate Input Ratio
IMC	Inverse Matrix Coefficient
I-OMS	Internalization – Overseas Management Structure
JIT	Just-in-Time
LDCs	Less Developed Countries
L-IBD	Location – International Business Distribution
M&A	Merger and Acquisition
MIR	Mean Importance Rating
MNCs	Multinational Corporations
MNEs	Multinational Enterprises
MOC	Ministry of Construction
NGO	Non-Government Organization
NICs	Newly Industrializing Countries
NOI	Net Outward Investment
NSI	Network Spread Index
OII	Overall Internationalization Index
O-IRTR	Ownership - the ratio of international revenue to total revenue
OLI	Ownership, Location and Internalization
OLI+S	O-IRTR, L-IBD, I-OMS, and S-ISF
OSTS	Overseas Subsidiaries as a percentage of Total Subsidiaries
PCM	Product Cycle Models
PDIO	Psychic Dispersion of International Operations
PFI	Private Finance Initiative
PLC	Product Life Cycle models
PPP	Private Public Partnerships
R&D	Research and Development
RCTs	Rural Construction Teams
RII	Relative Importance Index
RSA	Rough Set Analysis

S-ISF	Specialty – Involvement of Specialized Fields
SMEs	Small and Medium-Sized Enterprises
SOE	State Owned Enterprises
SWOT	Strength, Weakness, Opportunity and Treats
TCA	Transaction Cost Analysis
TCE	Transaction Cost Economy
TFP	Total Factor Productivity model
TMIE	Top Managers' International Experience
TNCs	Transnational Corporations
TNI	Transnationality Index
TQM	Total Quality Management
U-M	Uppsala Internationalization model
UNCTAD	United Nations Conference on Trade and Development
URCs	Urban and Rural Collectives
VATFP	Value-added Total Factor Productivity

Chapter One

INTRODUCTION

1.1 Background

From a global perspective, the construction industry is probably one of the oldest internationalized economic sectors that can be traced back to more than 100 years ago. Most of the construction multinational corporations (CMNCs) from the developed countries are well developed with a sophisticated presence in many countries. Likewise, the current trend is that construction markets in developing countries have become increasingly attractive and contractors from developing countries, for example China, Brazil and Turkey, have also been increasingly involved in the international construction market. Table 1.1 shows the total construction spending of the Less Developed Countries (LDCs), the Newly Industrializing Countries (NICs) and the Advanced Industrialized Countries (AICs) (see Endnote 1) and their annual growth rates from 1996 to 2000. It appears that the LDCs and NICs exhibited faster growth in terms of construction spending than the AICs. Among the NICs, China exhibited high growth in the construction industry both in terms of its absolute value of construction spending and its annual growth rates in recent years. On the other hand, construction MNCs from the NICs also showed an increasingly considerable involvement in the international construction market. As shown in Table 1.2, which is based on the Engineering News-Record (ENR) annual surveys, the number of international contractors from the NICs increased from 41 firms in 1995 to 55 firms in 2000. Their share of international billings rose from 5.3% of the total of the top 225 international contractors to a peak of 9.25% in 1999. This maintained at 7.6% in 2000 in spite of the then poor economic outlook in some NICs. The total values of

international billings of these firms from the NICs increased by 58.42% from US$ 5,561.7 million in 1995 to US$ 8,810.7 million in 2000. This seems to suggest that while the domestic construction market grew rapidly in the NICs, construction MNCs from the NICs have increased their involvement in the international market.

Table 1.1 Total construction spending and annual growth rates, by country groups 1996-2000

Countries	1996	1997	1998	1999	2000
	Total construction spendings: (US$ million)				
AICs	2,530,355	2,313,307	2,466,341	2,538,697	2,634,719
NICs	587,803	639,775	573,811	596,761	664,349
LDCs	119,392	123,999	99,763	96,932	114,210
Total	3,237,550	3,077,082	3,139,915	3,232,391	3,413,277
China	144,341	161,663	163,807	167,741	181,323
	Annual growth rates:				
AICs		-8.58%	6.62%	2.93%	3.78%
NICs		8.84%	-10.31%	4.00%	11.33%
LDCs		3.86%	-19.55%	-2.84%	17.82%
Total		-4.96%	2.04%	2.95%	5.60%
China		12.00%	1.33%	2.40%	8.10%

Source: Adapted from ENR (1998) and ENR (2000)

Table 1.2 Number of firms from NICs ranked in ENR's Top 225

Year	Number of firms from NICs ranked in ENR's Top 225 International Contractors	Total international billings of firms from NICs among the top 225 international contractors (US$ million)	Share of international billings of firms from NICs to the total of top 225 internaitonal contractors
1995	41	5,561.70	5.30%
1996	47	7,098.80	5.60%
1997	45	7,786.00	7.06%
1998	49	8,940.00	7.68%
1999	52	10,978.50	9.25%
2000	55	8,810.70	7.60%

Source: adapted from ENR (various issues from 1996 to 2001)

During the past two decades, Chinese multinational corporations (MNCs) have made much progress in the international market. In a paper of the United Nations Conference on Trade and Development (UNCTAD), Nolan and Zhang (2002) noted

that while large firms from China faced many challenges from globalization, it is possible for China to support the growth of its internationalizing corporations because of a potentially huge domestic market and a powerful and relatively effective state mechanism. The construction industry, as an important industry in the economic revitalization of China (Han and Ofori, 2001), is fostering Chinese CMNCs to play an increasingly important role in the internationalization process of China. In fact, China's construction enterprises have been increasingly involved with international engineering projects, manpower services, and other cooperative projects overseas. According to ENR, more than 30 Chinese construction enterprises were included within the top 225 international contractors based on their construction revenues generated outside China in 2001 (Table 1.3). China represented a ranking of second across more than 12 nationalities. Chinese CMNCs are emerging as one of the strongest contenders in the field after international construction enterprises from the US, UK, Japan and several other European countries.

Although Chinese CMNCs are recently growing to be more involved with global businesses, limited literature and analysis of their international performance are available for study in this area. Although relatively more firms from China were ranked among the top 225 international contractors, their share of the total international billings is lesser than that of the other developed countries. Nevertheless, since all the Chinese firms were involved in the international construction market only over the last few decades, the necessity of analyzing the performance of these firms is even more critical.

Table 1.3 Nationalities of top international contractors

Country	Number of Firms		International Billings		
	Rank	Number	Rank	US$ Million	%
US	1	73	1	24,962.80	21.5
China	2	35	6	5,383.80	4.6
Japan	3	21	5	8,801.60	7.6
Germany	4	11	2	18,162.60	15.7
Italy	5	10	10	3,437.20	3.0
Spain	6	8	8	4,405.20	3.8
France	7	7	3	15,991.60	13.8
UK	8	7	4	9,182.80	7.9
Korea	9	7	9	3,611.80	3.1
Turkey	10	7	11	265.8	0.2
Canada	11	5	12	194.6	0.2
Netherlands	12	2	7	4,522.40	3.9
All Other		32		16,985.30	14.7
All Firms		225		115,907.50	100

Source: ENR, 2001

1.2 Definition of terms

Although modern multinational firms date from the late nineteenth century, the term Multinational Corporation (MNC) did not appear until 1960. At a conference at Carnegie Mellon University, Lilienthal (1960) distinguished between portfolio and direct investment and then defined multinational corporations as 'Such corporations -- which have their home in one country but which operate and live under the laws of other countries as well' (Stephen, 2001). Given the considerable attention paid to foreign investment by economists since the late nineteenth century, one would have expected considerable discussion of the "multinational corporation" and its related concepts; however, it did not happen until the late 1950s and early 1960s.

Contributions by Edith Penrose, Stephen Hymer and John Dunning revolutionized the study of FDI and MNC, approaching it as a function of the growth of the firm rather

than the export of capital (Dunning, 1976; Hymer, 1976; Penrose, 1959). According to Dunning (1996), MNCs are legal entities that own or control value-added activities in two or more countries. Other definitions of MNC are similar, such as the one according to the United Nations' view - that MNC comprises entities in two or more countries, regardless of legal form and field of activity; operates under a coherent system of decision-making and common strategy; comprises entities, so linked, by ownership or otherwise, that one or more of them exercises significant influence over the activities of others. It is generally acknowledged that the terms Transnational Corporations (TNCs), Multinational Corporations (MNCs) and Multinational Enterprises (MNEs) carry the same meaning and are therefore interchangeable. However, some differences between them may be noted. MNCs are the enterprises which own or control production or service facilities outside the country in which they are based, and they are not always incorporated or private. TNCs are the enterprises which are jointly owned and controlled by entities from several countries and operated as a whole, while MNE is a rather broader term, which may include MNC and TNC. The crucial characteristic of an MNE is the ability of one company to control the activities of another company located in another country.

In view of these differences, the term "MNC" is adopted in this thesis. This is because most of the Chinese multinational construction enterprises are state owned ones, and their headquarters have sole control over their overseas operations, except a few joint ventures with foreign firms which will be mentioned separately. A construction multinational corporation (CMNCs) is a multinational corporation whose principal business line is to provide construction-related services, including construction works,

consultancy, design, and others. Chinese CMNC refers to a CMNC with its home country as China and headquarters based in China.

It may be useful to clarify here regarding the use of terms “host”, “home” and “local”. Host country refers to the country where MNC works outside its home country, and home country is where the MNC is originated from. For the study of international market as in Part II of this thesis, “local” company refers to the one that works in and has the same nationality of the host country. For the study of domestic market as in Part III of this thesis, “local” company refers to the Chinese company who works only in the particular regions of China, and without the business coverage of regions over the rest of China. Other terms used in this thesis may be explained where they appear.

1.3 Knowledge gap, research problem and research questions

In an overview of Chinese construction MNCs in international and domestic market, and the received studies on international production and MNCs’ internationalization, the research problem and knowledge gap may be found. On one hand, Chinese CMNCs have been increasingly involved in international construction market, as well as continually playing a significant role in domestic construction market, but the studies on these firms have not been intensively done so far. On the other hand, the well-developed international production theories including Dunning’s Eclectic Paradigm have been studied and examined in the contexts of many economic sectors such as the manufacturing and the service sectors, but most of these studies were focusing on the MNCs from developed countries. Therefore, there is a necessity to provide a comprehensive study for both Chinese and foreign practitioners who are involved with Chinese construction MNCs in international construction market and

China's domestic construction market. The knowledge gap in the literature may need to be filled in this regard.

This research intends to bridge the practice of Chinese CMNCs and the application of international production theories. This may raise a research question in this thesis is that:

> Since Chinese CMNCs working in international construction market possess their own competitive advantages, and they are still working in China's transitional economy and experiencing structural reform, can their internationalization be explained by the received international production theories? If yes, how significant are the various factors influence their value-added construction related activities in both international and domestic construction market?

By doing so, it may address the problem that there is no extensive research so far in studying the activities of Chinese construction MNCs in both international and domestic construction markets. This is becoming important especially in the light of China being perceived as one of the fast growing economies in recent years. Many Chinese construction firms are going abroad while many foreign firms are going into China's market. This research may provide implications of both academic and practical importance. In particular, this research may provide answers to the following research questions:

- For the international market contexts:

i. What is the current situation of Chinese construction MNCs in international market? How have they developed their international expertise?

ii. What are the underlying reasons that the Chinese constructions MNCs grow fast in international construction market? What are their competitive advantages and business strategies that contribute to their development and what other factors influence their expanding in the international construction market?

iii. In the broader view, how are the Chinese construction MNCs' performance in international market when compared with their counterparts from developed countries?

- For the domestic market contexts:

iv. What is the current development of China's domestic construction market and what is the role of these construction enterprises in their domestic economy?

v. How do Chinese CMNCs respond to their competitors in domestic market, including the local construction firms and foreign MNCs from other countries? What are their competitive advantages against these competitors?

- Regarding theoretical issues:

vi. Can the well established international production theories be used in the analysis of Chinese construction MNCs? If yes, how will this be conducted?

vii. How can the activities of the Chinese large construction firms in their domestic market be better analyzed? Is it possible to extend the international production theories to explain the practice of large Chinese construction firms in their domestic market?

1.4 Research scope and objectives

In order to address the research problem and answer the research questions, various players in connection with Chinese CMNCs need to be identified and therefore, the scope of the research can be defined. These players include Chinese and foreign construction uninational corporations (UNCs) or the local competitors and foreign construction MNCs.

As shown in Figure 1.1, different players are involved with the competition in international and domestic construction market. In international construction market, Chinese CMNCs may face the competition and cooperation with other foreign construction MNCs, and foreign construction UNCs or the local counterparts, while in domestic construction market, Chinese CMNCs may react to their counterparts including foreign construction MNCs and Chinese construction UNCs or the local Chinese construction firms. When the Chinese construction MNCs in international construction market are studied, the involvement of foreign construction MNCs and the local construction UNCs in host countries may be taken into consideration, since the their operations influence the Chinese CMNCs' strategies to a certain degree. Similarly for the study of China's domestic market, the Chinese construction UNCs and foreign CMNCs that are involved with China's construction market will be analyzed. In general, Chinese construction MNCs are working in an environment where the Chinese construction UNCs and other foreign CMNCs in domestic market, the foreign CMNCs and the foreign construction UNCs in international construction market are all involved in. Therefore, the scope of this study is the analysis of Chinese CMNCs in connection with their various counterparts in the international and domestic construction markets.

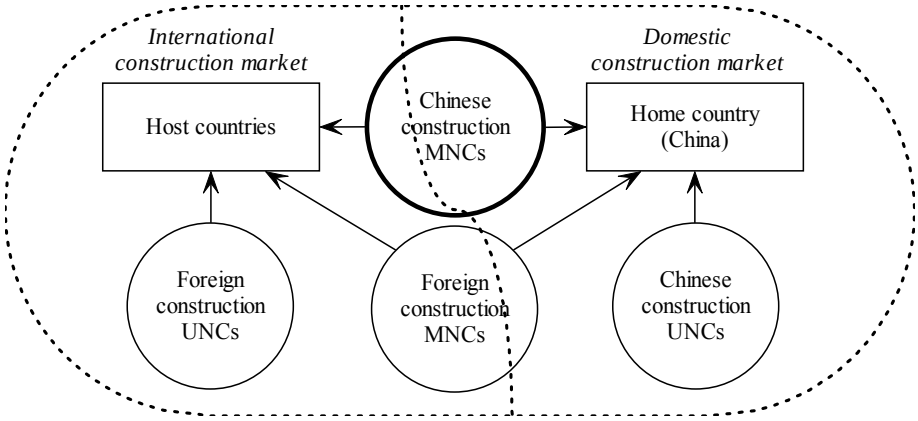

Figure 1.1 The scope of research

Note: the entire global construction market may be conceptually divided into international market and domestic market, and this is illustrated by the vertical wavy line in the figure.

The research objectives are set to identify the role of Chinese CMNCs in international and domestic construction market, and to find out the interaction mechanism between the market players. This research also seeks to identify the advantages based on which Chinese construction MNCs compete with their rivals, and to analyze the factors that influence their performance in both international and domestic markets. By attempting these objectives, this research focuses on applying the received international production theories to Chinese construction MNCs' experience, both in international and domestic market. Although there are some literature about the construction industry in China, very few studies have been done to apply the international production theories to construction MNCs in the transitional economy in China. Achievement of this objective therefore can be perceived to be of major significance. In particular, the following specific objectives are set for the research:

- To find out the current situation and to trace the evolutionary development of Chinese construction MNCs in international construction market;
- To apply the international production theories to Chinese construction MNCs, to explain Chinese construction MNCs' competitive advantages and their

reactions in international construction market; consequently, the viability of application of these theories in Chinese construction MNCs who are from China's transitional economy and with the reforming organizational structure can be examined. Meanwhile, the competitive advantages, the business strategies, and the determinant factors of Chinese construction MNCs in international market can be identified.

- To attempt to extend the eclectic paradigm, which originally is formulated for international production and foreign direct investment (FDI), to the study of Chinese CMNCs' operation in domestic market. To test the viability of extension of international production theory to the contexts of domestic industrial environment. If this can be successfully done, the comparative advantages, the business strategies, the influencing factors for Chinese CMNCs in domestic market can be identified.
- Based on the studies of Chinese CMNCs in international and domestic markets, to provide implications for theoretical and practical perspectives.

Two other supplementary objectives are set in this study. The first one is to develop a quantitative model from the received theories to estimate construction MNCs' international business and marketing strategies. Using this quantitative model, the comparative analysis at both macro level or country level and micro level or firm level can be conducted. The second one is to apply the newly advanced research methodology, Rough Set Analysis, to the OLI factors study. By doing this, the causality relationship between factors can be identified and more direct decision rules for CMNCs' managers can be formulated.

1.5 Empirical base and research methodology

In order to study the various aspects of Chinese CMNCs in international and domestic market, the empirical base of this research is a combination of quantitative methods (survey research) and qualitative methods (case study research). These methods serve as tools in identifying important advantages and factors of Chinese CMNCs in both markets. In this work, the quantitative studies served as means to identify and evaluate the significant advantages, disadvantages owned by and various factors faced by Chinese CMNCs. The qualitative studies, on the other hand, served as means of illustrating and further analyzing the findings from quantitative studies, in order to gain a deeper understanding of the various aspects of Chinese CMNCs in international and domestic construction market. There are advantages to be gained through the use of multiple methods to examine the same aspects of a problem. The weakness of one method will be compensated by the counter-balancing strengths of another, and thus the validity and reliability of the research is strengthened (Jick 1979; Lincoln and Guba 1985).

1.5.1 Survey research

The largest Chinese construction firms are approached for the questionnaire surveys and interviews. To identify the Chinese construction MNCs, the criteria was set as the construction firms which have been actively involved in international construction during the past 10 years and are based their head offices in China. The name list of these firms is sourced from the ENR's Top 225 International Contractors, and the China's Top 500 Enterprises. The list of ENR's Top 225 International Contractors is specially taken into account, since most of the Chinese contractors listed in ENR's

Top 225 are the largest construction enterprises in China and they contributed the majority of the total international revenues of Chinese construction firms. For example, the 33 Chinese contractors who were ranked among ENR's Top 225 International Contractors in 2000 in terms of their international revenues generated from international construction market, contributed their total international revenue at US$ 6.099 billion (ENR, 2001) or 73% of the total international contracting revenues or US$ 8.379 billion (DFEC, 2001) of all Chinese enterprises who had worked in international market in the same year. Meanwhile, the Chinese contractors who were ranked among ENR's top 225 included almost all of the largest construction enterprises, which had the direct connections with various ministries in China's State Council before the SOE reform in late 1990s, and included the major large construction enterprises in provincial level. The details of the survey design and respondents' profiles are provided in Chapter 6.

1.5.2 Case study research

In order to illustrate and further analyze the findings from quantitative studies, case studies are conducted. In fact, process studies, in terms of case studies, are fundamental to the understanding of the dynamics of organizational life and to the development and testing of theories of organizational adaptation, change, innovation and redesign (Huber and Van, 1995). Case studies made it possible to study how Chinese CMNCs have worked in construction market, and to illustrate and clarify the cause and effect relations on how different OLI factors influence firms' operation. (Lincoln and Guba 1985; Merriam 1988; Yin 1993). Three case studies are conducted in this research. They are based on the information sourced from 6 Chinese

construction firms, 7 non-Chinese construction firms and 9 construction projects (Table 1.4).

Table 1.4 Information sources of case studies

No.	Title of case study	Number of Chinese firms	Number of non-Chinese firms	Number of construction projects
CS1	Chinese CMNC in international market and its transaction chain	3		5
CS2	International performance of China State Construction Engineering Corporation	1	3	
CS3	Business forms of Chinese CMNC in international market	2	4	4
	Total:	6	7	9

In addition to the quantitative and qualitative methods used in this research, a number of archived data are also investigated. The archived data are mainly obtained from various companies' annual reports or brochures, and other published references such as China Statistical Yearbook, Engineering News-Record (ENR), and Dun & Bradstreet's *Who Owns Whom*. These data are used for quantitative analysis, including the estimation of firms' performance, the comparison between different CMNCs. Some other quantifiable factors in connection with Chinese construction MNCs were also investigated, such as the labor cost level, market size, for which the data were mainly obtained from published sources. To compare Chinese construction MNCs quantitatively with those from other countries, the OLI+S model and its Star model are utilized. To find out the causal relationship and predictive rules regarding the OLI advantages of Chinese CMNCs in international market, the method of rough set analysis is used. It also needs to be mentioned that interviews with some practitioners in Chinese CMNCs and face to face discussions with them were conducted throughout the fieldworks.

1.6 Significance and contribution of the research

Firstly, analysis of Chinese CMNCs and identification of their advantages in international construction market in this research is considered to be of major significance. As mentioned earlier, the previous studies mostly focus the application of international production theories on manufacturing industry and trading sectors, and most of the works done are for the analysis of industries in developed countries. Very few studies so far have addressed the issues related to Chinese construction MNCs in international market. Therefore, this research will re-examine the application of international production theories in the context of developing countries.

Secondly, extending international production theories to analyze CMNCs in domestic construction market is of significance. International production theories were formulated originally for explaining MNCs' transnational activities; however, economic and geographical conditions in China may provide the opportunity to extend and re-examine the eclectic paradigm in a domestic market context. If it is viable, this research will probably be the first one to extend and apply the eclectic paradigm in a domestic context.

Thirdly, the OLI+S model and the Star model developed by Professor Low Sui Pheng and the author during this study are useful for analyzing MNCs' internationalization both at macro or micro levels, and helpful for benchmarking purpose and for long-term strategic planning and resource allocation purpose at both country and firm level. In essence, it is an attempt to quantify and simplify the sophisticated OLI model in the context of international construction industry. It is especially helpful for the

comparison of advantages between CMNCs from developing and developed countries due to the relative basis in analysis. Examples can be seen in Low and Jiang (2003; 2004a; 2004c), Low, Jiang and Leong (2004). In addition, the model has been taken into the syllabus of the MSc. (Project Management) master program in National University of Singapore.

Fourthly, two transaction chains in international construction, as derived from transaction cost theory, are formulated during this study, in order to provide an integrated approach to analyze the internalization and externalization of CMNCs in international market. This is useful for explaining the different business forms and construction procurement adopted in international construction industry (Low and Jiang, 2004b).

Fifthly, this research may provide some practical implications. In view of the increasing involvement of Chinese CMNCs in international construction market in recent years, relatively very few studies have been done regarding their international experience. Therefore, this research may provide a reference for Chinese practitioners and their foreign partners who have construction business in China. The comparative studies between Chinese construction MNCs and others (UK and Singapore, as in Chapter 11 and 12) in this research also provide some insights about the different advantages and/or disadvantages of the firms. This may be helpful for them in business planning and strategizing.

Lastly, some other points may also be drawn as significance of this study, for example, the mapping of geographical movement of British and Chinese international

contractors; and the modeling of Total Factor Productivity (TFP) to analyze Chinese domestic construction industry.

1.7 Research framework and structure of the thesis

The framework of this research is formulated as shown in Figure 1.2 and Figure 1.3. The frameworks include the proposed methodology, data processing and findings. The detail of methodology and data processing will be elaborated later in the corresponding chapters.

The structure of the thesis is shown in Figure 1.4. Following this introduction, the thesis is organized into four parts. Part I provides the theoretical background of the thesis. This includes Chapter 2 review of internationalization and MNC theories, Chapter 3 the eclectic paradigm and its application and Chapter 4 construction MNCs and international construction industry. Part II presents the studies about Chinese CMNCs in international market. This includes the analysis of roles and current status of Chinese CMNCs in international market (Chapter 5), the study on competitive advantages of Chinese CMNCs (Chapter 6) and the analysis of causality relationship of OLI advantages of CMNCs using rough set analysis (Chapter 7). Part III offers the study of Chinese CMNCs in domestic construction market, including the analysis of construction industry in Chinese domestic economy (Chapter 8) and the study of competitive advantages of Chinese CMNCs in domestic market (Chapter 9). Part IV provides the two implications of the study, one is a comparative study of top British and Chinese international contractors (Chapter 10) and the other is the comparison of competitive advantages of Chinese and Singaporean international contractors

(Chapter 11). Chapter 12 covers the summary and conclusions drawn from this research.

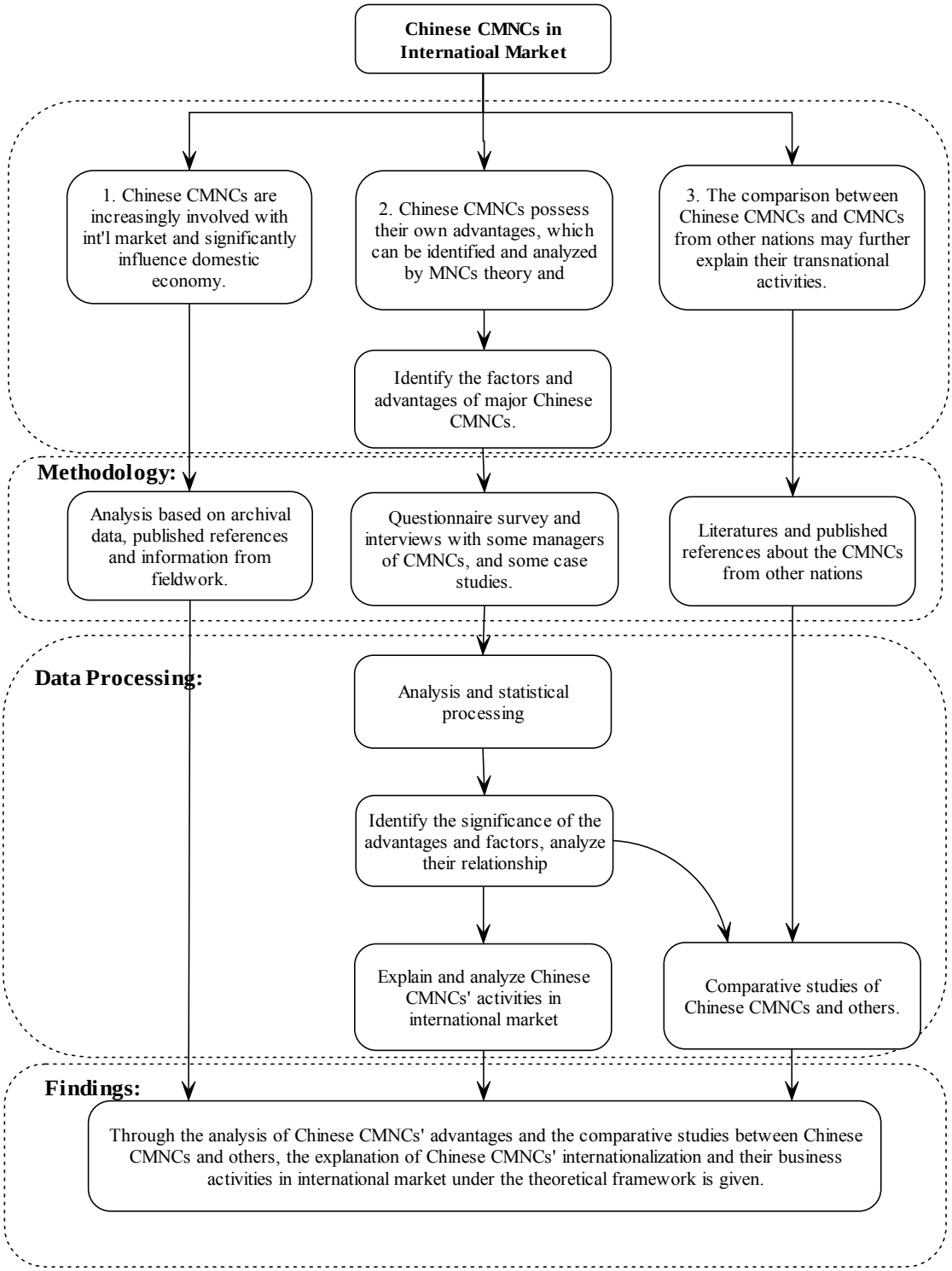

Figure 1.2 Research framework: Chinese CMNCs in international market

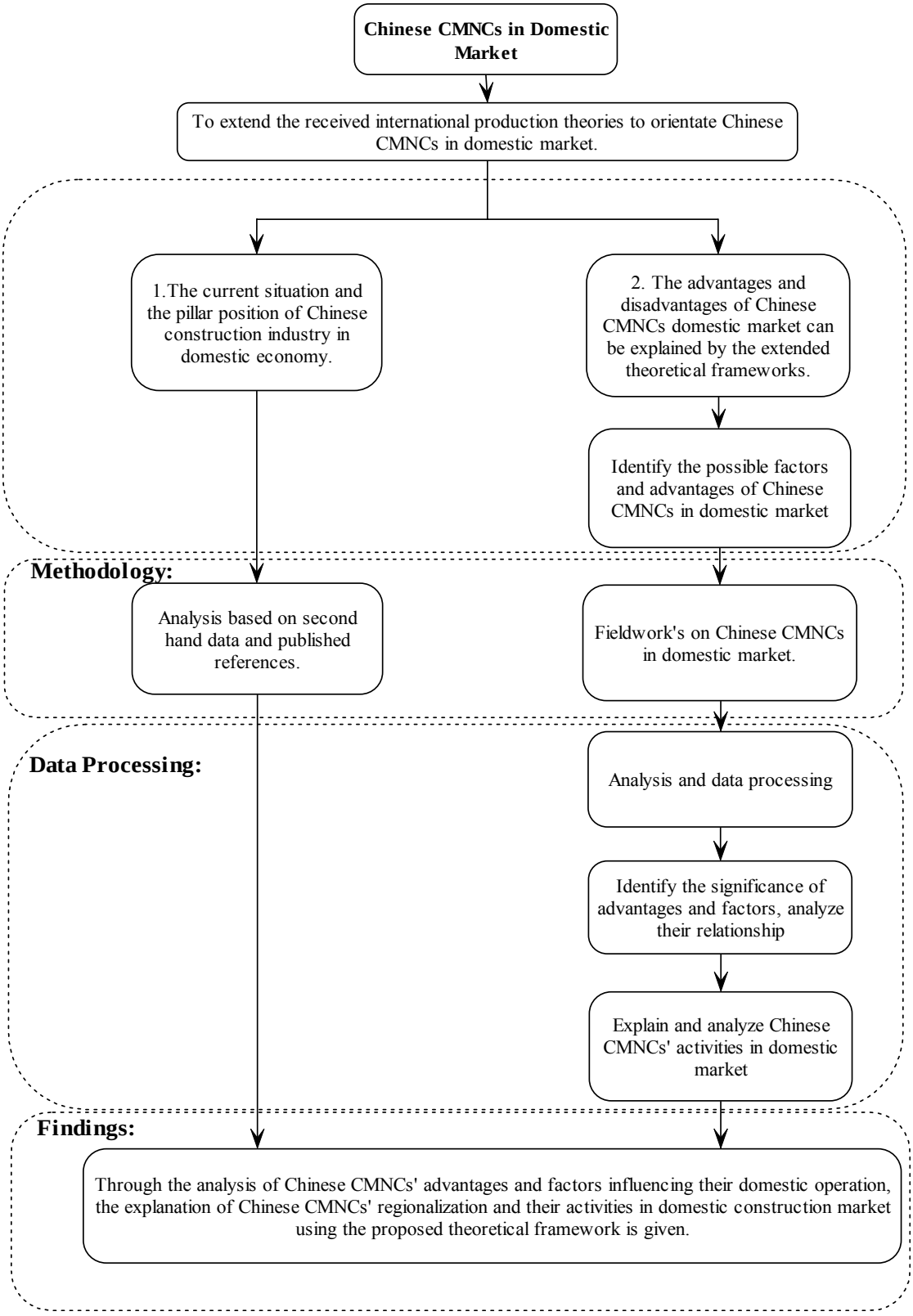

Figure 1.3 Research framework: Chinese CMNCs in domestic market

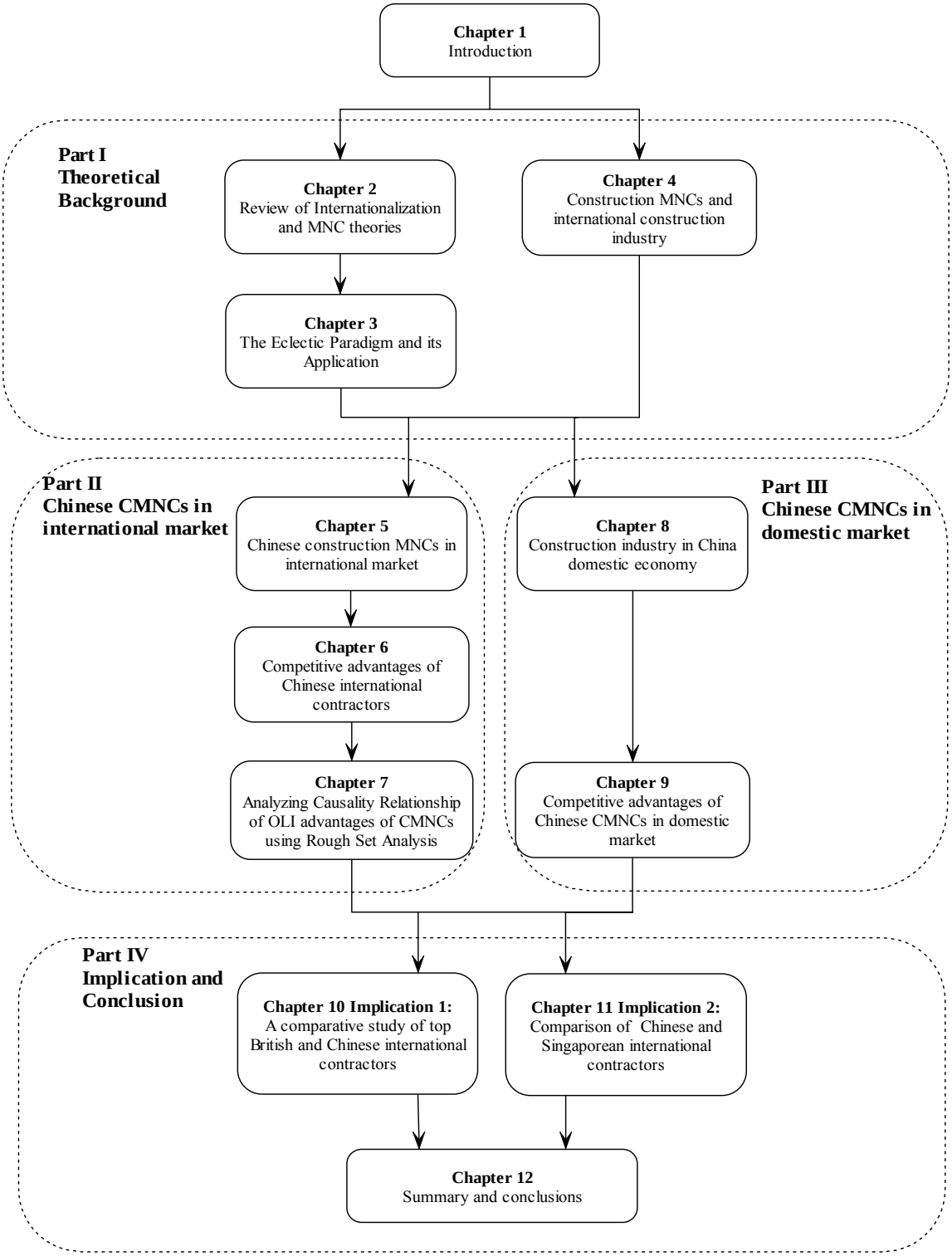

Figure 1.4 Structure of the thesis

In particular, the outlines of the respective chapters are listed below:

Chapter 2 reviews various schools of theories on internationalization and MNCs, and these include static and contingency models of FDI and MNCs activities, dynamic approaches of internationalization and MNCs, and macro-economic approaches of MNCs.

Chapter 3 focuses on Dunning's eclectic paradigm – the theory, its development and its applications in different economic sectors. Eclectic paradigm can serve as an envelope to encompass various MNCs and internationalization theories into an integrated platform. Therefore, it is taken as a theoretical foundation for this whole research. Various received studies are reviewed regarding construction industry and non-construction industries.

Chapter 4 discusses the international construction industry and construction MNCs. Basic characteristics, and economic nature of international construction industry are analyzed. Two transaction chains in international construction are identified and OLI+S model is formulated to quantitatively analyze the internationalization of CMNCs.

Chapter 5 studies the development and overall performance of Chinese CMNCs in international construction market. This includes their market shares, productivities, profitability and financial performance, and the horizontal, vertical and geographical analysis regarding top Chinese CMNCs.

Chapter 6 presents comprehensive study regarding Chinese CMNCs in international market using the proposed OLI framework. Ownership, locational and internalization advantages and disadvantages of Chinese CMNCs are identified and examined based on data from fieldwork. The analysis also includes the variation analysis and correlation analysis between various significant OLI factors. This provides further understanding of these factors. In addition, various features of the locations where Chinese CMNCs had worked in international market were analyzed. The data from questionnaire survey and fieldworks were utilized in Chapter 6.

Chapter 7 applies the new advanced technology of rough set analysis to this study, in order to establish causality relationship between various OLI factors. The straightforward predictive rules from the RSA are also drawn in Chapter 7 for reference to practitioners in international construction industry.

Chapter 8 studied the general status of China's domestic construction industry. The development, the macro economic perspectives, and the industrial structure were analyzed using various economic methodologies.

Chapter 9 follows the similar theoretical framework as in Chapter 6, and the ownership, locational and internalization advantages and disadvantages of Chinese CMNCs in domestic construction market are identified and examined based on data from fieldwork. The variation analysis and correlation analysis between various significant OLI factors provided some insights regarding the practices of Chinese CMNCs at home. OLI factors owned by Chinese CMNCs were also analyzed regarding four major economic regions in China respectively.

Chapter 10 and Chapter 11 present two comparative studies as the implications of this research. Chapter 10 analyzes and compare the advantages of the British and Chinese international construction firms through four internationalization ratios in the OLI+S model. Chapter 11 presents the comparison of Singaporean and Chinese CMNCs in intentional market. Their respective advantages and disadvantages in international operations are discusses and compared. Suggestions regarding to the CMNCs from these three countries in international construction market are provided.

Chapter 12 covers the summaries, theoretical and practical conclusions, implications for policy makers, limitations of this research and suggestions for future research.

Part I

Theoretical Background

Chapter Two

REVIEW OF INTERNATIONALIZATION AND MNC THEORIES

2.1 Introduction

The economic theories on which this research is based cover the areas of international production, internationalization and multinational corporation (MNC) theories. In addition, theories and studies in connection with international construction industry, construction MNCs and China's construction industry are also reviewed and analyzed. This chapter reviews the internationalization and MNCs theories, and Chapter 3 focuses on the eclectic paradigm and its application. Theories regarding international construction industry and construction MNCs are reviewed in Chapter 4.

The cores in international production, internationalization and MNCs theories are to seek to identify and explain the motivation, the location and paths of MNCs' value-adding activities crossing national borders. This is to answer the questions of why, where and how the MNCs may internationalize their business. Derived from classic and neo-classic economic theories, the issues related to MNCs' activities have been extensively studied by many in view of the fact that transnational business has been increasingly developed all over the world during the past century. The evolution of internationalization and MNCs theories may be summarized into four major strands.

(i) The first is the strand originated from the classical absolute cost theory (Adam Smith, 1776) and the comparative cost theory (David Ricardo, 1817), which was developed into the neo-classical international trade theory, known as

Heckscher – Ohlin model and the Heckscher-Ohlin-Samuelson (H-O-S) model. Various MNCs theories were built on these foundations and these include: Vernon's product cycle model (Vernon, 1966; 1974), Kojima's comparative advantage theory and the related macro economic theory (Kojima, 1978; 1985), Macdougall's model of international investment (Macdougall, 1960) and location theory in MNCs (Dunning, 1972; 1973; Caves, 1974; Buckley 1985).

(ii) The second strand of the theories is industrial organization theories, and these include monopolistic advantages theory (Hymer, 1960; Kindleberger, 1969) and its various extensions and variations proposed by Aliber (1970), Caves (1971), Magee (1977) and Knickerbockers (1973).

(iii) The third strand of MNCs and internationalization theories were derived from Coase's (1937) transaction cost theory. The major scholars in this strand include the works contributed by Williamson, Oliver E. - Transaction Cost Analysis (TCA) and market vs. hierarchies theory (Williamson, 1971), and the works of Buckley, Casson, and Rugman - internalization theory (Buckley and Casson, 1976; 1981; 1996; Rugman, 1980).

(iv) The fourth strand is to analyze the phenomenon from strategic and structural perspective, which was firstly put forward by Chandler (1962), and later on, developed into network approach in internationalization (Johanson and Mattsson, 1985; 1986; 1988), contingency theory (Bartlett and Ghoshal, 1990; Ghoshal and Nohria, 1993) and organization theory (Egelhoff, 1988; Goshal, 1993).

Based on a comprehensive review on these theories, the author summarizes the evolution and relationship of the theories in Figure 2.1.

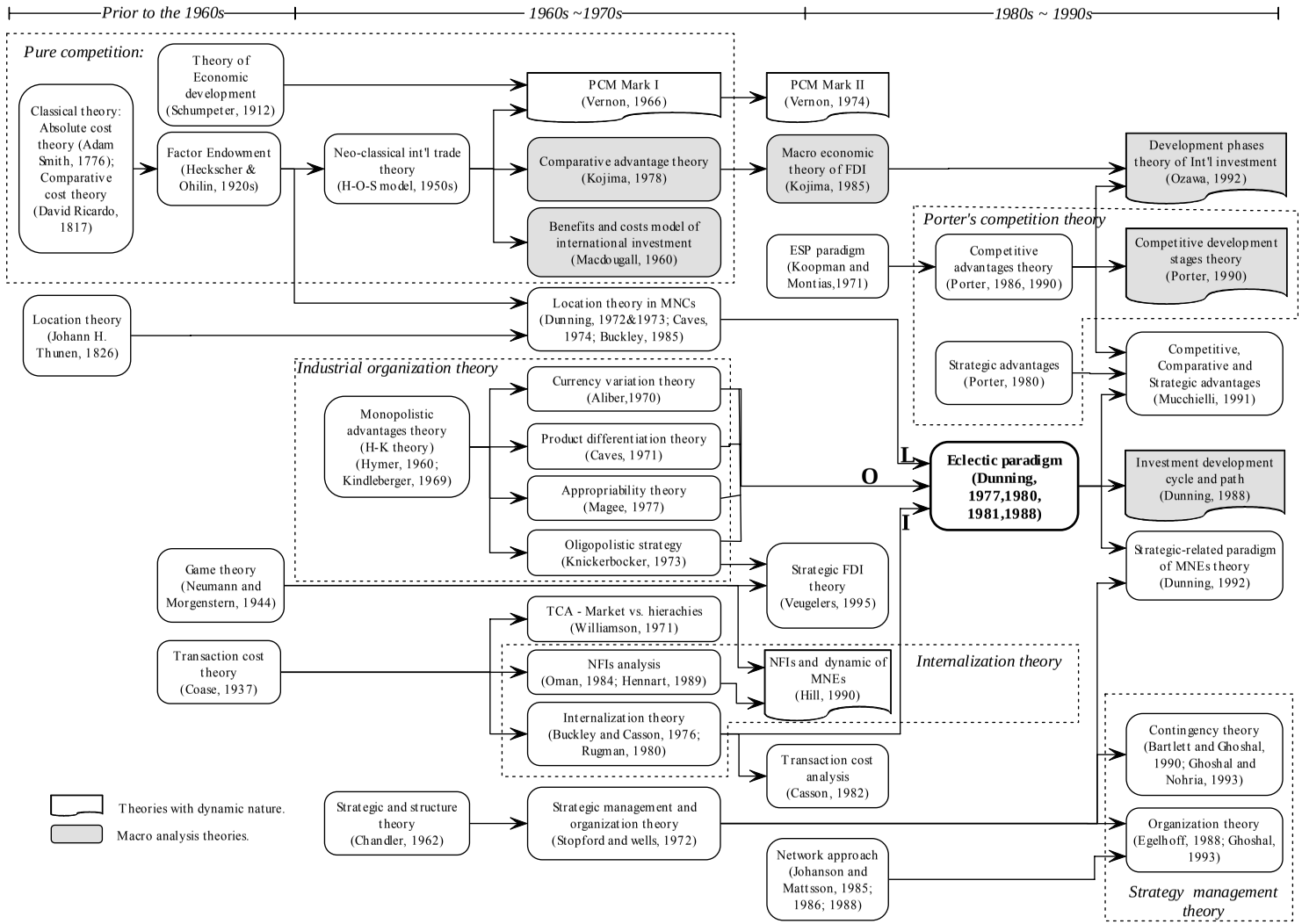

Figure 2.1 The evolution and relationship of economic theories in connection with MNCs
Source: The author

From Figure 2.1, one may find that Dunning's Eclectic Paradigm incorporates many important theories from the four major strands, and in fact, it has become an envelop for economic and business theories of international business activity (Dunning, 2000). The Eclectic Paradigm and a number of its applications are elaborated in Chapter 3.

There are different ways to classify the theories of internationalization and MNCs, such as stages vs. contingency models, static vs. dynamic models, planning vs. action orientation (Sørensen, 1997) and micro vs. macro models. In view of the complexity in the received international business and MNCs theories, two general classifications are widely used in literatures, namely from a static or a dynamic perspective, and with micro-economic or macro-economic approach. A static perspective may imply that the theories provide a snap-shot of the business situation. Most of the contingency models of firm's internationalization are of static approaches. The contingency models state that the internationalization of a MNC is contingent to or dependent on environment, including exogenous and endogenous factors. These factors may be market or demand conditions, industrial structure, locational factors, government policies, and others. No generalized pattern for internationalization of MNC is to be expected. Presently, contingency models, together with stages models, of internationalization are generally regarded as the mainstream thinking in international business economics, and these include: various components in industrial organization theories, internalization theory, transaction cost theory, Porter's competitive advantages theory and Dunning's eclectic paradigm.

In contrast to the static models, dynamic models imply the adding of a time dimension, and the internationalization is analyzed at different points of time. Vernon's (1966;

1974) product cycle models are the outstanding ones in this category, and other theories include: Kojima's (1978) comparative advantages theory, Ozawa's (1992) development phases theory of international investment, Porter's (1990) competitive development stages theory and Dunning's (1988) investment development paths theory. These dynamic models are of macro-economic approach in nature, and they sometimes are also referred to as comparative static approaches in some literatures. In addition, there is another strand of dynamic models. A dynamic perspective of internationalization theory may also imply that it is not time as such which is of interest but the dynamic processes (Sørensen, 1997), e.g. the interaction of business players, which gradually leads the company to internationalization. Uppsala Internationalization Model (U-M) and the Network Approach of Internationalization are two examples. Another is the inward - outward connection in internationalization, which is especially meaningful for the analysis of internationalization process in developing countries.

This chapter is structured according to the static and dynamic perspectives, and the theories with macro-economic approaches are also reviewed:

- Static and contingency models of FDI and MNC activity
- Dynamic approaches of internationalization and MNC activity
- Macro-economic approaches to MNC theories

2.2 Static and contingency models of FDI and MNC activities

In this section, the industrial organization theories, location theory, internalization theory, transaction cost theory, Porter's competitive advantages theory and Dunning's eclectic paradigm are reviewed.

2.2.1 Industrial organization theories

Monopolistic advantage theory

A significant contribution in the past century for MNCs theories was the works of Stephen Hymer (1960), who proposed the monopolistic advantages to explain the foreign direct investment (FDI) of American firms. Together with Charles P. Kindleberger, Hymer established the monopolistic advantage theory for FDI, which is also called H-K theory (Hymer, 1960; Kindleberger, 1973).

Hymer's monopolistic advantage theory was the extension of industrial organization theory in international production. Hymer expressed his dissatisfaction with the traditional international trade theories including the theory of indirect or portfolio capital transfers to explain the foreign value added activities of firms. This is because the pure competitive market does not exist in real life, and the market imperfections alerted the behavioral parameters affecting the conduct and performance of firms and therefore the strategy in servicing foreign markets. In seeking the explanation of MNCs' operation in the imperfect market, Hymer argued that such firms had to possess some kind of proprietary or monopolistic advantages. By utilizing such advantages available to the MNCs, the enterprises can not only vault the barriers to entering a foreign market, but also erect barriers against indigenous producers and other MNCs to form an oligopolistic or monopolistic market in that country.

The monopolistic advantage theory includes five major contents. (i). The analysis premise was set in the imperfect market competition. Under the imperfect market

competition, there were price competition and non-price competition, and the monopolistic advantages were the consequence of such imperfect market competition. (ii). The monopolistic advantages of firms were fostered from four status of imperfect market: the internal and external economics of scale, including vertical and integration advantages; the imperfect competition of goods market, including product differentiation, special marketing skills and administrated pricing; the imperfect competition caused by production factors, including access to patented or proprietary knowledge, discrimination in access to capital and human skills such as the managerial skills; the imperfect competition caused by the government intervention including the taxation policy and the restrictions of product output or market entry. (iii). The currency variation cannot explain the FDI completely. Hymer emphasized the difference between the FDI and equity investment, which is the controlling power of the MNC on its foreign enterprises. Kindleberger pointed out that the equity investment resulted from the interest variations while the FDI from the profit variation. (iv). FDI was related with the monopolistic industrial structure. This was demonstrated by the concentration degree of the industrial sectors which were involved with MNCs. (v). The ownership advantages of firms include three categories: the knowledge capitals, the advantages from imperfect product market, and the advantages in internal and external economics of scale.

The fundamental basis of monopolistic advantage theory relies on the monopolistic advantages the firms owned and therefore could be utilized for competition in foreign markets. Hymer concluded that the prerequisite of internationalization of firms was the ownership advantage of firms. This idea had influenced much to the following studies on MNCs. Many followers had attempted to refine and test the theory, such as the

product differentiation theory (Caves, 1971), the appropriability theory (Magee, 1977), the oligopolistic strategy of firms (Knickerbock, 1973), and the more comprehensive eclectic paradigm (Dunning, 1977, 1980, 1981, 1988). Scholars followed the frameworks of industrial organization analysis, i.e. the market structure to the behavior of firms to the effects and consequences of such behaviors, to study the source of monopolistic advantages of firms and therefore significantly enriched the theories.

Currency variation theory

Aliber's (1970) currency variation theory of MNCs is in line with the monopolistic advantages theory in the sense that the advantage MNCs possess over host country competitors arose from the currency variation. The statement in this theory is that the MNC will come from highly stable, low currency premium countries, and could realize an immediate profit from takeover of a less stable currency denominated asset in the host countries. This explanatory model of MNCs' FDI based on the failure of international financial and currency markets to perform efficiently. The three major implications of the currency variation theory are as follows: (i). MNCs' FDI is originated from the country with high capitalization rates and flows to the countries with lower capitalization rates. (ii). The FDI concentrates in the economic sectors with high capital expenditures in the operation of MNCs, and therefore these MNCs will be prevalent in these capital intensive sectors. (iii). The MNCs own the advantages from the currency variation over the indigenous competitors only, and not over other firms from the same original country.

Aliber's currency variation theory explains the reason of FDI based on the comparison of benefits gained from investment in domestic and foreign countries, and this approach

better facilitates the FDI movement from the US to Europe in the 1950s and the 1960s. It had to be found that this movement was certainly related to the stability and high value of US dollar during the period. But during the second half of the 1960s, the domestic revenue of US MNCs was higher than their international revenues while the FDI of these firms was still increasing in Europe. This phenomenon could not be explained by Aliber's theory. The limitation of currency variation theory is that currency variation is just one of the many aspects influencing FDI, therefore the application of this theory is very limited. For example, it cannot explain the cross investment between American and European MNCs which consisted of the main stream of the FDI in the post-war period.

Product differentiation theory

Caves (1971) explained the monopolistic advantages of MNCs from the concept of differentiated product, and therefore his theory was known as the product differentiation theory. Caves argued that the MNCs may gain the advantages over others either by differentiating the same product across different regions which was the firms' horizontal extension, or by differentiating a wide range of products to the tastes of one region which was the firms' vertical extension, or by a combination of the two which was the firms' conglomerate diversification. Caves argued that the MNC with high product differentiation would normally adopt the horizontal extension in its internationalization, whereas the MNC with lower product differentiation will pursue the vertical extension. He also pointed out that the product differentiation was not the only factor influencing FDI. He examined three potential advantages of MNCs when he analyzed the FDI of Canadian and British manufacturing sectors, and these are (i). The

ownership of intangible assets such as the product differentiation; (ii). The economics of scale and technical advantages of the multi-factory firms over the uni-factory firms such as the marketing and R&D advantages; (iii). The entrepreneurship in MNCs which was not sufficiently exploited.

Appropriability theory

Both Magee (1977) and Johnson (1970) emphasized the appropriability of corporate behavior and technological know-how ability as parts of MNCs' ownership advantages. Magee's argument is primarily that the more sophisticated the technological know-how, the more monopolistic advantages the firms possess and therefore the MNC may appropriate the maximum rents to itself. Hence, the MNC with the engagement in technical developments, marketing and managerial skills to a significant degree may undertake internationalized production in the form of FDI. Johnson argued that the development of technical know-how required resources input, but the know-how became a public product once it was created. Hence, a kind of protection was necessary to encourage the development of technical know-how. Although the patent protection was such kind of mechanism, the more effective protection was monopolization (Johnson, 1977). MNCs' subsidiaries in foreign countries may obtain such appropriability with relatively less cost than the indigenous firms, therefore to protect its appropriability, the MNCs may engage in FDI. The more technology contents the MNCs own, the more they transfer such appropriability to their foreign subsidiaries through FDI, so as to ensure their monopolization on the technology.

Hirsch (1976) identified that the firm-specific know-how and intangible proprietary assets may provide direct influence on the internationalization of MNCs. These technological know-how and assets are the results of long term research & development and marketing in the MNCs, and therefore relevant ownerships may protect the MNCs in competing with other firms.

Oligopolistic strategy theory

The oligopolistic strategy theory as put forward by Knickerbocker (1973) explained the "Follow the leader" policy or the so-called "Bandwagon Effect" in the cross investment between the MNCs in developed countries during the post-war period. In an oligopolistic monopolizing market, oligopolistic firms will venture into the foreign market following each other as a competing strategy. On one hand, this is because of the high expected profit in the foreign market; and on the other hand, this is to protect the balance in competition for the competing position of the MNC, which is otherwise difficult to be concreted in the location. Kindleberger also pointed out that, the Bandwagon effect is one of the oligopolistic actions of MNCs, since a strong correlation between the bandwagon effect and the index of stability and cohesion of the national market was found.

Graham (1974; 1978) suggests that the entry of a foreign firm into a stable oligopolistic national market may cause retaliatory entry by the host country oligopolistic firms to the foreign entrant's home market to dissuade entry or set the grounds for collusive bargaining. This is generally called "Exchange of Treat Hypothesis" (Kindleberger, 1973)

It is difficult to formulate the theoretical foundation of Bandwagon Effect using traditional economic theories. Veugelers (1995) sets up a game-theoretic model to analyze the MNCs' strategic considerations and motivations of FDI, and thereby the Bandwagon Effect in internationalization is better explained and facilitated in line with economic theories (see section 2.3.4).

2.2.2 Location theory

Location theory can be dated back as early as before industrialization in the first half of the nineteen century, when Johann H. Thunen created the presently so-called "Von Thünen model" of agricultural land use (Andreae, 1981). This model is still widely used in agricultural and geographical economic studies. The model on which location theory was applied in internationalization and MNCs is directly derived from Hecksher-Olin (H-O)'s factor endowment theory (Almor & Hirsch, 1995; Buckley & Dunning, 1976), which had a strong connection with Ricardo's (1817) comparative cost theory.

The Hecksher-Olin (H-O) theorem explains a country's trade in terms of the endowment of production factors. Countries would specialize in the production of goods which required relatively large inputs of resources with which they were comparatively well endowed, and would export these in exchange for goods with which they were relatively less endowed. The assumptions in this theory are made as: two countries, two homogeneous inputs (labor and capital), factor immobility, identical technology and tastes, perfect competition for factors and markets, identical production function, no trade barriers, and no transport costs. The H-O model has been criticized as

unrealistic and too simple in its assumptions. Three issues were questioned. Firstly the famous "Leontief Paradox" (Leontief, 1956) suggests that US exports have been more labor intensive than its import although US has been well endowed with capital. Secondly, the large part of actual internationalization occurred between countries with relatively similar factor endowments. Thirdly, the intra-industry trading is increasing.

It is obvious that the H-O model needs to be improved to cater for the more complicated issues in internationalization. In fact, based on the concepts in H-O model and Von Thunen model, scholars have done many empirical studies towards location theory in international business using econometrics methods. Dunning (1972;1973), Caves (1974), Buckley (1985) incorporate the location factors into the MNCs theory in their theoretical and empirical studies, and therefore the location factors became one of the major aspects in MNCs theories. Buckley (1985) identified three major locational factors in MNCs' internationalization, i.e. (i) raw materials which may lead to vertical FDI; (ii) cheap labor which may lead to offshore production facilities; (iii) protected or fragmented markets which may lead to FDI as the preferred means of market servicing. Locational factors in MNCs' internationalization will be further analyzed in Chapter 4.

2.2.3 Internalization theory

The internalization theory has been a major content of internationalization and MNC studies (e.g. Buckley and Casson, 1976; 1985; Rugman, 1981; Dunning, 1993; 2000; Hennart, 1982). It is either an independent explanatory mechanism in MNCs theory or a key strand in Dunning's Eclectic Paradigm (Dunning, 1988). Scholars premise the internalization theory with the non-perfect competitive and with monopolistic

competitive advantages of firms. Internalization theory, together with Williamson's (1971) market vs. hierarchies and TCA analysis, is a departure from the complete set of perfect competitive markets of classic economic theory.

Internalization was originated from the transaction cost concept proposed by Coase (1937). Williamson (1975) enriched and developed the concept into a comprehensive transaction cost theory. Meanwhile, internalization theory was created to explain the underpinning mechanism of cross-border transaction of MNC as to why the MNCs are driven to internationalize themselves by hierarchies rather than determined by market factors.

Rugman (1981: 28) defines internalization as "the process of making a market within the firm". In order to be able to realize abroad the potential additional value of employing the intangible assets held by the firm, it must internalize the market, as intangible assets based on proprietary information cannot be exchanged at arms length. The internalization of a market can be accomplished by engaging in international direct investment. MNCs are likely to engage in FDI whenever they perceive that the net benefit of their joint ownership of domestic and foreign business activities and the cross-border transaction arising from them are likely to exceed those offered by external trading approaches (Dunning, 1993). The core prediction in internalization theory is that, MNCs activity is positively related to the costs of organizing cross-border markets in intermediate product within a particular distribution of factor endowments. The theory seeks to identify the situations in which the markets for intermediate products are likely to be internalized and hence the MNCs may own and control the business activities

within their firms' boundaries. The underpinning mechanism of the theory relies on the relative costs and benefits of the internalized form and the externalized transaction.

The basic reason of firms' internalization according to Dunning (1995) is the existence of imperfect markets. Market imperfections may be structural as well as cognitive. Uncertainty over future markets forms a cognitive reason and government policies form a structural variable. In summary, reasons for internalizing activities within the MNC are at least the following:

- Both to generate innovations and ideas and to retain exclusive right to their use (inside the control of the firm) (Dunning 1995);
- The desire to minimize risk and/or cost of fluctuating exchange rates; to cushion the adverse effects of government legislation or policy, for example in respect to dividend remittances; to be able to take advantage of differential interest rates and "leads" and "lags" in intra-group payments (Rugman 1980);
- To avoid intervention from public policy makers in the allocation of resources "It can be concluded, therefore, that the ownership advantages of firms stem from their exclusive possession and use of certain kind of assets. Very often firms acquire these rights by internalizing those previously distributed by the market or public fiat, or by not externalizing those which they originate themselves" (Dunning, 1995).

Following up the internalization theory, Buckley and Casson (1976) suggests four major categories of factors which influence the internalization of MNCs:

- Industry specific factors, relating to the nature of the product and the structure of the external market;

- Region specific factors, determining the transaction cost relating to the geographical and social characteristics of the regions linked by market;
- Country specific factors, relating to the influence of political, legal, and economic policies between the linked countries;
- Firm specific factors, relating to the influences to the transaction arising from the organizational and managerial abilities of the firm.

In internalization theory, a major issue is to identify the timing of FDI and the choice of exporting, FDI and licensing as methods to internalize into foreign market. Rugman (1982) presents a model to illustrate this process.

- Export if: $C + M^* < C^* + A^*$ and $C + M^* < C^* + D^*$
- FDI if: $C^* + A^* < C + M^*$ and $C^* + A^* < C^* + D^*$
- Licensing if: $C^* + D^* < C^* + A^*$ and $C^* + D^* < C + M^*$

Where:

C Normal costs of producing good in the home country;

C* Normal costs of producing good in the foreign country;

M Additional marketing costs associated with importing (such as tariff);

M* Export marketing costs including insurance, transport and tariffs;

A* Additional costs to foreign firms operating in the foreign country;

D* Knowledge dissipation cost associated with the risk of compromising the firm specific advantages once a license is granted.

The different variables include different factors in internalization. Similarly, the choice of serving the home market by MNC is described as follows:

- Production at home if:

$$C < C^* + M + A^* \text{ and } C < C^* + M + D^*$$

- Offshore assembly production for import if:

$$C^* + M + A^* < C \text{ and } C^* + M + A^* < C^* + M + D^*$$

- Trading licensee allow production by a license if:

$$C^* + M + D^* < C^* + M + A^* \text{ and } C^* + M + D^* < C$$

Buckley and Casson (1981; 1996) proposed similar but simpler models to determine the likelihood of happenings of FDI, licensing and exporting in international business, and they added international joint venture into their original model in 1996 to form a comprehensive model about international business and MNCs.

In addition to the Buckley and Casson (1981) model, Buckley and Casson (1996) includes international joint venture (IJV) to their new model (Figure 2.2), while exporting is included in this new model as a component of all three strategies, and so does not need to be treated separately as in the 1981's model.

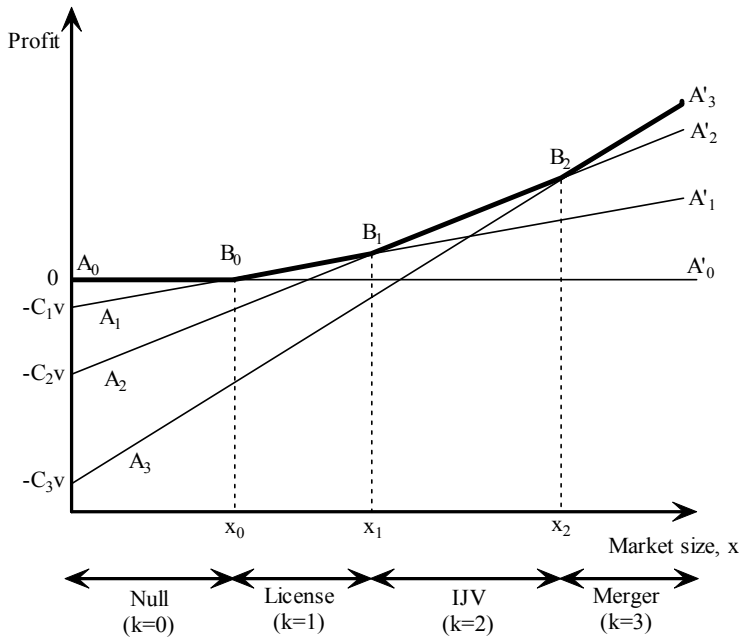

Figure 2.2 Buckley and Casson's new internalization model
Source: Buckley and Casson (1996)

The model as shown in Figure 2.2 measures profit vertically and market size horizontally. The zero profit axis is A0A0', corresponding to the null strategy; the bottom line is used purely to clarify the labelling of the figure in terms of different internalization choices. The variation of profitability with market size under licensing is indicated by the line A1A1'; since licensing affords low setup costs, but no internalization benefits, the intercept is only slightly below that of A0A0', whilst the slope is fairly modest. The situation under an IJV is indicated by A2A2', the intercept is lower, because the setup costs are higher, but the slope is steeper because internalization benefits are available. Finally the line A3A3' shows the situation under merger; the intercept is very low because the setup costs are very high, but the slope is the steepest of all because the full benefit of internalization is being obtained. The envelope A0B0B1B2A3', indicated by the heavy line, indicates the maximum profit generated at each market size. The corresponding internalization strategy can be read off along the horizontal axis.

The figure shows that no one strategy is dominated by the others, instead, there is a steady progression of internalization strategies for MNCs - as market size increases, from no collaboration, to licensing, to an IJV and finally to a merger. This is because as the size of the market grows the setup costs of internalization, which are fixed costs independent of market size, can be spread more thinly and so greater investment in internalization becomes worthwhile. The size of the market governs the benefits of internalization, and Buckley and Casson term the factor v which governs costs as the volatility factor. Volatility factor reflects the impact of both the pace of technological progress and the cost of capital. Buckley and Casson also explain the instability of IJV in this model. Compared to a merger, the advantage of an IJV relies on the ability to

partners for technology transferring. It is intrinsic to an IJV that it may not last for longer than a merger would. Otherwise, it would suggest that MNC had made a strategic error as a merger would have been better instead. In fact, many IJVs in developing countries leading to a subsequent merger confirms Buckley and Casson's view. It also confirms the recent phenomenon that short-lived IJVs are not necessarily a failure in many MNCs.

Therefore, Buckley and Casson's new model explains the new development in internationalization of MNCs' activities, and provides more comprehensive theoretical groundings for internalization.

2.2.4 Transaction cost analysis (TCA)

Both the transaction cost analysis and internalization theory are similarly originated from Coase's works (1937). However, internalization theory was developed with the focus on the analysis of MNCs' internationalization, while transaction cost theory was established as one of the fundamental elements of organization theory by Williamson (1975). Transaction costs are the costs of administering an exchange relationship, which may include the costs of negotiating, drafting, and monitoring contracts; the costs of settling disputes and enforcing settlements, and the opportunity costs associated with administering a contract inefficiently until a new agreement is recognized as necessary and then reached (Williamson, 1975). Although the transaction cost theory does not explicitly deal with the internationalization of firms, there is an increasing trend to use this theory in MNCs studies. Internalization theory explains the underpinning mechanism of and how the cross-border transactions of MNC are exercised, i.e. the timing and options of different internalizing strategies. In contrast, transaction cost

theory is fundamentally based on two human factors (bounded rationality and opportunism) and two environmental factors (uncertainty and industry structure). Given specific configurations of the four factors, a company will opt for the internalization solution, i.e. the activity will be part of the hierarchical governance structure (Williamson, 1975; 1979; 1993). The central issues in TCA theory are to identify the appropriate limits of the firm and understanding inefficient managerial activity. Williamson's theory is often called 'Markets and Hierarchies approach', and transaction cost theory is also referred to as transaction cost economy (TCE) or transaction cost analysis (TCA) in literatures.

Market and hierarchies approach takes the individual economic exchange or the transaction as the basic unit of analysis, and as a methodology, it considers different institutions for administering exchange relations or governance structures, and determines what characteristics make transactions better in one governance structure rather than in another. Because all kinds of governance structure have limitations and costs, the analysis may be comparative which means given a choice between structures, compare and choose the better one. In original version of TCA (Williamson, 1975), the choices were drawn between the free markets and hierarchical firms, leaving for the intermediate forms of organization such as joint ventures and strategic alliances. Later on, the intermediate forms including the contract approach of organizations are taken into account (Williamson, 1993).

The transaction cost theory stipulates the conditions under which a company will or should choose to use the market, e.g. an agent or importer, or when it will or should

integrate the activities into the company by, for example, establishing a production subsidiary abroad. The theory stipulates that:

If:

1. Uncertainty about outcomes prevails, e.g. as to the size/stability of demand;
2. Transactions, i.e. buying/selling, recur frequently, and
3. The transactions require substantial transaction specific investments in, such as special production equipment,

Then:

The economic activity will be internalized, i.e. carried out by the company itself rather than transacted using the markets.

The reasons for this behavior are that companies and their managers are characterized by bounded rationality and they may have opportunistic inclinations. To overcome the bounded rationality and the potential opportunism, companies decide to produce the products in-house rather than buy them from the market. In-house, managers are in control and it is possible to practice incremental decision making, e.g. breaking a large investment decision into smaller ones. Related to exports, the three conditions are often fulfilled: the outcome of going and being international is uncertain; In many cases, transactions are repeated, and, often, the exporter must adapt to specific market conditions and thus make market or transaction specific investments. However, the financial requirements, pursuing the internalization strategy, are often comprehensive forcing the companies to adopt a strategy using the market, e.g. using agents or importers, instead of establishing foreign subsidiaries.

Another development on the transaction cost approach regarding MNCs' activities is Hennart (1989), where the so-called "new forms of investment" (NFIs) including various contractual arrangements in international business are identified and explained based on transaction cost theory.

2.2.5 Competitive advantages theory

Michael Porter's competitive advantages theory, as set out in Porter (1990), states that the competitive advantages of firms located in a particular country are determined by certain attributes which are unique to that country. Four attributes are identified:

- The nature resources, and created capabilities, especially human and innovatory capital, and the wealth facilitating infrastructure of a country;
- The level, variation, composition and quality of output demanded by domestic consumers;
- The presence of 'clusters' of suppliers or supporting industries;
- The extent and pattern of inter-firm rivalry and the effect that has on the innovatory and competitive strategies of domestic firms.

Surrounding and interacting with these four attributes is the role of national governments and that of chance. Each of these advantages is, to some extent, interdependent. Although the relative significances of each likely vary between countries and between particular industries or segments of industries, they will be fully effective only when they are systemically organized.

Porter also proposed a similar model in determining factors of national advantage. This model has become known as Porters Diamond. It suggests that the national home base of an organization plays an important role in shaping the extent to which it is likely to achieve advantage on a global scale. This home base provides basic factors, which support or hinder organizations from building advantages in global competition. Porter distinguishes four determinants: (i) factor conditions, the situation in a country regarding production factors, like skilled labor, infrastructure, etc., which are relevant for competition in particular industries; (ii) home demand conditions, describes the state of home demand for products and services produced in a country; (iii) related and supporting industries, the existence or non-existence of internationally competitive supplying industries and supporting industries; (iv) firm strategy, structure, and rivalry, the conditions in a country that determine how companies are established, are organized and are managed, and that determine the characteristics of domestic competition.

Since its inception, Michael Porter's competitive advantages theory and the Diamond model have yielded much influence (Flanagan, et al, 2003; Nicholas, 1996). The contribution is a significant one. However, Porter's theory was not used as the theoretical framework in this study because of its historical background, theoretical basis, limitation in application and the nature of China's economy.

In fact, Porter's theory was based on the economic situation in the eighties. This period was characterized by strong competition, cyclical developments and relatively stable market structures. Porter's model focuses on the analysis of the actual situation (customers, suppliers, competitors, etc) and on predictable developments (new entrants, substitutes, etc) (Dagmar, 2001). In the model, competitive advantages were seen to

develop from strengthening an organization's own position within the five forces in the diamond. Therefore, the model becomes weak when explaining or analyzing current dynamic changes that have the power to transform whole economies and industries. This is especially true in the context of China where dramatic changes are taking place in terms of its economic system and industry structure. In addition, digitalization, globalization and deregulation have become powerful forces in recent years. Yet it would appear that Porter's model rarely takes these into consideration.

The core of Porter's theory is competitiveness. Competitiveness is one of the central preoccupations of government and industry in every nation. The nature of competition is embodied in the five competitive forces as described earlier (Porter, 1990). However, the question is what competitiveness entails. Given the wide-ranging nature of the concept, it is not surprising to find that there is no unique definition of competitiveness. The 1985 report of the President's Commission on Industrial Competitiveness states that competitiveness is the degree to which a nation can, under free and fair market conditions, produce goods and services that meet the test of international markets while simultaneously maintaining or expanding the real incomes of its citizens (Young Commission, 1985). Likewise, the Organization for Economic Co-operation and Development's (OECD) definition of competitiveness is that it is the degree to which a country can, under free and fair market conditions, produce goods and services which meet the tests of international markets while simultaneously maintaining and expanding the real incomes of its people over the longer term (OECD, 1997). Despite other definitions of competitiveness (Scott and Lodge, 1985; Storper, 1995; European Commission, 1994), one of the key considerations of the studies on competitiveness is that it is conducted under the circumstance of a free market.

However, this is not the case in China. China's economy is in transition from a centrally planned economy to a market economy. This may not necessarily mean that Porter's competitive advantages theory is totally invalid in China, but that the theory may not effectively and efficiently explain the situation in China. Similar arguments can be found in Nicholas (1996) who noted that Porter's arguments are formed almost entirely with reference to developed countries, and that all his assumptions are therefore specific to the West.

In terms of application, Porter's competitive advantages theory also has some limitations. Firstly, the "diamond" factors form a system, that is, a set of inter-dependent parts that together form a unitary whole so that weaknesses in one part of the system can undermine the whole (Nicholas, 1996). There are, in addition, synergies from the clustering of suppliers, buyers and rivals in the home country, mainly in promoting efficiency, specialization and innovation. These inter-dependencies cannot be denied; otherwise the conclusions drawn from the application of the theory may not be convincing and successful. Secondly, Porter's model does not cope with synergies and interdependencies within the portfolios of large corporations. This is particularly a problem when analyzing the operations of modern multinational corporations. Thirdly, there seems to be an important part in Porter's model which is missing (Franke et al., 1991; van den Bosch and van Prooijen, 1992 and Nicholas, 1996), which is the difference in cultural values. The cultural values are ultimate determinants of human organizations and behavior, and thus of economic growth. Fourthly, the influence of politics is not emphasized properly in Porter's model. In particular, the bureaucracy has traditionally been looked to in developing countries as a means of employment. It is not only a major cost for the government; it also becomes a major cost for business through

the high taxes needed to finance it, the corrupt levies it enforces, the favoritism it accords and the myriad rules it inflicts (Nicholas, 1996). Last, but not least, the cooperation between firms was not properly positioned in Porter's model. Cooperation, rather than competition alone, has become an issue that has increasingly drawn attention from industries. This is especially so in developing countries such as China where cooperation and competition with foreign competitors always co-exist, and how best to synergize their resources during the dynamic process of cooperation and competition has become an important issue.

Porter's model does not appear to have the influence it used to have any more. New economic situations developed and other drivers started to transform markets. Nevertheless, this does not mean that Porter's theory has become invalid. The "diamond" factors may be used as a part of a larger framework of theories. Therefore, the generality and flexibility of Dunning's Eclectic Paradigm is perceived to be a better theoretical framework to meet the needs of this study. The justification for using the Eclectic Paradigm is elaborated in the following sections.

2.2.6 Eclectic Paradigm

The eclectic paradigm, developed by Dunning (1977, 1980, 1981, 1988, 2000), provides an envelope to encompass most of the factors identified in the other theories into three categories: ownership advantages, locational advantages and internalization advantages. The three variables in the eclectic paradigm, i.e. ownership advantages (O-advantages), location advantages (L-advantages) and internalization advantages (I-advantages) are derived from and therefore incorporated with many other theories in MNCs and

internationalization studies. The O-advantages may be reflected as the monopolistic advantages in H-K theory, the product differentiation advantages as in Caves (1971), the oligopolistic strategy as identified by Knickerbocker (1973) and others. The concept of L-advantages may be traced back from the neo-classical international trade theory (H-O-S model) to the factor endowment (H-O model), Ricardo's comparative cost theory and the traditional Thunmen's location theory (refer to previous sections). The I-advantages are explicitly taken from the internalization theory, as well as the concept in transaction cost theory. As the respective theories enveloped in eclectic paradigm are further developed, more tenets are incorporated into the eclectic paradigm. Strategic-related paradigm of MNCs theory (Dunning, 1992) draws attention to the strategic advantages which becomes an important research area during the past decade. Detailed reviews on the eclectic paradigm are in Chapter 3.

2.3 Dynamic approaches of internationalization and MNC activity

The dynamic approaches of internationalization and MNCs theory are important in three folds. Firstly, in terms of micro-economic perspective, the static and contingency models as elaborated in section 2.2 reveal the underpinning mechanism and the conditions under which the decisions are made for MNCs activities. But they are weak to explain the phenomenon on a developmental perspective. Taking the time dimension, the dynamic approaches of internationalization of MNCs analyze the phenomenon with the distinction of the initial act and sequential development. Therefore a wider picture may be revealed. Secondly, the static models do not take the interaction of different business players into account. In the increasing networking of current international business environment, taking into consideration the dynamic effect between players

becomes important. Thirdly, departing from the individual activities of MNCs' internationalization, the overall trends and the macro-economic perspective of MNCs' cross border transactions may react to the individual firms' business strategies. The internationalization issues among the respective industry may also be addressed. The macro-economic approaches become important in the studies of internationalization and MNCs.

The dynamic approaches of internationalization and MNCs theories may be reviewed in three groups: (i) analysis on time dimension with focus of micro-economic perspective, such as learning stages model and the Product Cycle Models (PCM Mark I and PCM Mark II); (ii) analysis based on a dynamic process, such as Uppsala internationalization model (U-M) and the network approach of internationalization, and the inward – outward connection in internationalization; (iii) analysis on time dimension with focus of macro-economic perspective, such as Kojima's (1978) comparative advantages theory, Ozawa's (1992) development phases theory of international investment, Porter's (1990) competitive development stages theory and Dunning's (1988) investment development paths theory.

2.3.1 Learning stages models

In terms of dynamic approaches of internationalization, learning stages' models are still the dominating theories. This group of theories views the internationalization of a company as a sequential and orderly process, where the shift from one to the next stage is based on the learning and accumulation of experience within the previous stage. The most influential theories of learning stages' models include Jaohnaon and Wiedersheim

– Paul (1975), Biley and Tesar (1977), Cavusgil (1980) and Czinkoda (1982) among others (Figure 2.3).

The different versions of the theory of learning stages of internationalization focus on different aspects, and emphasize different major factors. Johanson and Wiedersheim-Paul (1975) focuses on the market entry and development mode of firms to internationalize, and points to a gradual process occurring in stages, rather than spectacular investment activities. Actually, Johanson and Wiedersheim-Paul's (1975) learning stages model is a part of the Uppsala internationalization model (see section 2.3.3), while this learning stage version identifies the internationalization of MNCs in four stages: from no regular export activities to export via overseas agents, establishment of an overseas sales subsidiaries and finally the overseas production manufacturing.

Johanson and Wiedersheim-Paul's works influenced subsequent studies in the area. Bilkey and Tesar (1977) focuses on the market selection of the internationalization of firms with six stages. The concept of psychological closeness of one market to another was proven to be an important issue in internationalization. Bilkey and Tesar's model was further refined by Cavusgil (1980). Cavusgil (1980) incorporated the internal company factors into the explanation of internationalization process. The internal company factors include inhibiting firm characteristics, attitudinal barriers, internal managerial aspirations, willingness to commit resources and others. All these factors may be grouped into four, i.e. (i) expectations of management; (ii) level of commitment; (iii) differential advantages to the firm; (iv) managerial aspirations. The identification of these four groups of factors was included into many later studies in MNCs'

internationalization. Czinkota's six-stage model (Czinkota, 1982) overlaps with the previous models, but emphasizes the experimentation aspect and the differences induced by the company size.

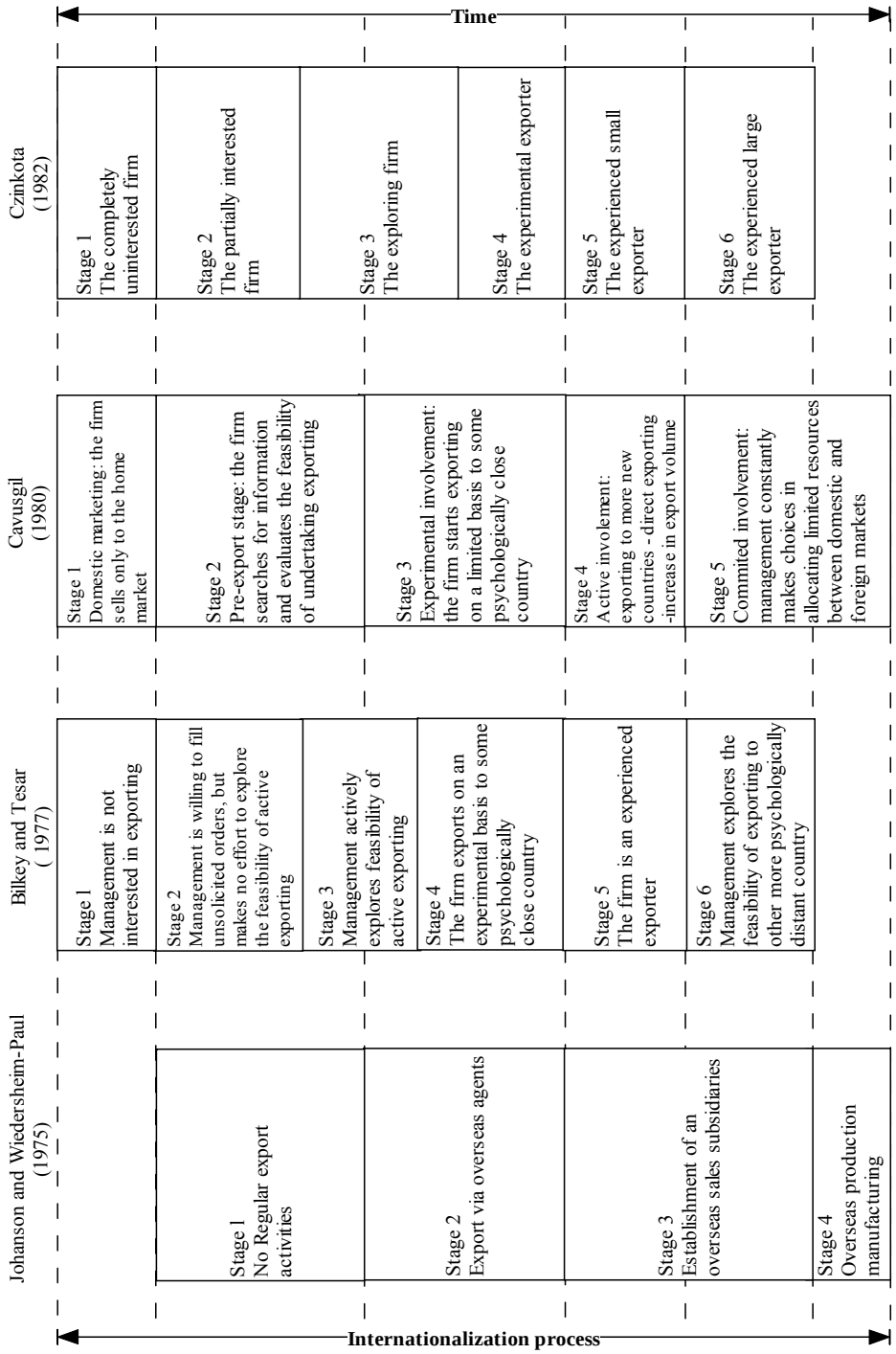

Figure 2.3 Learning stages models of internationalization
Source: Jaohnaon and Wiedersheim – Paul (1975), Biley and Tesar (1977), Cavusgil (1980), Czinkoda (1982), and Czinkota and Ronkainen (1998)

A major concern regarding to the learning stages models is that these theories ignore the context in which the internationalization takes place, or they assume the

internationalization of a firm is context free, i.e. the same pattern is expected across different contexts and environments (Sorensen, 1997). This is absolutely not realistic in contrast with the static and contingency models shown in section 2.2.

The static and contingency models imply that the firm that intends to internationalize would make attempt to be differentiated from others and therefore to build up its *unique* competitive advantages or comparative advantages, as elaborated in the different industrial organization theories and competitive theory. However, the learning stages theories implied and generalized their *common* patterns during internationalization. This looks contradictive. Sorensen (1997) gives three explanations on this issue, and therefore enhances the understanding of static and dynamic approaches of internationalization. According to Sorensen (1997), at least three explanations can be provided:

- According to the rationale of the stages models, the internationalization is based on the laws and principles of learning, combined with risk taking. A company learns from its action and when it has acquired experience enough and reached an acceptable risk level, it is ready to take another step on the internationalization path. As all companies follow this rule of risk reduction through learning, a common internationalization pattern may emerge.
- Related to the first explanation, a general pattern may also be found because: (i) enterprises are managed by people who have acquired the same management philosophy and the same management tools; (ii) the enterprises may learn from each other and imitate the presently most successful companies. In these instances, a common pattern will emerge based on common world views and, in general, the emergence of a common business culture or system (Whitley, 1992a;

1992b). However, the experiences of internationalization of Japanese companies showed that this explanation of general patterns became inadequate.

- The structure of an industry may also facilitate a general pattern in internationalization. If industry structures comprise many companies with similar nature, and each of them may decide autonomously but influenced by their relations to other companies, a general pattern of development may emerge. This aspect may also connect with the networking theories such as the Uppsala model.

2.3.2 Product life cycle models: PLC Mark I &II

In contrast to the learning stages models, Vernon's (1966, 1974, 1977, 1979) product life cycle (PLC) models were based on the production process and the adaptation to changes in the environment. Vernon (1966) proposed his original version of PLC model known as PLC model Mark I. Following some criticisms, Vernon (1974) revised the model by encompass the oligopolistic behavior of MNCs, and PLC model Mark II was formed up. The PLC models were essentially the extension of the theory of economic development as in Schumpeter (1912) into internationalization studies.

Vernon's PLC model Mark I

The basic assumptions of the theory are that location of new products usually is started in some of the developed economies. The new product innovation and production goes through different stages of the product life cycle. In Vernon's international PLC model Mark I, a company's internationalization can be divided into three stages:

- New product stage: in the PLC, internationalization starts in advanced market economies, and the key factors driving the process is high income and the savings on labor costs. New products are developed and marketed primarily in the domestic market, but soon export on a small scale takes place to other advanced market economies;
- Maturing product stage: the internationalization goes further due to the growing markets, the increase in competition and the standardization of the products. This accompanies with the relocation of the production from the home country to the larger foreign markets. Depending on the production and transactions costs, the foreign market may now be served from the home base or from the new production base abroad;
- Standardized product stage: in this stage, production may be relocated to developing countries where the locational advantages can be utilized. The products may also be shipped back to the home country as well as to other country markets.

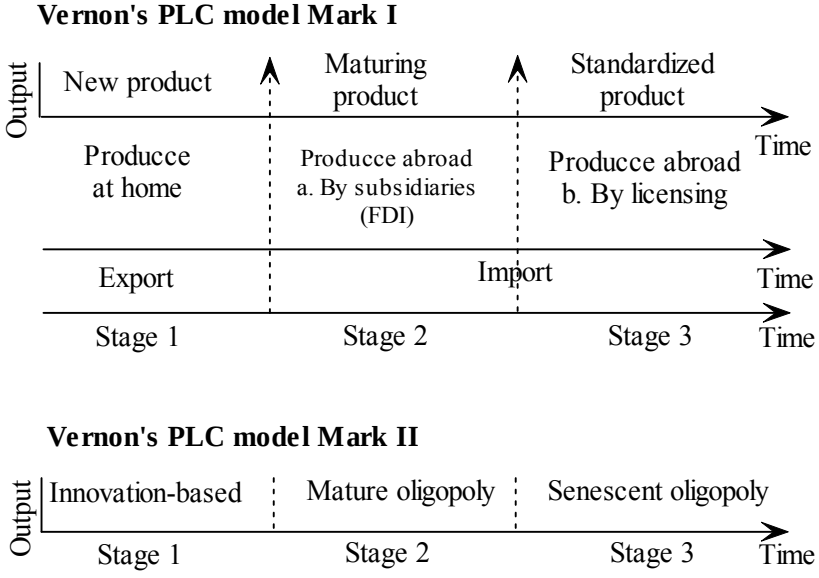

Figure 2.4 Vernon's PLC models: Mark I and II
Source: adapted from Vernon (1966, 1974, 1977, 1979)

Paliwoda (1993) points out the rationality of PLC's process as the influence of costs including production cost, factor cost, transaction cost and capital cost. For example, if the marginal cost of production, together with the freight costs of exporting from the USA, is lower than the average cost of prospective producers in the market of import, US producers will delay the foreign investment. If economies of scale are being fully exploited, the principal differences between any two locations are likely to be factor costs. Thus, the servicing of third markets may take place from the new location, and if labour costs offset the cost of freight, the servicing of the US market as well. Vernon does not find the rationality of PLC model in terms of the decision-making relating to lower cost locations abroad.

Vernon's PLC model Mark II

In PLC model Mark I, the notions of technological change and deregulation of markets were not taken into account. In addition, the behavioral dimensions does not have any decisive role to play. In view of the changing environment, Vernon revised his model Mark I and proposed PLC model Mark II in Vernon (1974, 1977, 1979). In PCM Mark II, the model was revised as the three stages of:

- Innovation-based oligopoly stage: in this stage, the crucial factor of product innovation is still the domestic market conditions. Due to the differences in economic conditions and social factors in different countries, the firm-specific advantages are different. The technological innovation is the major barrier of market entry for oligopolistic firms.
- Mature oligopoly stage: in this stage, the strategic decision of production is related to the reaction of other oligopolistic firms, the research and development,

the economy of scale in production and marketing. All these factors would become the barrier of market entry for the competitors. With the similar notion in Knickerbocker (1973)' "Bandwagon Effect", in this stage, the new strategies adopted by one MNC would influence others, and the existing balance in the market would be broken, and other MNCs would follow up.

- Senescent oligopoly: in the last stage, the economy of scale becomes weaker in terms of market barrier for oligopoly, although the oligopolistic MNCs made much effort to maintain their positions. The locational choices in this stage are mainly determined by cost and market factors, rather others.

Vernon then classifies MNCs into three types to explore their likely behavior in production cycle, namely: (i) the global scanner: the MNC with a powerful capacity for global scanning; (ii) the producers of standardized products for homogenous world demand; and (iii) the myopic innovation and home-oriented production while all decision-making are left to individual foreign producing subsidiaries.

The PLC models were the first dynamic interpretation of the determinants and relationship of international production. However, it does not address the rate of change of innovation or time lags, nor suggest the time frame and requirements of the occurrence of the different stages in the cycle. It also does not explain the exogenous factors of other firms' production on the standardization of the product.

2.3.3 Uppsala Internationalization Model (U-M)

In view of the increasing networking of international business, researchers from Uppsala University in Sweden have developed a model for internationalization of companies (Johanson and Vahlne 1975, 1977, 1990; Johanson and Mattsson, 1988), which is called Uppsala internationalization model (U-M). U-M proposed two basic propositions:

- The internationalization of firm is a developmental process;
- This process is reflected as a sequential form in which the firm gradually increases its commitment to foreign market.

In U-M, a company can internationalize in three ways:

- by extension, i.e. establish relations to actors/networks in new markets;
- by penetration, i.e. deepen relations in existing networks abroad, and
- by coordination, i.e. improve the relations between actors in different networks in different markets.

Depending on its position in the network, a company's internationalization may be considered in terms of (i) how international is the company compared to other actors, and (ii) what is the general degree of internationalization of the industry and market. Combining the two dimensions, a firm's internationalization appears with four different network positions:

- The early starter: The early starter has no links to actors abroad and must break new ground as no other companies in the industry have established such links. Only indirect links may exist, for example via the company's supplier or customers.

- The lonely international: The company in question has acquired international experience of its own but its competitors and customers, i.e. its network partners, are still mainly domestic oriented. By using the networks established as an early starter as well as the international experience acquired through that stage, the company might build new relations in new markets, i.e. build new relations, or penetrate deeper into present ones by building more and stronger ties to the present actors in the country.
- The later starter: Here the other companies comprising the industry have already established long term relations to actors abroad while the focal company has remained domestic oriented. The question is not to identify actors with an international orientation but the problem is to find actors who are "free", i.e. who have not already established long-term relations to actors abroad.
- The international among others: With all companies being international, the company can strengthen its position by building stronger ties to present actors or by coordinating the various links in the different countries.

In general, U-M considers the internationalization of a firm as a continual and gradual process; therefore the degree of internationalization of a firm can be reflected on the process. In particular, this internationalization process may be reflected in two aspects: (i) the geographical expansion of the firm's foreign market, i.e. local market –regional market – national market – overseas neighborhood market – global market; (ii) the evolution of managerial forms of internationalization, i.e. pure domestic business – export via overseas agents – direct export – establishment of overseas subsidiaries – overseas production.

In this approach, the “market knowledge” is introduced to explain the reason of the gradual process of internationalization, and the “psychic distance” is employed to analyze the sequence of the selection of market in a firm’s internationalization (Johanson and Vahlne, 1990). When the firm lacks market knowledge, it tends to involve in internationalization in least degree due to the instinct of avoiding risks; after some time of international working, the firm accumulates the experience in international market, the market knowledge the firm gained would become a new basis for the firm to deepen its internationalization, and therefore to push the firm to deploy more resources into the international market. According to U-M, when a firm faces different foreign market, the firm would choose the overseas market from where the psychic distance is near to where it is far.

2.3.4 Strategic management approach of internationalization

The strategic management was not incorporated into the theories of internationalization and MNCs until the 1990s. The traditional notions of internationalization and MNCs theories were based on the imperfect market and firm and/or country-specific advantages. Till the 1990s, the changing international business environment forced MNCs to adjust their cross-border business activities in a very dynamic status. The increasing emergence of merger and acquisition (M&A), strategic alliance, contracting arrangement and networking organization in international market demonstrated the importance of strategic management in internationalization.

Strategic management in MNCs' internationalization

The origin of strategic reaction of MNCs can be traced back to Chandler's (1962) works. Ghoshal (1993) and Veugelers (1995) analyzed the strategic issues in organizational and contingency theories of industrial organization. Knickerbocker's (1973) "Bandwagon effect" in internationalization (see section 2.2.1) is another reflection of strategic response of MNCs. Dunning (1993) pointed out that, because of the inadequacy of both pure markets and pure hierarchies to offer an optimal solution for MNCs to organize their resources and capabilities, the strategic response of MNCs should be integrated into the traditional configurations. Strategic management is essentially concerned with the ways in which managers act to achieve their long-term objectives in conditions of market failure. It embraces decisions about how resources are acquired and utilized, the way in which the markets are identified and served, and how transactions relating to these decisions are organized. It also concerns how the firms with different mixtures of physical human and financial assets deploy these advantages between countries with different cultures, institutional structures and economics systems. It also deals with the ways how the firms related with a business network interact with each other. The dynamic nature of strategic management gains much attentions in studies of internationalization and MNCs, including: Veugelers (1995), Hill (1990), Dunning (1993, 1995, 2000).

Game theory and strategies of internationalization

Because of the inadequate explanation of internationalization strategies using traditional economic theories, game theoretical models have been increasingly adopted in studies

from the 1990s (Veugelers, 1995). This includes the modeling of cooperation vs. competition, and that of transaction cost analysis (Hill, 1990) for MNCs' internationalization. Veugelars (1995) provides an example as reviewed below.

To simplify the scenario, there are two firms in the industry, composed of two national markets. These two markets are taken to be the home market of the two firms. With both firms having a different nationality, each market therefore constitutes at the same time the home market of one firm and the foreign market of the other. Because of the cost factors and locational conditions in the two markets, foreign market profits differ from home market profits. The firms intend to make the decision to invest and operate in international markets, and their strategic interactions in an imperfect competition may influence their cost and benefit analysis to internationalize.

Table 2.1 A typical game-theoretic model for investment strategy

		Firm 2	
		Multinational	Domestic
Firm 1	Multinational	V_1 (M/M), V_2 (M/M)	V_1 (M/D), V_2 (D/M)
	Domestic	V_1 (D/M), V_2 (M/D)	V_1 (D/D), V_2 (D/D)

Where:

The subscript 1 and 2 denote the firm index;
V denotes the total company profit level;
M stands for multinational, the outcome when the firm opts for investment for internationalization;
D stands for domestic, the outcome when no investment for internationalization is taken.

There are four outcomes in this strategical game: multinational outcome M/M, domestic outcome D/D, and two mixed outcome M/D and D/M. M/M is the outcome where both firms choose to engage in the investment, and will operate in two markets. With both firms originating from different countries, they end up entering each other's home market. Hence, a multinational duopoly will prevail in both markets. D/D refers to the domestic outcome, where both firms prefer to stick to their domestic markets, and in both markets a local monopoly will prevail. The mixed equilibrium M/D and D/M is the

outcome where one firm chooses to invade its foreign market. Both firms produce in the other firm's home market and the first firm remains a monopolist in its own market.

In this game process, one firm's decision on whether to opt for FDI and multinational operation may depend on the other firm's strategic decision and the respective payoffs. Depending on different levels of payoffs, three equilibrium outcomes may be resulted in:

- V (M/M) > V (D/M) and V (M/D) > V (D/D)

  This equation indicates that the net benefits of the investment are so compelling, either because the costs are low, the scope advantages are important and /or the foreign market profits are sizeable, that no matter what the rival's decision looks like, it is always more profitable to go for the multinational option. This situation corresponds to the traditional decision-theoretic framework of MNC motives for FDI, devoid of any strategic incentives.

- V (M/M) < V (D/D) and { V (M/M) > V (D/M) and V (M/D) > V (D/D) }

  This indicates although it is a dominant strategy for both firms to operate multinationally, it may still be the case that a local monopoly would yield higher profits to the firm than a multinational duopoly outcome, as in the example shown in Table 2.2.

Table 2.2 Game theoretic model for investment strategy: Prisoner's Dilemma

		Firm 2	
		Multinational	Domestic
Firm 1	Multinational	300, 300	500, 100
	Domestic	100, 500	400, 400

In this case, both firms prefer the local outcome to a multinational one, since the multinational competition makes the profit level decreased from 400 to 300. This multinational outcome is, however, preferred to the hybrid outcome M/D or

D/M. It is only optimal for the firm to remain in its home market if it knew that its rival would also do so. If the firm remained local but its rival chose to engage in multinational production, it is caught in a worse position than if it had opted for the same (profit level of 500 and 100). Hence, given the condition of non-cooperation between the firms, the only rational move for each firm is to engage similarly in international production (profit level of 300 and 300). The basic point that emerges is that firms may enter into each other's country, not necessarily because of rational expansion incentives but induced by strategic motives. With both firms originating from the same home country, this scenario may illustrate the defensive strategy of MNCs' internationalization as the Bandwagon Effect in Knickerbrocker (1973).

- V (M/D) > V (D/D) and V (D/M) > V (M/M)

  This suggests a mixed-industry outcome would prevail when it is only optimal to engage in MNC production if rival firms are local. When rival firms are multinational, the competitive game would prove too costly to recover the investments associated with the MNC option. In this case with both firms making their decisions simultaneously, two possible Nash equilibriums will be found: M/D and D/M. This then may result in a mixed-industry outcome, where one firm is multinational and the other local, as a stable configuration in international markets.

Therefore, strategic FDI and strategic international trade theories are both built on the premise of imperfect competition and both may adopt the game theory as analytical methodology. The difference may only give the implication on that strategical FDI

theory analyzes the internationalization and the movement of FDI while the strategical international trade theory focuses on the international trading and marketing.

Strategic advantages in MNCs

In terms of competition of MNCs, Porter (1980, 1986, 1990) analyzed the forming up of strategies and the sources of strategic advantages. Porter (1987) provides a useful two dimensional framework in which he categorizes internationalization as involving configuration – where and at what scale are primary activities conducted, and coordination - to what extent and how are activities coordinated, knowledge shared, etc. Therefore, the value creation is the fundamental purpose of strategy. Companies should focus on how to create value through the configuration and coordination of their multimarket activities; and that the value of a multibusiness corporation should be greater than the sum of its component parts. The strategic advantage is the advantage the MNCs developed by the combination of configuration and coordination in various forms. Mucchielli (1992) revised Dunning's OLI advantages to a new framework as the competitive advantages, comparative advantages and strategic advantages, so as to incorporate the international contracting arranges and other strategic issues into the analysis of MNCs' activities. Dunning (1992) also proposed a strategic-related paradigm of MNCs to supplement his eclectic paradigm.

2.3.5 Inward - outward internationalization approach

The inward-outward internationalization is an approach on which both inward and outward international operations ought to be taken into account when analyzing internationalization. However, during the last decades outward internationalization seems to have been the focus of main research interest (as in the various static and dynamic models reviewed earlier), while inward internationalization has received only limited attention. Although the inward-outward approach is not in the main stream of internationalization theories, it is especially meaningful when analyzing the internationalization process in developing countries where the connection between the inward and outward processes plays a significant role.

According to the inward-outward internationalization model (Welch & Luostarinen, 1988), the outward process may follow the inward process in the internationalization of firms. For example, the experience and knowledge acquired during importing can later on be used when starting exporting. The network approach of internationalization is most often applied on vertical relationships, between sellers and buyers. However, relationships between competitors have not been studied to the same extent (Johansen & Johansen 1998). The inward-outward internationalization approach concerns about the relationships between competitors and the horizontal business networks, therefore, a multidimensional relationship and the advantages arising out of the relationships may be revealed.

Inward internationalization process usually covers a variety of different forms used to strengthen a firm's resources (Table 2.3). In general, inward flows imply importing products needed for the production process, such as raw materials and machinery. But

inward operations can also include finances and technology through different operational forms, such as franchising, licensing, direct investments and alliance agreements (Luostarinen and Welch, 1990). According to Welch and Luostarinen (1993), inward and outward connections can develop in different ways. These connections are most reflected in counter-trade arrangements, but they can also be found in the complex relationships between sub-units or subsidiaries within MNCs and in strategic alliances. Through inward activities, the focal firms' uncertainty may decrease as they gain knowledge of and experience in international business. Visiting to the foreign markets, investigation of potential suppliers, negotiations with foreign partners, learning about foreign cultures and deciding on what operational mode to use during the inward process, may give the management experience and encourage the firms to later initiate outward activities. Knowledge about foreign markets and networks gained as a by-product of inward process can result in an outward flow. Another by-product may be the creation of relationship between domestic and foreign competitors and partners.

Table 2.3 The inward-outward internationalization approach

	Outward process	Inward process
Trading	Export	Import
Technology transfer	Sales of patented technology, technological aids	Purchasing of patented technology
Contractual arrangement	Licensing, franchising, management contract, turnkey project, international sub-contracting	Compensation trade, assembling process
Joint venture	Foreign joint venture	Domestic joint venture
Wholly owned enterprise	Foreign subsidiaries or branches	Subsidiaries of foreign enterprise

Source: Welch and Luostarinen (1993)

2.4 Macro-economic approaches of MNC theories

The macro-economic development theories regarding international production and MNCs activities describe the dynamic and developmental processes or the ways in which stages of development or maturity of countries and MNCs affect their internationalization (Tolentino, 2000). The major theories about the macro-economic approaches of MNCs include the Japanese approaches of MNCs theories such as Kojima's comparative advantages theory and Ozawa's development phases theory of international investment, Porter's competitive development stages theory regarding internationalization and Dunning's investment development paths theory. In terms of the generality, the concept of investment development path advanced by Dunning shows the impact of the national stage of development on both the level and character and composition of international production (Tolentino, 2000).

2.4.1 Japanese approaches of MNCs theories

Kojima's comparative advantages theory

Derived from the neo-classical international trade theory (H-O-S model), Kojima's macro-economic theory of FDI (Kojima, 1978; 1990) suggested that Japanese FDI in Asia was geared towards exploiting host countries' comparative advantage and that it creates harmonious trade with the host country. This was contrasted with US FDI, which was deemed to be driven by domestically oligopolistic industries and the foreign investors intent on exploiting monopolistic advantages in the host countries. Kojima's theory integrated the international trade and international production analysis, as well as the interaction between ownership advantages and the changing location of production.

The basic theorem in this theory is that FDI should originate from the comparatively disadvantaged or marginal industry of the home country which leads to lower cost and expanded volume of exports from the host country. This type of FDI is referred to as pro-trade or Japanese-type FDI. In contrast, the firms from US and major European countries normally pursue the wholly owned, vertically integrated resource-based production; these FDI originates from the comparatively advantaged industries of the home country and lead to misallocation of resources and a decreased volume of exports from the host country. This type of FDI is called anti-trade or American-type FDI (Tolentino, 2000).

Kojima classified the motives of FDI as three types: (i) resource oriented: the intention of FDI is made to exploit the nature resources, and FDI may flow to resource abundant countries; (ii) market oriented: FDI is to expand the shares of market internationally, and following exporting product, the MNCs may seek to establish their own production bases through FDI; (iii) factor oriented: in contrast with the capital resource, the mobility of labor resources are restricted by law in many countries and the land resources are without mobility; this may trigger the FDI to follow into the labor resource abundant countries in order to obtain this production factor.

Ozawa's development phases theory of international investment

Ozawa (1979, 1991) retains the specificity of Japan's pattern of MNCs' internationalization but links it to the country's industrial development. A four phases model is proposed. The first two phases of Japanese outwards FDI are referred to the Japanese MNCs' internationalization on resource-based and labor intensive international production. In the later stages more technology-intensive production are

transferred abroad, even to developed countries. Ozawa explains switches from one phase to the other in terms of the constraints to Japanese domestic development arising within each phase. The constraints appear as negative external factors and affect the overall development of internationalization more than that of each individual firm's. As a result, internationalization has to be enhanced by government intervention because Japanese firms would not be prepared to go abroad otherwise, at least not to the required extent.

In contrast with other MNCs theories, two points should be addressed to Kojima and Ozawa's approaches. Firstly, although most MNCs based in developing countries are unlikely to develop as rapidly as the Japanese MNCs who normally own the frontier technologies, the phases of development suggested by Ozawa for Japanese MNCs were more relevant to the study of MNCs based in developing countries than that in developed countries (Tolentino, 2000). Secondly, the determinants of internationalization pointed out by Kojima and Ozawa have little or no relation to the behaviors of firms. The question therefore is whether the firm may still be conceived of as the cornerstone in the analysis of internationalization. Hence, the analysis of MNCs and internationalization can not reply only on these macro-economic approaches nor the micro-economic approaches but the combination of the two.

2.4.2 Competitive development stages theory in internationalization

Although Porter's competitive development stages theory (Porter, 1980, 1990) does not focus on internationalization and MNCs, its concepts are widely introduced into MNCs studies (Dunning, 1992, 1993) and influenced the macro-economic approaches in

internationalization theories. Porter set forth four stages of national competitive development, namely factor-driven, investment-driven, innovation-driven, and wealth-driven stages (Porter, 1980, 1990).

- *Factor-driven:* During this stage nations draw their advantage almost entirely from the mobilization of basic factors of production, which are abundant and relatively inexpensive. Little technology is created locally, and domestic firms use imported technology mostly through licensing and joint ventures. The factor-driven development path is supported by a relatively low level of inward investment. As far as resource-based and traditional industries are concerned, more advanced product designs and technologies are obtained through passive investment in turn-key projects, subcontracting or OEM arrangement with local partners.
- *Investment driven:* In this stage, domestic market conditions fostered by government policies attract investment in the production of standardized products, and may further attract investment into export-oriented mass production of medium-technology products. The competitive advantage is based on the willingness and ability of the firms to invest aggressively, as low labor costs are no longer sufficient grounds for the establishment of local production. The ownership advantages of MNCs are weakened when competing with local firms. The ability of local industries to absorb and improve foreign technology is essential in this stage, and local firms begin developing their own refinements including product models. Passive investment in turnkey projects is insufficient.
- *Innovation-driven:* At this stage, the national innovation system matures and enables the economy not only to appropriate and improve technology from

foreign locations, but also to create its own. Outward investment is growing rapidly, and inward and outward investment become increasingly complementary. Firms in an innovation-driven economy compete internationally in more differentiated industry segments based on productivity due to high skill levels and advanced technology.

- *Wealth-driven:* This stage leads to decline as the past wealth drives to decrease investment and innovation. Firms begin to lose competitive advantages in international industries. Although mergers and acquisitions will be widespread with the rising of inward investment, the focus is drawn on preserving rather than improving position.

2.4.3 Dunning's investment development paths theory

The investment development path (IDP) was proposed by Dunning (1981a, 1981b, 1982, 1986, 1988). The first version of IDP reveals that the level of inward and outward FDI of different countries and the balance between the two is a function of their stage of development as measured by gross national product (GNP) per capita. The plotted data of the net outward investment (NOI), i.e., the difference between inward and outward investment, and GNP of different countries, both variables normalized by the size of the population, present a J-shaped investment development curve with countries classified into four main groups with their corresponding stages of development. Dunning (1988) further introduced the fifth stage of development based on some new evidences.

- *The first stage* is characterized by low levels of development and underdeveloped infrastructure. In this stage the little inward FDI that the country receives is concentrated in extractive or primary resources because L advantages

are insufficient. There is hardly any outward FDI because O advantages of domestic enterprises have not been developed. Government's intervention in this stage focuses on building up infrastructure and development of human resources. Therefore, little or no outward investment occurred, and the NOI would accordingly be around zero or negative.

- *The second stage*, due to the development of local markets and other L advantages as well as the availability of low labor costs, the country becomes more attractive to inward investment. Domestic enterprises develop some O advantages as they accumulate certain technological capability. Government policies also encourage accumulation of technological capability. These O advantages would lead to outward FDI at this stage. But there will be only little outward investment. The country's NOI position will become increasingly negative in this stage, and the country becomes a net receiver of inward investment.
- *The third stage* is marked by a slowdown of the growth in inward investment. The O advantages of domestic enterprises are strengthened and they acquire technological capability to produce standardized goods. This will erode the competitiveness of O advantages of foreign investors. Outward investment will increase during this stage as domestic firms become more internationally competitive and develop their firm-specific assets which allow them to compete abroad successfully. The country's NOI position in this stage is increasing, although the country will still be a net investment receiver.
- *In the fourth stage*, the country's NOI position becomes positive, implying that the country becomes a net outward investor. At this stage, inward investment occurs not in order to take advantage of lower labor or other production costs

but it will be strategic investment with the aim of rationalizing international production or sourcing technologies. Outward investment will grow faster than inward investment as domestic firms aim at maintaining or expanding their international competitiveness by locating production facilities in other countries.

- *Finally, in the fifth stage*, the country's NOI position fluctuates around zero. In other words, the country's inward and outward FDI positions will be nearly equal, possibly at a very high level. This stage is reached by leading developed countries, whose level of inward investment is around as high as their outward investment.

Dunning's investment development paths theory is the dynamic form of his static eclectic paradigm. The theory can be used to analyze the macro economic development of FDI, as well as the inward and outward development of economic sectors. In Chapter 3, we will revisit Dunning's IDP and review some applications in this regard.

Chapter Three

THE ECLECTIC PARADIGM AND ITS APPLICATION

3.1 Introduction

This chapter reviews Dunning's eclectic paradigm and a number of its applications. Eclectic paradigm provides the theoretical frameworks for this thesis, and it has been applied into various economic sectors in different countries. However, there is a need to re-examine the theory, and the reasons are given at the end of this chapter.

3.2 The eclectic paradigm: theory and its development

John Dunning's eclectic paradigm firstly emerged in 1976 known as eclectic theory, and was further developed and refined by Dunning (1977, 1979, 1981a, 1981b 1988b, 1993a, 1995, 1996, 1997, 2000, 2003) during the following 20 years. The theory evolutes into the eclectic paradigm in the mid-1980s, and significant and numerous applications of the paradigm in various economic sectors and countries/regions began to appear in the recent decade.

3.2.1 The main tenets of the eclectic paradigm

Definitions

In this section, three terms used in eclectic paradigm need to be defined firstly and they are as follows: (Dunning, 1993a: 77-79)

- *Ownership (O) advantages*: The capability and willingness of one country's enterprises to supply either a foreign or a domestic market from a foreign location depends on their possessing or being able to acquire certain assets not

available, or not available at such favorable terms, to another country's enterprises. Such assets we may refer to as ownership-specific advantages or O advantages because they are assumed to be unique to firms of a particular nationality of ownership.

- *Location (L) advantages*: The assets in terms of O advantages the firms possess might be specific to a particular location as to be referred to as location specific (L) assets or location advantages in their origin and use, but available to all firms. These include not only the factor endowments, but also cultural, legal, political and institutional environment in which they are deployed, market structure and government legislation and policies.
- *Internalization (I) advantages*: The market deficiencies may cause the enterprises to be uninational or multinational, to diversify their value-adding activities and in so doing realign the ownership and organization of these activities. The enterprises do so partly to maximize the net benefits of lower production or transaction costs arising from common governance and partly to ensure that they gain the maximum economic rent from the O advantages they possess. Such perceived advantages of hierarchical control may be referred to as internalization (I) advantages.

Key propositions

The eclectic paradigm argues that, at any given moment of time, the extent and pattern of international production, i.e. production financed by FDI and undertaken by MNCs, will be determined by the configuration of three sets of forces:

1. The (net) competitive advantages which firms of one nationality possess over those of another nationality in supplying any particular market or set of markets. These O advantages may arise either from the firm's privileged ownership of, or access to, a set of income-generating assets, or from their ability to coordinate these assets with other assets across national boundaries in a way that benefits them relative to their competitors, or potential competitors;

2. The extent to which firms perceive it to be in their best interests to internalize the markets for the generation and/or the use of these assets, and by so doing add value to its O advantages rather than to sell them, or their right of use, to foreign firms. These advantages are called market internalization (I) advantages. They may reflect either the greater organizational efficiency of hierarchies or their ability to exercise monopoly power over the assets under their governance;

3. The extent to which firms choose to locate these value-adding activities outside their national boundaries. The distribution of these resources and capabilities is assumed to be uneven and, hence, depending on their distribution, will confer L advantages on the countries possessing them over those who do not. (Dunning, 1988b; 1993a; 2003)

When the strategic-related variables are incorporated, then given the configuration of the ownership, location and internalization (OLI) advantages facing a particular firm,

4. The extent to which firms believe that foreign production is consistent with its long-term management strategy. (Dunning, 1993a)

The eclectic paradigm further avers that the significance of each of these advantages and the configuration between them is likely to be context specific, and in particular, is likely to vary across industries (or the types of value-added activities), regions or countries (the geographical dimension) and among firms (Dunning, 2003). Hence, there are likely to be country-specific differences in O advantages of one national's firms compared with another national's firms. The extent of market failure influencing whether or not the market for technology is internalized is likely to be different in one industry than in another; while the relationship to the comparative locational advantages of two countries as a manufacturing base for a type of value-added activity may be differently regarded by two different firms even with same nationality.

Dunning (1988b, 1993a, and 2003) argues that the eclectic paradigm is best regarded as a framework for analyzing the determinants of international production rather than as a predictive theory of the MNCs. Because the motivations for, and expectations from, the international production vary a great deal, there is no single theory to be expected to satisfactorily encompass all kinds of foreign-owned value-added activities.

The OLI variables

The Table 3.1 identifies some of the important OLI advantages, and these advantages form the main contents of the eclectic paradigm of international production. Some of the advantages explain the initial action of FDI conducted by MNCs, and other advantages are helpful in explaining sequential actions of foreign production. Oa denotes the asset advantages that give the O advantages to the MNCs in terms of the possession of particular intangible assets. Ot denotes the transaction cost minimizing

advantages that give the arising of the ability of firms to coordinate multiple and geographically dispersed activities.

The propensity of firms of a particular nationality to engage in FDI will vary according to the economic, the specific characteristics of their home country and the countries in which they proposed to invest, the range and types of products including intermediate products and their management and organizational strategies (Dunning, 1988b). All these factors may be grouped into three categories, i.e. the country or region specific; the industry or activity specific and the firm specific. Some of these OLI variables are set out in Table 3.2. The OLI variables shown in Table 3.1 and Table 3.2 form the core of the eclectic paradigm, and may provide the theoretical foundation for further empirical works.

Table 3.1 The eclectic paradigm of international production.

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1. **Ownership-specific advantages** of an enterprise of one nationality (or affiliates of same) over those of another.

(a) Property rights and/or intangible asset advantages (Oa); the resource (asset) structure of the firm. Product innovations, production management, organizational and marketing systems, innovatory capacity, organization of work, non-codifiable knowledge: 'bank' of human capital experience; marketing, finance, know-how, etc. Ability to reduce costs of intra and/or inter-firm transactions.

(b) Advantages of common governance, that is, of organizing Oa with complementary assets (Ot).

i Those that branch plants of established enterprises may enjoy over de novo firms. Those resulting mainly from size, product diversity and learning experiences of enterprise (e.g. economies of scope and specialization). Exclusive or favoured access to inputs (e.g. labor. natural resources, finance, information). Ability to obtain inputs on favoured terms (e.g. as a result of size or monopolistic influence). Ability of parent company to conclude productive and cooperative inter-firm relationships. Exclusive or favoured access to product markets. Acccss to resources of parent company at marginal cost. Synergistic economies (not only in production, but in purchasing, marketing. finance. etc. arrangements).

ii Which specifically arise because of multinationality. Multinationality enhances operational flexibility by offering wider opportunities for arbitraging production shifting and global sourcing of inputs. More favoured access to and/or better knowledge about international markets. Ability to take advantage of geographic differences in factor endowments, government intervention, markets, etc. Ability to diversify or reduce risks (e.g. in

different currency areas and creation of options and/or political and cultural scenarios). Ability to learn from societal differences in organizational and managerial processes and systems. Balancing economies of integration need to respond to differences in country-specific resources and consumer demands.

2. **Internalization incentive advantages** (i.e. to circumvent or exploit market failure).
To avoid search and negotiating costs.
To avoid costs of moral hazard and adverse selection, and to protect reputation of internalizing firm.
To avoid cost of broken contracts and ensuing litigation.
Buyer uncertainty (about nature and value of inputs, for example, technology being sold).
When market does not permit price discrimination.
Need of seller to protect quality of intermediate or final products.
To capture economies of interdependent activities (see (b) above).
To compensate for absence of future markets.
To avoid or exploit government intervention (quotas, tariffs, price controls, tax differences, etc).
To control supplies and (conditions of sale of inputs (including technology).
To control market outlets (including those which might be used by competitors).
To be able to engage in practices, such as cross-subsidization, predatory pricing, leads and lags, transfer pricing as a competitive (or anti-competitive) strategy.

3. **Location-specific variables** (these may favour home or host countries).
Spatial distribution of natural and created resource endowments and markets.
Input prices, quality and productivity (e.g. labour, energy, materials, components, semifinished goods).
International transport and communication costs.
Investment incentives and disincentives (including performance requirements, etc.).
Artificial barriers (e.g. import controls) to trade in goods and services.
Societal and infrastructure provisions (commercial, legal. educational. transport and communication).
Cross-country ideological, language, cultural, business, political differences.
Economies of centralization of R&D production and marketing.
Economic system and strategies of government: the institutional framework for resource allocation.

Source: Dunning (1993a)

Table 3.2 Illustrations of OLI variables at country, industry and firm levels

OLI variables	Structural variables		
	Country or region	Industry or activity	Firm
Ownership	Factor endowments (e.g. resources and skilled labour) and market size and character. Government policy towards innovation, protection of proprietary rights, competition, education and training, and industrial structure. Government attitudes towards	Degree of product or process technological intensity; nature of innovations; extent of product differentiation; production economies (e.g. if there are economies of scale); transaction economies (e.g. if there are economies of scope); importance of favoured	The structure of the asset (resource) base, size, extent of production, process or market diversification; extent to which enterprise is innovative, marketing oriented or values security and/or stability (e.g. with respect to sources of inputs, markets); extent to which

	internalization of business and cross-border alliances. The organizational culture and wealth-creating ethos of a country. The nature of corporate governance and inter-firm rivalry anti/or cooperation.	access to inputs and/or markets.	there are economies of joint production and entrepreneurial vision; attitudes to risk taking and the strategy of asset accumulation and usage.
Internalization	Government intervention and extent to which policies encourage MNEs to internalize transactions (e.g. transfer pricing); government policy towards mergers; differences in market structures between countries with respect to transaction costs, enforcement of contracts, buyer uncertainty etc; adequacy of technological, educational and communications infrastructure in host countries; and their ability to absorb contractual resource transfers.	Extent to which vertical or horizontal integration is possible/desirable (e.g. need to control sourcing of inputs or markets); extent to which internalizing advantages can be captured in contractual agreement (cf. early and later stages of product cycle); use made of ownership advantages (cf. IBM with Unilever type operation): extent to which local firms have complementary advantages to those of foreign firms; extent to which opportunities for output specialization and international division of labour exist.	Organizational and control procedures of the enterprise; attitudes to growth and diversification (e.g. the boundaries of a firm's activities); attitudes towards subcontracting and contractual ventures such as licensing, franchising, technical assistance agreements; extent of which control procedures can be built into contractual agreements.
Location	Physical and psychic distance between countries; government intervention (e.g. tariffs, quotas, taxes, assistance to foreign investors or to own MNEs). An example is the Japanese government' s financial aid to Japanese firms investing in South East Asian labour-intensive industries.	Origin and distribution of immobile resources; transport costs of intermediate and final goods product; industry specific tariff and non-tariff barriers; nature of competition between firms in industry; can functions of activities of industry be split? Significance of 'sensitive' locational variables, e.g. tax incentives, energy and communication costs.	Management strategy towards foreign involvement; age and experience of foreign involvement (position of enterprise in product cycle, etc); psychic distance variables (culture, language, legal and commercial framework); attitudes towards centralization of functions such as R&D and market allocation; geographical structure of asset portfolio and attitudes to risk diversification.

Source: Dunning (1993a)

3.2.2 Development and economics of eclectic paradigm

In explaining the growth and composition of international production and the MNCs, eclectic paradigm was a by-product in the evolution in the 1960s and 1970s of at least four main branches of economic theory, namely the macro-economic theories of trade (e.g. Vernon's product life cycle model), international capital movement (e.g. Aliber's currency variation theory); the meso-economic theories of industrial organization (e.g. monopolistic advantage theory, product differentiation theory, appropriability theory and oligopolistic strategy theory) and innovation; and the micro-economic theories of the firm (e.g. internalization theory and transaction cost theory) (Dunning et al., 1986). (For details of the distinct body of theories, refer to previous Chapter).

The term "eclectic" was used because (i) the theory was drawn upon a variety of theoretical approaches in economics; (ii) it explains a number of possible channels of international economic involvement each of which is determined by a number of factors, and (iii) there is no single theory satisfactorily encompassing all kinds of factors in the MNCs' activities (Dunning, 1981a, 1988b).

Essentially, the theory of MNCs activity stands at the intersection between a macro-economic theory of international trade and a micro-economic theory of the firms. The eclectic paradigm starts with the acceptance of traditional international trade theories such as the H-O-S model, however, it argues that, to explain the MNCs' ownership advantages and the spatial distribution of these advantages, two kinds of market failures must be taken into account (Dunning, 1993a). The first is the structural market failure which discriminates between firms in this ability to gain and sustain control over

property rights or to govern multiple and geographically dispersed activities. The second is that of the failure of intermediate product markets to transact goods and services at a lower net cost than those which a hierarchy might have to incur (Dunning, 1993a).

The issue of *market failure* is the economic core of the eclectic paradigm, which distinguished the eclectic paradigm with the neo-classical international trade theory. The arguments between the eclectic paradigm and the internalization theory on explaining the international production revolve the role and interpretations of the concepts of ownership and internalization, while both theories were centralized with the issue of market failure (a further discussion in this aspect is in section 3.2.3). Dunning (1993a) pointed out three reasons for the market failure in organizing transactions: (i) the first is that buyers and sellers do not enter the market with complete or symmetrical information or perfect certainty about the consequences of the transactions; (ii) the second is that the market cannot take account of the benefits and costs that arise as a result of a particular transaction, but which are external to that transaction; and (iii) the third reason is that wherever the demand for a particular product, while infinitely elastic, is insufficiently large to enable the producing firms fully to capture the economies of size, scope and geographical diversification.

3.2.3 The appraisal and criticisms of the eclectic paradigm

The eclectic paradigm provides a rich conceptual framework for explaining not only the level, form and growth of MNCs activities, but also how such activities are organized. It encompasses most of the theoretical concepts and theories of the international

production, and is considered as an envelope of international production theories to answer the question of why, how and where the MNCs cross-border activities incur. By using the eclectic paradigm, the role of FDI as an engine of growth and development can be analyzed; the economic consequences of MNCs activities for a particular country in which they operate can be predicted; and the extent to which the policies of home and host government are likely both to affect and be affected by such activities can be evaluated (Dunning, 1988b, 1993a, 2003).

As stated by Tolentino (1993, 2003), both the emergence of the eclectic paradigm and its evolution as a paradigm represented as close intertwining of the relativist and absolutist approaches in the formulation of economic theory. The evolution of the theory into a framework or paradigm was a scholarly response to the need to continually adapt the eclectic theory as a tool to examine the economic questions raised by the increasingly widespread activities of MNCs.

Since the emergence of the eclectic paradigm in the 1970s, some criticisms of the paradigm were put forward. Among the criticisms during the past a few decades, two major debates and three major criticisms (e.g. in Itaki, 1991; Devinney et al, 2003) were most influential in literatures, hence they are reviewed as follows.

Debate 1: the role of O advantages

During the past two decades, two major debates regarding to the role of O advantages and the internalization factors pose significant influences on the evolution of the eclectic paradigm.

The controversy over the role of O advantages in explanation of MNCs activities has centered on whether the O advantages are exogenous or endogenous factors. In the eclectic paradigm, asset O advantages are considered endogenous to MNCs, while in internalization theory, they are considered exogenous to the individual MNC. In fact, the existence of such advantages is not a necessary condition for international production in internalization theory, as argued by Buckley and Casson (1976) and Casson (1987), and a combination of internalization and location factors are necessary and sufficient conditions for the explanation of MNCs in internalization theory.

This debate was addressed by Cantwell (1991) and Tolentino (2003) by clearly distinguishing the alternative interpretations of the concept of O advantages in the two schools of thought. The existence and growth of international production in internalization theory is geared solely to reduce transaction costs or costs of market transactions. As a result, theory has assigned a more important role to efficiency of firms in terms of the organization of exchange of intermediate products, and a rather less important role to asset O advantages and inter-firm competition in final product markets (Cantwell, 1991). In contrast, the eclectic paradigm contends that apart from reducing transaction costs, firms may initiate and sustain international production as a means to lower production costs per unit, so as to improve the capacities and monopolistic positions of firms. Therefore, the eclectic paradigm allows for the coexistence of the two different functions of MNCs both as a market player for profit driven and as an innovation and knowledge creator for further growth (Cantwell, 2002; Penrose, 1959; Tolentino, 2003).

Debate 2: the internalization factors

A similar debate about the eclectic paradigm was revolved about the internalization factors in explanation of the MNCs activities (Tolentino, 2003). In Dunning's earlier versions of eclectic theory (Dunning, 1977, 1979, 1981b), the conceptual interpretation of internalization was regarded as the internalization of the ownership advantages or intermediate products, while the counterparts in the internalization theory regarded the internalization as that of the markets for ownership advantages or intermediate products. In acknowledging this argument, Dunning (1988a, 1988b, 1988c) reformulated his theoretical interpretation of internalization in the broader context of (i) the firm using or transferring asset O advantages it possesses, or (ii) the firm engaging in value-adding activities based on these advantages it possesses, and (iii) a modality through which transaction ownership advantages are achieved. Therefore, by clearly distinguishing the interpretations of the concept of internalization in the eclectic paradigm, the firm can be regarded both as an active agent capitalizing on the creation of endogenous structural imperfections in final product markets as well as a passive product responding to exogenous transactional imperfections in intermediate product markets (Tolentino, 2003).

Criticism 1: a shopping list of variables

The eclectic paradigm is essentially a "kitchen sink" theory (Grosse, 2003). That is it includes everything that could explain the economic aspects of international production and MNCs, including the kitchen sink. It does not give any hint as to priorities among factors in explaining MNCs activities but only "a shopping list of variables" when a

particular situation of international production was studies. Dunning (1988b, 2003) clearly addresses this criticism by three folds. (i) Each and every OLI variables in eclectic paradigm is well grounded in economic or organizational theories; (ii) The purpose of the paradigm is not to offer a full explanation of all kinds of international production but rather to provide a methodology and to a generic set of variables which contain the necessaries for any satisfactory explanation of particular MNCs' activities; and (iii) much of this kind of criticism can be directed toward any other general theories such as the PLC theory, the Kojima's macro models and internalization theories. Hence except to eclectically explain the international production as in the paradigm, there is no better alternative in terms of a general theory (Dunning, 1988b).

Criticism 2: interdependence of OLI variables

As criticized by Itaki (1991), there are three shortcomings in OLI paradigm: (i) many O advantages of MNCs may not exist or be utilized without internalization factors, hence they are not necessary regarding to the I advantages; (ii) O advantages are often connected with and determined by the L advantages; (iii) L advantages are generally not clearly identified and therefore may depend on different explanations. Dunning (1993b, 1997, 2000, and 2003) accepts the logic behind this criticism and has fully acknowledged the ways in which the OLI variables determining the international production of firms and countries may be linked to one another. Therefore, he proposed the dynamic form of the eclectic paradigm to incorporate the interdependence of OLI variables. (See section 3.2.4)

Criticism 3: a static approach only

Another common criticism on the eclectic paradigm is that it is only a static approach and without a dynamic developmental perspective. This is also referred to as there being no role for strategy to play in the paradigm. In Dunning (1993b), he incorporated the strategic management issues into the eclectic paradigm, and further added the fourth proposition into the original paradigm (see section 3.2.1). In addition, he developed the dynamic aspects of international production in two ways: (i) one is at macro-economic perspective, known as the concept of the investment development path (see section 2.4.3); and (ii) the other is still at micro-economic level but introducing the time variable into the traditional eclectic paradigm of international production (Dunning, 1988b, 1993b) (see section 3.2.4).

In addition to these major debates and criticisms, issues proposed by other scholars about the nature and application of the paradigm, such as Kojima's criticism of the paradigm as a pure micro-economic phenomenon, are generally addressed by Dunning's extensive contributions to literatures of the eclectic paradigm, and some of these issues were incorporated into the present version of the eclectic paradigm.

3.2.4 Dynamic form of the eclectic paradigm

The eclectic paradigm of MNCs activities asserts that at any given point of time, the level and composition of a firm's foreign production (FP) reflects its strategic response to its OLI configuration (Dunning, 1993b). A firm's FP may change either because of a change in the configuration of OLI advantages, or because it pursues a different strategy

towards the existing configuration of OLI advantages changes, and such responses to the configurations will in turn influence the OLI configuration in a subsequent moment of time. Let OLI_{t0} be the OLI configuration in time t_0, OLI_{t1} the OLI configuration in time t_1, S_{t-n} the past strategies of firms still being worked out, and be any change in the strategic response of firms to that configuration between time t_0 and t_1. Then: (Dunning, 2003)

$$OLI_{t1} = f\left(OLI_{t0}, S_{t-n}, \Delta S_{t0 \to t1}\right) \tag{1}$$

$$OLI_{t2} = f\left(OLI_{t1}, S_{t-n}, \Delta S_{t1 \to t2}\right) \tag{2}$$

International production, at a future time t-1, represents the accumulation of the strategic responses of firms to past OLI configurations, and to change in these configurations induced by change in the external environment and non-strategic endogenous variables (Dunning, 1993b). The strategic and non-strategic response of firms to their current OLI configurations and actual or expected changes in these configurations will determine the future pattern of their international production.

The strategic response is one of the endogenous variables which affect the OLI configuration of firms. Others include technological or organizational innovations, changes in the composition of management, increases in labor productivity, new marketing techniques, mergers and acquisitions, and so on (Dunning, 2003). The significant exogenous changes include: population therefore the market volume, material prices, exchange rates, government policies (host and home), and so on. If all endogenous variables other than strategy are taken as EN and all exogenous variables as EX, and assuming that changes in EN and EX don't affect the firms' strategies, the final equation will be as:

$$OLI_{t1} = f\left(OLI_{t0}, S_{t-n}, \Delta S_{t0 \to t1}, \Delta EN_{t0 \to t1}, \Delta EX_{t0-t1}\right) \tag{3}$$

$$OLI_{t2} = f\left(OLI_{t1}, S_{t-n}, \Delta S_{t1 \to t2}, \Delta EN_{t1 \to t2}, \Delta EX_{t1-t2}\right) \quad (4)$$

By doing it the way as elaborated here, Dunning incorporated the strategic related variables into the eclectic paradigm, and therefore, the paradigm became a dynamic approach and a more generalized theory. According to this concept, Dunning provided an alternate interpretation to Knickerbocker's analysis (see Section 2.2.1) in terms of the OLI paradigm. In addition to the game theoretical explanation of Knickerbocker's observation (see Section 2.3.4), Dunning asserts that firms go internationally because they consider their O advantages are threatened if they do not follow their competitors' lead, or because their advantages would be less without their presence. The strategy followed by firms in response to a given OLI configuration in time t_0 is governed by their desire to protect or influence that configuration in t_1. The eclectic paradigm became a dynamic approach in terms of the interaction of OLI variables and strategic-related variables.

3.2.5 Macro-economic implication of the eclectic paradigm

In terms of macro-economic implication of the eclectic paradigm, Dunning proposed the investment development path (IDP) model (see section 2.4.3), and therefore extended the paradigm in explaining the changing international position of countries as they passed through different stages of development. The basic hypothesis of the IDP is that as a country develops, the configuration of the OLI advantages of the MNCs that might invest in that country and its own firms that might invest overseas, undergoes change, and that it is possible to identify the conditions of changes and the changes of the variables (Dunning, 1981b, 2003). The concept also suggests the ways in which the

interaction between foreign and domestic firms might influence the country's investment path (Tolentino, 1993, Dunning et al, 2003).

In addition to the description of the different stages in IDP as in Section 2.4.3, the interaction and changes of OLI variables are illustrated in Table 3.3.

Table 3.3 OLI variables in the IDP model

	Inward investment		Outward investment	
Stage 1	Of	Substantial	Od	None
	I	Substantial	I	Not applicable
	Ld	Few	Lf	Not applicable
Stage 2	Of	Substantial	Od	Few
	I	Substantial	I	Few
	Ld	Improving	Lf	Few
Stage 3	Of	Declining/ more specialized	Od	Growing
	I	Declining	I	Growing
	Ld	Declining	Lf	Growing
Stage 4	Of	Declining/ more specialized	Od	Increasing
	I	Declining	I	Substantial
	Ld	Declining	Lf	Increasing

Source: Dunning (1981b)
Note: O = ownership advantages; L = locational advantages; I = internalization advantages; f = foreign; and d = domestic.

This IDP model further developed and introduced the dynamic element into the eclectic paradigm at macro-economic level. It confirms the equation 1-4 in previous section by taking into consideration the time dimension and various countries' development path. In fact, the concept in the dynamic form of eclectic paradigm and IDP model are very relevant in explaining the recent fast growth of inward and outward internationalization processes in developing countries. The inward and outward investments (see section 2.3.5) in a country are two closely connected processes during the country's economic development, and they impact each other. How to better utilize the inward internationalization and to concrete its own competitive capability and consequently

explore its own outward internationalization are some major issues facing the governments in developing countries.

3.3 The eclectic paradigm: applications

The eclectic paradigm has been the leading explanation for the growth of MNCs activities over the past two decades (Cantwell and Narula, 2003) in terms of the application and extension of the paradigm in various perspectives. The simplicity and generality of the eclectic paradigm makes it widely applicable in a number of economic and managerial situations. It has been applied by management scholars, economic geographers, evolutionary economists, resource-based theorists and development economists, among others (Cantwell and Narula, 2003).

3.3.1 Empirical studies by Dunning and others

From the emergence of the eclectic paradigm in 1976 to the early 1990s, Dunning, together with others, had done some empirical studies for the paradigm to refine the theory and to examine its viability. These empirical studies include Dunning (1979), Dunning (1980), Dunning and Mcqueen (1982) and Dunning (1986) and others (Table 3.4).

Table 3.4 Eclectic paradigm: empirical studies by Dunning and others

Economic sectors/ subjects of study	Description	Country/regions	References
Manufacturing sector	Empirical study of the eclectic paradigm	*In* developed countries	Dunning (1979)
Manufacturing sector	Empirical study of the eclectic paradigm	*From* the US	Dunning (1980)
Hotel sector	Empirical study of the eclectic paradigm	Global perspective	Dunning and McQueen (1982)

Manufacturing	Empirical study of the eclectic paradigm	*From* Japan, *In* UK	Dunning (1986)
Hotel sector	Empirical study of the eclectic paradigm	Global perspective	Dunning and Kundu (1995)

Note: "*From* xxx country/region" refers that the study focuses on the MNCs from xxx country, i.e. the nationality of the MNC and its home country; while "*In* xxx country/region" refers that the study focuses on the activities of MNCs which were conducted in xxx country, i.e. the host country.

In Dunning (1979), the MNCs from manufacturing industry in US, Japan, UK, Sweden and West Germany were chosen to the study which showed the applicability of the eclectic paradigm in terms of the explanation of the different structures and patterns in the different countries, as well as the incentives of FDI from those countries. In Dunning (1980), Dunning conducted an empirical analysis regarding to the US MNCs from manufacturing sector with their operations in 7 countries to test the applicability of the eclectic paradigm. Similarly with the previous works, Dunning (1986) used the eclectic paradigm to study the Japanese manufacturing MNCs with their operations in the UK. In addition to the studies for the MNCs in manufacturing sector, Dunning and McQueen (1982) applied the eclectic paradigm to study the 81 international hotel companies with their operation in 22 countries. Dunning and Kundu (1995) empirically analyzed the international hotel industry using the eclectic paradigm.

From all these empirical studies done by Dunning and others over the two decades, it may be concluded that the eclectic paradigm is powerful and applicable to the studies of the internationalization of MNCs in different industries and countries contexts. Some major findings may be cited here as examples.

- Relative market size of the US was identified as a major locational advantages of US manufacturing MNCs in internationalization, and the level of the skilled

employment ratio in US was the key ownership advantages of its MNCs. (Dunning, 1980).

- The major ownership advantages of Japanese MNCs in UK were identified as: (i) product quality and their quality control system; (ii) level of management skills and workers' commitment and (iii) the flexibility of production processes and working system. The major locational advantages of UK market for the Japanese MNCs include political stability; size of market; technological infrastructure; labor and professionals' quality and others. (Dunning, 1986).
- The ownership advantages of successful MNCs in international hotel industry were revealed as (i) firms' reputation as established trademarks and brand names; (ii) lower cost in human resource management and training; and (iii) knowledge of the tastes and requirement of home country clients. The locational advantages for a particular host country market include: (i) the size and economic growth of the host country market; (ii) the opportunities and potential development of tourism in host country; (iii) the availability and quality of hotel related infrastructure; and (iv) the political, social and economic stability of the host market. (Dunning and McQueen, 1982; Dunning and Kundu, 1995).

Some common features may be found in these early empirical works, and these are: (i) the studies focused on the MNCs either from developed countries or operating in developed countries; (ii) comprehensive empirical tests were drawn mainly on manufacturing sectors, rather than service sectors except hotel industry; and (iii) the studies were confined to certain time period of the MNCs' operation rather than with a dynamic time dimension.

3.3.2 Applications and extensions in non-construction sectors

From the 1990s, many empirical works, application or extensions of the eclectic paradigm were received in literatures. Due to its flexible applicability and generality, the eclectic paradigm has been applied in many areas related to internationalization and MNCs' activities in different economic sectors and different countries or regions from which the MNCs were originated or in which the MNCs' activities were conducted. It is neither possible nor pertinent to review all these applications in this chapter; instead, some typical studies are presented here, which may provide some further implication when the theory is applied to construction industry.

Table 3.5 Eclectic paradigm: applications in non-construction sectors

Economic sectors/ subjects of study	Description	Country/regions	References
Manufacturing sector	Application of IDP model	*From* Hong Kong	Lee, et al (1998)
Manufacturing and service sector	Application of the paradigm	*From* US	Riahi-Belkaoui (1999)
Service sectors	Application of the eclectic paradigm	*From* six developed countries	Nachum (1999)
FDI at country level	Application	*In* Malaysia	Ramasamy, B. (1999)
Financial sector	Examine the finance-specific factors within OLI paradigm	*From* developed countries	Oxelheim, et al (2001)
SMEs	Application of OLI paradigm on the study of SME from Swiss	*From* Swiss	Hollenstein (2002)
FDI and MNCs	Application of the eclectic paradigm	*In* Sub−Sahara Africa	Anthony (2002)
Financial sector	Extension the paradigm to explain the foreign portfolio investment (FPI) in terms of the OLE (E refers to externalization)	*In* developing countries	Dilyard (2003)
25 largest MNCs from various sectors	An application	*In* Latin America	Grosse (2003)
International franchisers (23 firms)	Choice of entry modes using franchising approach, an application of the envelope version of the eclectic paradigm	*From* UK and US	Pak and Beldona (2003)

Banking sector	Application	*From* Italy	Piscitello (2003)
E-commerce sector	Extension of OLI paradigm and IT implication in MNCs	Global perspective	Dunning, and Wymbs (2003)
(Not applicable)	Theoretical extension of OLI to OLMA (ownership, location, mode of entry and geovalent adjustment)	(Not applicable)	Guisinger (2003)
Manufacturing sector	Application of OLI model and extension of L advantages	*From* US	Eden, et al (2003)
Advanced Technology Program	Application of OLI model with spatial dimensions	*In* US	Spender (2003)
Extralegal enterprise (XLE)	Application of OLI paradigm on the issue of illegal drug trading in US	*In* US	Mudambi and Paul (2003)

Note: "*From* xxx country/region" refers that the study focuses on the MNCs from xxx country, i.e. the nationality of the MNC and its home country; while "*In* xxx country/region" refers that the study focuses on the activities of MNCs which were conducted in xxx country, i.e. the host country.

FDI and MNCs' activities

To analyze FDI and MNCs' cross-border activities is the primary intention of the creation of eclectic paradigm. Recently, the application and extension of the paradigm in this aspect is no longer to be restricted in the studies of the FDI and MNCs from developed countries or operating in developed countries. Following the eclectic paradigm, Anthony (2002) provides an empirical assessment of the factors that significantly influence the long run transnational corporations' investment decision making process in Sub-Saharan Africa. The study suggests that the most dominant long run determinants of FDI in Sub-Saharan Africa are market growth, export orientation policy and FDI liberalization. These are followed by real exchange rates and market size. Groose (2003) applied the eclectic paradigm to empirically analyze the 25 largest MNCs from various countries operating in Latin America. He suggested that the eclectic paradigm offered a very useful perspective on FDI patterns during the second half of the 20th century.

Ramasamy (1999) extended the OLI paradigm by incorporating two other factors, namely reversibility and delayability in the behavioral issues, to explain the behavior of foreign investors interested in investing in Malaysia. The paper analyzed the changing nature of sectoral FDI and links this to the reversibility and delayability factors. He found the evidence of the delayability aspect of FDI under uncertainty and the irreversibility of such investment in Malaysia.

Manufacturing sectors

MNCs from manufacturing sectors are always the major components in international market. Riahi-Belkaoui (1999) adopted the eclectic paradigm in the study on international manufacturing firms from the US. His study incorporated the firm behavioral considerations and validated the OLI paradigm by identifying the significant O, L, and I advantages of the firms. Eden et al (2003) studied the US manufacturing MNCs over the 1990-1994 period using moderated multiple regression analysis using the OLI framework, and further extended and decomposed L into three components and two measuring depth and a third breadth. He also found that O and L advantages both independently and interactively affect MNCs performance and the multinationality are positively related to financial performance.

Lee et al (1998) is one of the few empirical studies using the economic development path model. It studied the globalization of Hong Kong manufacturing industries on the basis of a survey and structured interviews. The results are analyzed in the light of the well-established models of national economic development including Dunning's IDP model. It is concluded that the manufacturing sector is as important as the service sector

for the stability and growth of Hong Kong and that Hong Kong's manufacturing sector needs to rapidly acquire greater technological sophistication.

Financial and banking sectors

The application and extension of the eclectic paradigm in financial and banking sectors are perceived in a number of literatures due to the rapid development and the increasing importance of the cross-border financial activities in recent decade.

Oxelheim et al (2001) enriched the OLI paradigm by incorporating the finance-specific factors as drivers of FDI. The paper suggests that financial strategies involving factors such as debt/equity swaps or equity-listings in foreign equity markets affect the firm's relative cost and availability of capital, and motivate a firm's engagement in FDI. The large MNCs, as the predominant resident in the US, UK, Japan or other liquid markets, have no restrictions as regards their ability to achieve a competitive cost and availability of capital. Therefore, this study emphasizes the relevance of finance-specific proactive strategies for FDI to occur. Eight testable hypotheses were tested based on the recognition of finance-specific factors as active drivers of value creating FDI. Dilyard (2003) encompassed the foreign portfolio investment (FPI), the counter-part of FDI in international market, into the eclectic paradigm, and a mode of OLE – ownership, locational and externalization advantages – are formulated for the analysis of FPI. By doing this, the eclectic paradigm was extended and the analysis of FDI and FPI were integrated. Various factors influencing the operation of FPI were also identified. Another application of the eclectic paradigm in banking sector is Piscitello (2003),

where the recent globalization of the Italian international banks was analyzed based on the eclectic paradigm.

Other service sectors

Nachum (1999) applied the eclectic paradigm along with other related theories into various service sectors, including the advertising agencies in the US, the UK and France, the professional service industries in various countries, the Swedish engineering consulting firms, and the Danish and UK management consulting firms. The various ownership advantages of the MNCs, major locational advantages of the home and host countries and the incentives and sources of competitiveness of the firms were identified. Dunning and Wymbs (2003) analyzed the challenges in the existing international business networks brought by the rapid application of IT. The influences of e-commerce in international business as well as the competitiveness of MNCs fostered by the high technology were analyzed using the eclectic paradigm.

Trading related sectors

In Pak and Beldona (2003), the business strategies and competitiveness of the international franchisers were analyzed by the eclectic paradigm. They argued that the OLI paradigm provided a solid framework for testing not only what the companies were trying to take advantages of but also the dynamic learning aspect of the international franchising operations. They concluded that the selection of foreign market entry model could be regarded as a strategic approach to acquiring new knowledge especially for UK franchisers. Mudambi and Paul (2004) focused on multinational activity by

multinational extralegal enterprise (XLEs) in the illegal drug trade, examining the applicability of the OLI paradigm, and they found that the location and internalization aspects of the paradigm apply well, while the ownership aspect does not.

Other applications and extensions

Currently, the application and extension of the eclectic paradigm are featured in diversified business situations and in multidisciplinary economic sectors. Hollenstein (2002) studied the international activities of Swiss-based SME firms with special emphasis on differences by size and sector. The analysis validated the eclectic paradigm, with O advantages being the main drivers, irrespective of firm size, sector and internationalization strategy. However, he also found important differences by firm size: L advantages foster international activities only in case of SMEs; I advantages are relevant primarily for large firms; application-oriented knowledge and foreign experience are particularly relevant O advantages in case of SMEs, whereas R&D is an O advantage of prime importance for large firms.

Guisinger (2003) theoretically extended the eclectic paradigm's OLI variables into OLMA model, where ownership (O), location (L), mode of entry (M) and geovalent adjustment (A) explain the principle determinants of MNCs' performance.

Spender (2003) extended and illustrated the OLI paradigm with three spatial dimensions, and applied it to the Advanced Technology Program in the US. He concluded that the eclectic paradigm is powerful to meet the conceptual needs of business and government decision makers.

3.3.3 Applications in construction-related sectors

One of the significant empirical studies of applying the eclectic paradigm in international construction industry was done by Seymour (1987). Some other application of the paradigm in construction industry include: Mansfield (1988), Abdul-Aziz (1995), Cuervo (2002), Cuervo and Low (2003), Wymbs (2003), Low, Jiang and Leong (2004) and Low and Jiang (2003, 2004a, 2004c and 2005). These works mainly applied the eclectic paradigm to study the construction MNCs or the construction industry in certain countries or regions by identifying the respective O, L, I advantages and therefore providing some explanation of the construction MNCs' activities, as well as the business strategies in various locations.

Table 3.6 Eclectic paradigm: applications in construction-related sectors

Economic sectors/ subjects of study	Description	Country/regions	References
Construction sector	Application of the eclectic paradigm	Global perspective	Seymour (1987)
Construction sector	Application of the eclectic paradigm	*From* UK	Mansfield (1988)
Construction sector	Application of the eclectic paradigm	Global perspective	Abdul-Aziz (1995)
Construction sector	Application of the eclectic paradigm	*From* Singapore	Cuervo (2002)
Public utility sector	Application of the eclectic paradigm with dynamic analysis	*In* US	Wymbs (2003)
Construction sector	Application of the eclectic paradigm	*From* Singapore	Cuervo and Low (2003)
Construction sector	Extension of the eclectic paradigm to OLI+S model to analyze international construction industry and CMNCs	*From* UK, China	Low and Jiang (2003; 2004a; 2004c), Low, Jiang and Leong (2004)

Note:
"*From* xxx country/region" refers that the study focuses on the MNCs from xxx country, i.e. the nationality of the MNC and its home country; while "*In* xxx country/region" refers that the study focuses on the activities of MNCs which were conducted in xxx country, i.e. the host country.

In Seymour (1987), the eclectic paradigm was used to study the multinational construction industry with the focus of UK construction MNCs. By doing so, the various factors and advantages in terms of O, L and I variables were identified and analyzed. A further elaboration of Seymour's works is in next chapter, where the major OLI advantages are summarized in terms of the analysis of international construction industry.

Mansfield (1988) analyzed the UK international construction sector based on the eclectic paradigm, and formulated the results in a SWOT (Strength, Weakness, Opportunity and Treats) analysis at both country and firm levels. His study reveals that UK firms demonstrated their expertise to offer and to differentiate themselves from competitors in various advantages. Reputation, size, human capital and breadth of services were shown to be vital firm specific advantages; the quality of management and international experience were also key elements. The country specific advantages of competitors were seen in the financial and political backing, the effective subsidy of feasibility studies. Financial institutions played an important role in UK construction firms' international business, and they were, for example, the major aid agencies and the private UK banking sector. Because the consulting engineers, surveyors and architects do not have to carry out their service on the site of the project location, they are more free to carry out some of the work in another country and gain certain advantages from doing so. He also found that joint ventures with host-country partners were important for entering the host markets. As of the locational advantages, firms indicated that they tended to operate in countries where they had projects in the first place, and from there, they could tender for work in neighbouring countries and gradually extend their influence. The significant locational advantages included the

favorableness to their own nationality on cultural grounds, the demand of the host market. The counteracting competitor's political associations and the direct government interventions were proved to be difficult for many firms.

Abdul-Aziz (1995) emphasized on assessing the role of internalization factor for international contractors, as well as identified various ownership and locational advantages that construction MNCs should exploit. For example, the indigenous skills of the host country, the local research and development capacities, the host government assistance were identified as important country specific advantages. He also argued that the traditional view of FDI is not the only basis of construction MNCs' internationalization, while the joint ventures, subcontracting or contractual arrangements should also be considered as important approaches pursued by construction MNCs. Internalization advantages should not be viewed as superfluous in the analysis of construction MNCs' internationalization, and the internalization advantages of construction MNCs does not only include the type of entry modes to foreign markets, but also the internalization of the firm's tangible and intangible assets in foreign markets.

Cuervo and Low (2003) analyzed the significance of ownership advantage and disadvantage factors of Singapore transnational construction corporations in their internationalization of construction business. They examined the relationship of these ownership factors and the firm specific contextual variables such as size, international age, multinationality and extent of specialization/diversification. They found the most important ownership advantage of Singapore construction MNCs, namely (i)

information, knowledge, technology and R&D capability; (ii) the firm's name and reputation; and (iii) management and organizational capability.

Wymbs (2003) adopted the eclectic paradigm not only at static but also at dynamic perspectives by introducing time dimension in the study. This study used the eclectic paradigm as a theoretical framework for examining the growth of the public utility industry, including the infrastructure for telecommunication, electric, gas and water, since their inception in the late 1800s. The modality of investment by MNCs, their geographical orientation, their foreign investment and how these have changed over the past 125 years, have been portrayed in terms of the changing nature of the OLI variables and the interaction among them.

3.4 Re-examination of eclectic paradigm

From the above literature reviews, it may be perceived that Dunning's eclectic paradigm represented by the OLI variables can serve as a platform for incorporating the economic and business theories of MNCs to interpret the internationalization process of firms including the construction MNCs. In terms of its generality and flexibility, the paradigm has been applied and therefore empirically tested in various economic sectors and in a number of country's contexts, especially for the transnational activities of MNCs in manufacturing and financial sectors. However, there is a need to re-examine the eclectic paradigm in the current context of international construction industry on its applicability in the context of China's construction MNCs. Some reasons are given as the following:

- There are increasingly changed factors that may influence the O advantages of the construction MNCs in international construction market, such as the overall globalization trend of economy and the increasing involvement of the construction MNCs from developing countries; the more complicated issues regarding to the tangible and intangible assets possessed by the construction MNCs and so on.
- Most of the existing studies are concentrated on the MNCs from developed countries, especially the triad countries, and more studies are focusing on the analysis of L advantages of the location in developed countries than that in developing countries. This is probably because it is just during the recent two decades that the developing countries are increasingly becoming the receivers of FDI from developed countries, and the outward FDI from developing countries has just started largely during the past decade.
- In terms of the internalization advantages, the construction MNCs may adopt more diversified market entry models and business strategies than before, and how the clients demand the construction services and products in terms of the international project procurement approaches are also diversified (see Chapter 4), therefore more comprehensive study in this aspect may be needed.
- Most of the empirical studies and the applications of the eclectic paradigm were conducted at micro-economic level without the macro-economic implication. Actually the macro-economic implication of the eclectic paradigm has been increasingly drawn attention, especially for the context in developing countries.
- The transitional nature of China's economy from a centralized planning system to a market system places many unique characteristics for Chinese construction MNCs comparing with those from developed countries. Despite a number of

applications of eclectic paradigm, it appears that none has been done for China's context.

- Although the generality and flexibility of the eclectic paradigm have been widely reckoned, it appears that no attempt has been made to apply the OLI paradigm to the analysis of domestic market, either for construction sector or for non-construction related sectors.

Because of the reasons mentioned above, a re-examination of the eclectic paradigm becomes pertinent.

Chapter Four

CONSTRUCTION MNC AND INTERNATIONAL CONSTRUCTION INDUSTRY[1]

4.1 Introduction

This chapter provides an economic overview of international construction industry construction MNCs. Based on relevant economic theories, two transaction chains of international construction are proposed to analyze the internalization and externalization of CMNCs, and OLI+S model is formulated to quantitatively estimate the internationalization of construction MNCs.

4.2 International construction industry

4.2.1 Definition of international construction

The construction industry is one of the oldest sectors in the world economy, and the construction process as a production and transaction process of the built or to be built products has been comprehensively studied. International construction is also not a new phenomenon, which has evolved for more than a century. The important role of construction in the development of nations and global economy is widely accepted (Low and Aziz, 1993). However, it is not easy to provide a formal definition for international construction (Mawhinney, 2002; Bon and Crosthwaite, 2000). Strassman (1989) states that the international or overseas construction takes place when a firm of any country builds at a foreign site. Mawhinney (2002) suggests that the simple

[1] Contents in this chapter have been published in Low and Jiang (2004a, 2004b, 2004c) and Low, Jiang and Leong (2004).

definition, such as the word “international” implies where one company, resident in one country, performs works in another country raises many complications in today’s global construction business world. One problem involves the identification of the nationality. Due to increasing globalization and cross-border merger and acquisition, the ownership and the organizational structure, as well as the managerial staffing and asset allocation become difficult to be clearly identified as belonging to a certain country. Moreover, Ofori (2003) pointed out that the definition of an international construction project as one undertaken by an enterprise outside its home-country is out of date, and that the definition must now include projects in a home-country involving foreign firms as competitors (West, 1992; Momaya and Selby, 1998). In the author’s view, modern international construction should be considered with both the inward and outward internationalization process (see Section 2.3.5 for details), and this is specially meaningful when the international contractors from developing countries and the construction market in developing countries are under consideration.

For one of the major players in international production, Seymour (1987) defined that the international contractor is an enterprise that utilizes its productive facilities in pre-demanded constructional activities using capital that is not owned by the firm. Although this definition excludes property development, government housing development, consultancy services, and logistics and facilities management, the scope defined by Seymour (1987) is the major focus of international construction at the time his study was conducted. Howes and Tah (2002) identified five elements of international construction that comprise the process associated with construction on an international scale, namely design consultancy, contracting, equipment supply, products and materials and facilities management. The relationship between these elements and their

stakeholders depends on how the clients demand the construction services and products in terms of project procurement approaches and how the international contractors supply their services in terms of their internationalization business strategies (further discussions on these issues can be found in sections 4.4, 4.5 and 4.6). Hence, international construction may be described as construction processes which cross national borders and are composed of production and transaction processes of the built or to be built products and the services associated with such products.

4.2.2 International construction process

Construction process involves the translation of a client's needs and intentions, first into documents and other information, and later into a physical item (Ofori, 1990). In other words, the process is the intermediate in which the raw materials are transformed to the final product (Seymour, 1987). In general, the construction process are composed of the production and the transaction process of the built or to be built products and the services associated with such products. Winch (2002) analyzed the governance of construction process drawing on transaction cost analysis. He presents a conceptual framework covering all the different transactions throughout the construction project lifecycle in terms of the vertical and horizontal dimensional governance in the construction value system (see Figure 4.1). Traditionally, the whole process is divided into several phases, for example, the initial phase, planning phase, design phase, construction phase and operation and maintenance phase (Pietroforte, 1997).

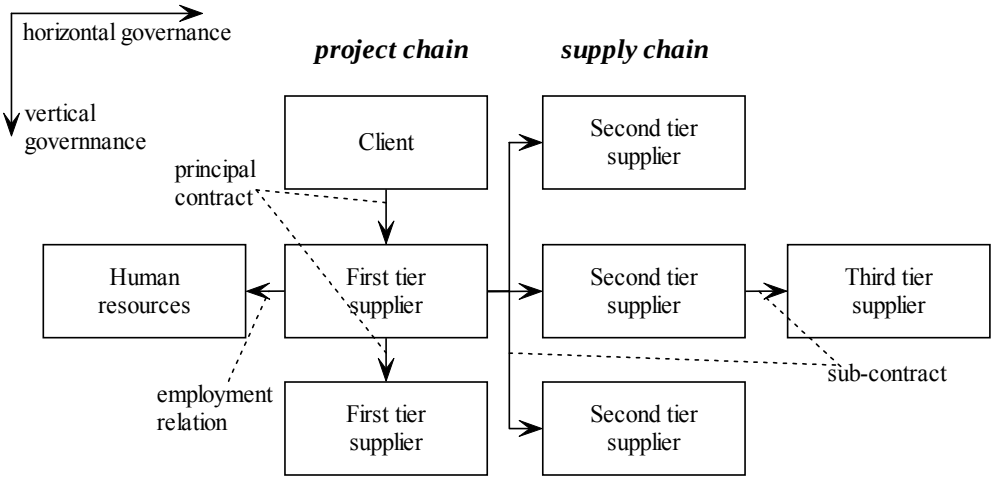


Figure 4.1 Vertical and horizontal governances in construction value system
Source: Winch (2002)

In view of the complexity and diversity of construction process currently in international construction industry, the whole process may be considered as the combination of the production cycle and the related transaction activities. The production cycle as shown in Figure 4.2 includes two sub-cycles: the first cycle involves the initiation of project, the construction process and the handover of the built facilities; the second cycle involves the production in the built facilities and the transaction of the end products. The second production cycle is traditionally not considered as a part of the construction process. However, due to the increasing implementation of PPP/PFI including BOT or BOOT procurement in international construction market, it is necessary to take into account the second cycle into the integrated construction process.

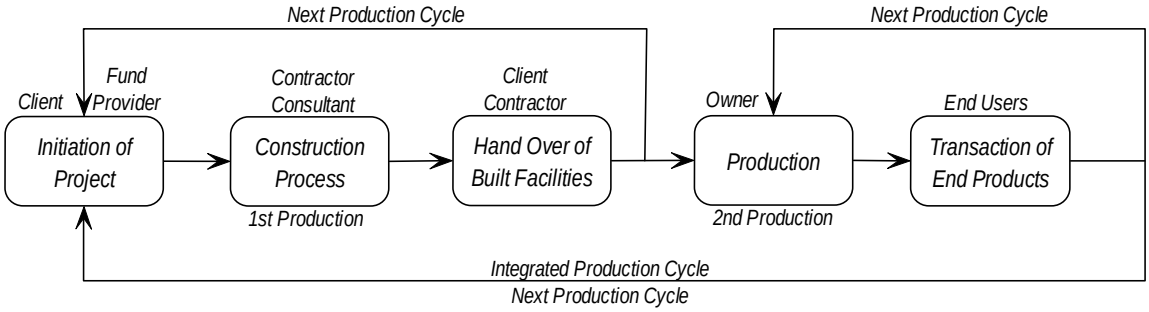


Figure 4.2 Production cycle in construction-related activities

Source: the author

In the production cycle, several phases may be identified and they may vary according to different procurement approaches. Furthermore, each of the phases may be divided into five sub-processes, namely the initiating process, planning process, executing process, controlling process and closing process. For example, in the traditional procurement approach, the whole construction process may include (i) the initial phase (feasibility study, conceptual design, etc.), (ii) planning phase (contractor qualification, tendering and bidding, etc.), (iii) design phase, construction phase (execution of contract), and (iv) delivery phase (contract closing, and maintenance). Each phase may further be divided into five sub-processes, namely: (i) initiating process (authoring and preparing), (ii) planning process (defining and refining objectives, and selecting the best alternative), (iii) executing process (coordinating resources including human resource and other resources to carry out the plan), (iv) controlling process (monitoring and measuring the progress to identify the variances from plan to actual works) and (v) closing process (accepting the output) (Figure 4.3). The sub-processes are linked by their inputs and outputs, for example, the inputs in construction phase need to be the outputs in the design phase. These sub-processes are also interacted and overlapped (Figure 4.4).

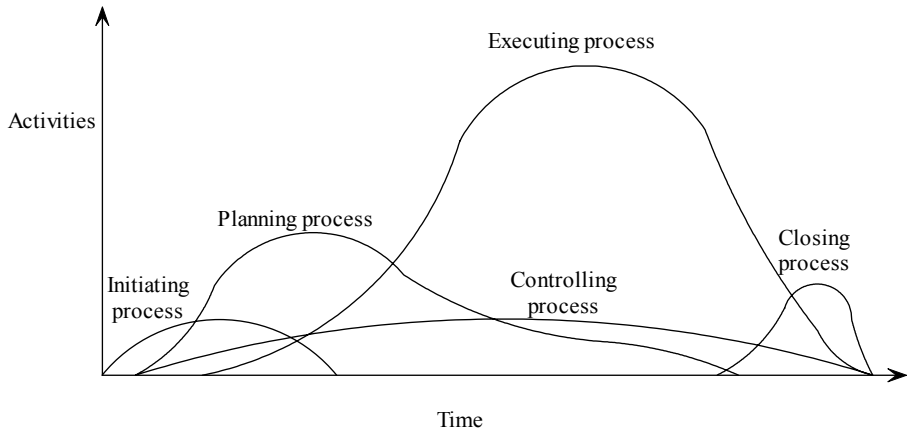


Figure 4.3 Sub-processes in one phase of construction process
Source: Adapted from PMI (2000)

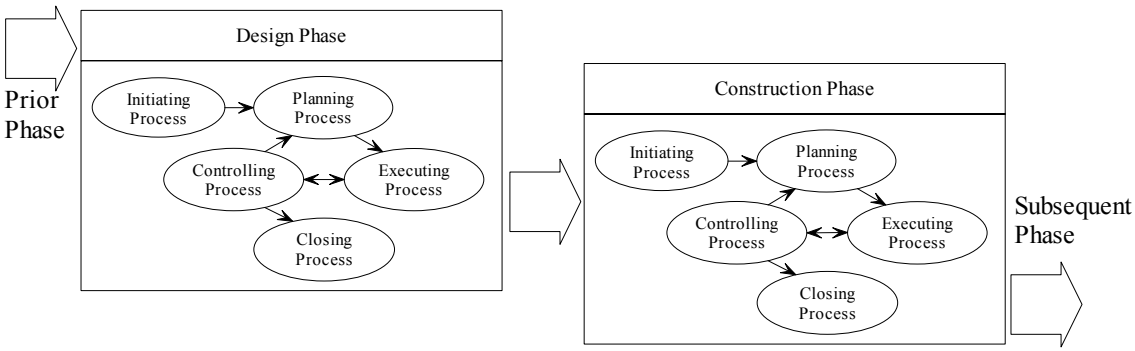


Figure 4.4 Interaction between different phases in construction process
Source: adapted from PMI (2000)

4.2.3 International construction industry

Many literatures have given the definition of the construction industry from different perspectives, such as the one in Hillebrandt (2000) with reference to types of projects, or the one in Bennett (1991) with reference to the technologies involved. One of the best definitions is offered by Ofori (1990), where the construction industry is defined as the sector of the economy which plans, designs, constructs, alters, maintains, repairs and eventually demolishes buildings of all kinds, civil engineering works, mechanical and electrical structures and other similar works. Ofori's (1990) definition excludes from the industry the activities of (i) the investment segments in the construction process, which is especially important in PPP/PFI arrangements or the BOT and BOOT projects; (ii) clients' own investing, constructing, owning and operating facilities and works, which is at one extreme of the construction transaction chain (see section 4.4); (iii) the supporting activities such as external logistical sectors including sub-contracted material supply and machinery and equipment rentals. Ive and Gruneberg (2000) made a distinction between construction – the act of adding value to the existing stock through new build and repair and maintenance – and the stock of constructed assets constituting the built environment. The former is a positive flow that adds to the latter stock, with natural depreciation being the negative flow. The activities of repair and

maintenance tend to offset at least some of the stock depreciation, and usually add value to the stock. The value of the stock also changes with real price movements regardless of any change in physical assets.

In summary, Figure 4.5 shows a schema of the structure of the construction industry. The bold line encloses the traditional narrow definition of construction value. The narrow sector is essentially the 'contractors' box in Figure 4.5 and refers to on-site assembly and repair of buildings and infrastructure, including site preparation, construction of buildings and civil engineering works, building installation (e.g. electrical wiring, plumbing), building completion (e.g. painting, plastering) and renting of construction or demolition equipment supplied with an operator (Pearce, 2003). Following this concept, 'contractors' tend to be defined to exclude those who engage in self-build, construction in the informal sector, and direct labor. The broader sector can be seen to include the supply chain for construction materials, products and assemblies, and professional services such as management, architecture, engineering design and surveying and land and facilities management (Pearce, 2003). This wider definition has the virtue of drawing attention to the economic activities that directly depend on the narrower definition of the construction industry. The fortunes of these activities are critically inter-dependent with the fortunes of the contractors. In fact, this broader concept in Pearce (2003) is consistent with the author's view of the two production cycles in the international construction process as described in section 4.2.2.

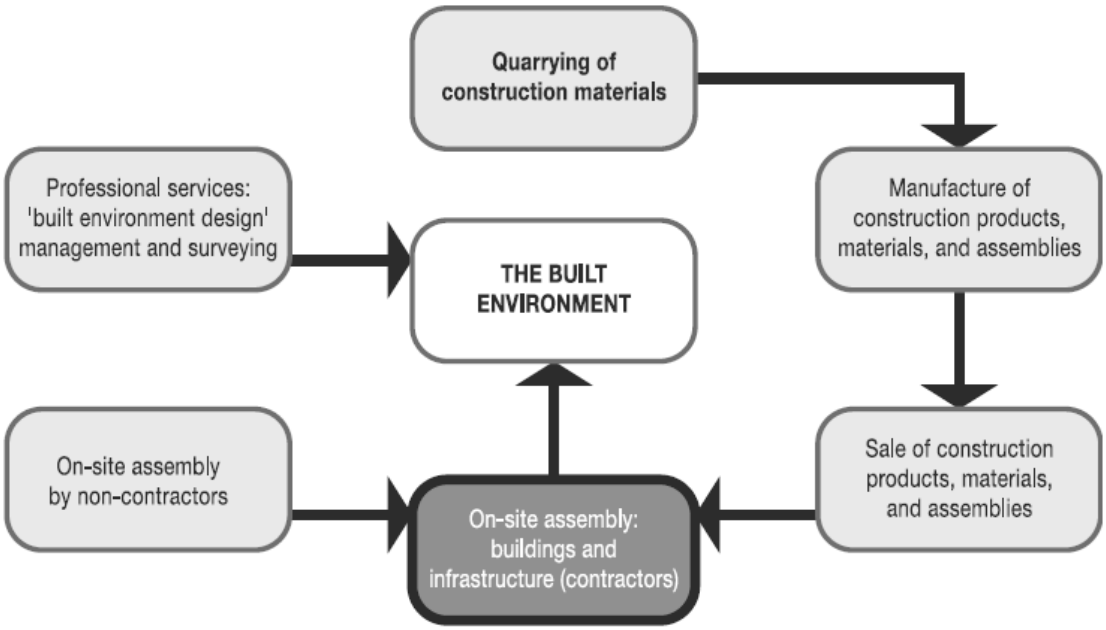


Figure 4.5 The structure of construction industry
Source: Pearce (2003)

The construction stakeholders

In the construction process as described earlier, the key stakeholders in construction market are the client, the design and/or supervisory consultant, and contractor. The client is the individual or organization commissioning the project and directly employing the designer(s) and contractor (or construction manager) (Will et al, 1997). The clients may come from either public sectors or private sector, or the combination of the two. In line with the recent portfolio investment in international construction financing, Howes and Tah (2003) identified the client structure and the split between public and private expenditures. In this case, the international corporate portfolio in construction industry may consist of five major components: government, private sectors, foreign investors, PPP/PFI and aid from other sources.

In addition to the three key stakeholders, others in the international arena may be identified as material and equipment suppliers, foreign and indigenous competitors and/or partners, financial agents, and sub-contractors, and others.

The construction products and services

As mentioned earlier, the construction process comprises the production and the transaction process of the built or to be built products and the services associated with such products. Hence, the built or to be built products are the tangible products as the output of the construction process. According to ENR, construction works available in international market are classified into ten categories, namely: general building, manufacturing, power, water supply, sewerage/solid waste, industrial process, petroleum, transportation, hazardous waste, and telecommunications (ENR, 2001). The construction products therefore are the various facilities in the ten fields, such as: building, manufacturing plant, hydro- or thermal- power plant, water supply and/or treatment system, petroleum plant and platform works, road and bridge, highway, railway, airport, sewerage plant, transmission system, and others. It may be noted that the construction products normally refer to the production outputs, i.e. the built facilities from the first production cycle, rather than that from the second production cycle (Figure 4.2). The outputs from the second cycle may be (i) the services provided based on the built facilities, e.g. highway, bridge, building rental, etc.; (ii) the final products from the second production cycle, e.g. electricity generated from the hydro- or thermal-power plant, water supplied and treated from the water supply system constructed in the first cycle, etc. The products from the second production cycle may also be considered as part of construction products when the construction processes are procured on an integrated approach such as BOT basis.

The services associated with the construction products include, but are not limited to:

- in the first production cycle: financing services for the works financed from third parties or banks, principle advisory works for project initiation, design works, supervisory and/or consultancy works, construction management, project management, logistic works (material and equipment supply and rental, etc.) and labor services;
- in the second production cycle: maintenance, retrofitting, renovation, alterations and operation.

The characteristics of international construction industry

Literatures have contributed much on the analysis of characteristics of international construction industry, and these include: Hillebrandt (1985, 1990), Seymour (1987), Ofori (1990), Linder (1995), Mawhinney (2002), Bon and Crosthwaite (2000), Low and Rashid (1990) and Strassman and Wells (1988). The major characteristics may be summarized as follows.

- *Immobility of the products and mobility of the process*. The built facilities from the construction process are normally fixed to their locations, and therefore, the process may be influenced by many locational factors, which may differ from one location to another in terms of the geographical conditions, social and political environment and many other related issues.
- *Risks and uncertainties associated with the various stakeholders change along with the construction process progress*. The risks associated with different construction stakeholders, such as the clients, contractors, the financer and even the general public, may change during the construction works progress. At a

certain point of time, the risks associated with different stakeholders are also different and those risks may be interactive between them. Risks associated with them determine the interrelated or independent responsibilities of the parties.

- *Complicated contractual relationship among parties involved*. Because of the complexity of relationship between parties in international construction, complicated contractual relationship have been well established and practised.
- *International construction projects have long gestation and long implementation periods*. Therefore they are vulnerable to exchange risk fluctuation, inflation, social orders, and political instability, etc.
- *Quality and safety* are important and common concerns in the international projects.
- *High fragmentation in the industry*. International construction works involve much cooperation from different specialties, many professionals with different nationalities with different social and cultural background. The segmentation of information needed in the construction process by different specialized professionals further intensified the fragmentation of the industry.
- *Other characteristics*: less barrier to enter into the sector; one-off nature of project; impact on local society, economy and environment, and others.

4.3 Historical development of international construction industry

From the transnational construction of railway projects in the 1840s to that of the petrochemical plants during the late of the 20th century, the construction industry probably is one of the earliest internationalized and the most complicated economic sectors. Historically, two trends in transnational construction have been observed

(Linder, 1995). One has been associated with extraction, which has led to construction projects at the sites of raw materials, such as mines and oil wells, as well as to constructing an infrastructure to service those sites, ranging from rail lines, canals, oil and gas pipelines, to electrical or other power sources. The other involves local production and economic development ventures, such as those of infrastructure, of national productive capacity, of people's welfare, and of capital accumulation.

4.3.1 Brief review of development in international construction

Modern construction industry was initiated by the industrialization in Europe and later in America in the nineteenth century. The beginning of international construction was signaled as the transnational building of railways in the 1840s.

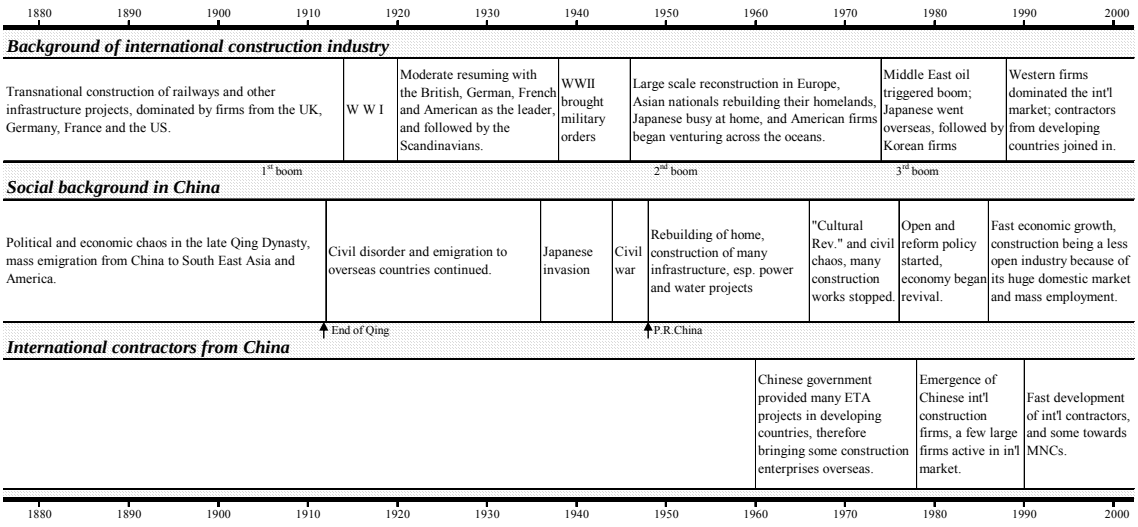


Figure 4.6 Brief review of development of international construction
Source: Jiang *et al*. (2003)

During the second half of the nineteenth century, the construction firms from the industrialized nations, such as the UK, France, and Germany and the US, dominated the infrastructure construction, firstly in their homes and later in their colonized overseas

states (Figure 4.6). By the turn of the twentieth century and prior to the World War I, the international construction industry received its first world wide boom with the construction sites being seen in almost every continent. The contractors were from the then major economic giants and the projects were constructed not only for the dominating railways but also for waterworks, dams, roads, and other infrastructures.

During the period between the two world wars, the international construction industry witnessed a moderate resumption with the British, German, French and American firms still as the key players, and the firms from the Scandinavia following up. During the World War II, the military orders transformed the course of the international construction firms, particularly the US firms. The second boom in the international construction industry did not come until the end of the war, when the large scale of reconstruction was undergoing in Europe. Meanwhile, the Asian countries started to rebuild their homelands, and consequently a world construction market was emerged. As a significant event during this period, some American construction firms emerged as one of the strongest world power and dominated the global construction market.

The massive construction programs initiated by the Middle Eastern oil-exploiting nations in the mid-1970s triggered the third world wide boom of the international construction industry. During this boom, the Japanese joined in the international contractors' family and the Koreans followed up, after their domestic construction markets were saturated. Another important phenomenon thereafter probably is the influx of contractors into the international construction industry from the developing countries, such as Turkey, Brazil, and China, which may be perceived as a direct consequence of the availability of funding for the major development projects in many

developing countries, particularly in the Middle East and Southeast Asia. From then on, the international construction industry, although still significantly dominated by the few advanced nationals, was no longer monopolized by them, since the Japanese and Korean also consolidated their positions in the international market and the firms from developing countries diversified the composition of the international contractors' family.

After the turn of the 21st century, the fast economic growth in China injected some fresh blood into the world wide economic recession, as well as into the construction industry. In international construction industry, whether the fast industrialization in some developing countries which is fueled by their huge domestic markets, such as in China and India, can bring the fourth boom for the international construction industry is awaiting to be seen.

4.3.2 Historical review of dominant construction project types

The evolution of different types of construction project reflects the advancement of human's technology and ability to control and utilize the natural resources. During the period of pre-industrialization, irrigation and water control were the major concerns of the governments in European continent and few other more civilized regions in the world. The industrialization brought the large scale construction of railway, firstly in Europe and North America, and then in Middle East, other Asian countries and Latin America. The initial motive of people from the then advanced nations to build railway in their overseas colonized countries was to facilitate their extraction of local resources, however, construction of such infrastructure did help the local social and economic development at large. Major types of construction projects that were constructed in

different regions in the world during different historical periods were illustrated in Figure 4.7a based on an extensive review of literatures regarding civil engineering history, construction history, and general world history. These include: Kirby (1956), Gregory (1971), Toynbee (1972), Guest (1974), Armytage (1976), Channell (1989), Linder (1994), Berlow (1998), Rogers and Fredrich (2001).

To describe briefly, two dimensions of development were observed, i.e. the time span as the vertical dimension and the geographical span as the horizontal (See Figure 4.7a). Contributed by the industrialization, the engineering and construction professionals in Europe started their construction of railway and large scale canals, and later the urban development and highways. As the construction technology was developed significantly during the past one and half century, the transportation construction – highway, airport, and subway including tunneling works had become common in Europe and Northern America. The power projects including hydro-power, thermo power, and even the nuclear power stations at recent decades were also developed gradually. From the horizontal dimension, the construction development in Asia and Latin America was lagged behind that in Europe and Northern America, while some essential infrastructure construction are still underdeveloped in a few African countries. Technology-intensive construction, such as the high-rise buildings and more recently the high-tech buildings and facilities, were dominated in Northern America, and later in Europe and some Asian countries. A clearer picture is drawn by figuration of terms in Figure 4.7a into icons in Figure 4.7b. A "V" shape of development was observed in terms of the historical evolution of dominant construction projects in international construction, according to different regions in the world at different time periods. In other words, taking time as the vertical coordinate and the geographical locations arranged as in

Figure 4.7 as the horizontal coordinate, the type of projects with more technological contents appeared earlier (the middle: Europe and America). It may also imply that there is no single type of construction project dominating international construction industry but a "V" shape development led by the professionals in Europe and Northern America was observed, and the trend may be maintained as the structure of international construction industry in terms of dominant project types.

Period	Middle East	Asia (excl. Middle East)	Europe	America	Latin America	Africa
1980s-2000s	Petrochemical	Urban Improvement	Urban improvement	Urban improvement	Urban Improvement	Urban Improvement
	Highway	Highway	High-tech building	High-tech building	Highway	Highway
	Urban Improvement	Subway/Mass Transit			Airport	Hydro Power plant
	Airport	Airport				Irrigation & Water control
		Petrochemical				Airport
		Nuclear plant				
1960s-1980s	Petrochemical	Urban Improvement	Urban improvement	Urban improvement	Urban Improvement	Irrigation & Water control
	Highway	Hydro power plant	Highway	Highway	Highway	Hydro Power plant
	Urban Improvement	Thermo Power	Airport	Petrochemical	Hydro Plant	Highway
		Highway		Airport	Airport	Urban Improvement
		Subway/Mass Transit		Nuclear Plant		
		Airport		Wind Force Plant		
WWII -1960s	Railway	Railway	Urban improvement	Urban improvement	Urban Improvement	Railway
	Urban Improvement	Urban Improvement	Highway	Hydro power plant	Hydro Plant	Irrigation & Water control
	Irrigation & Water Control	Irrigation & Water Control	Subway/Tunneling	Highway	Railway	
			Airport	Subway		
				Airport		
1900s-WWII	Railway	Railway	Urban improvement	Urban improvement	Railway	Irrigation & Water control
	Irrigation & Water Control	Urban Improvement	Highway	Highway	Urban Improvement	
		Irrigation & Water Control	Subway	Hydro power plant		
			Thermo Power plant	Thermo Power Plant		
1850s-1900s		Railway	Canal	Railway		
			Railway			
			Urban improvement			
Pre-industrialization	Temple	Temple	Church		Temple	
	Church	Mosque	Castle		Church	
	Mosque					

Figure 4.7a Historical review of dominant construction types in the world
Source: based on various literatures about engineering and construction history, including: Linder (1994), Toynbee (1972), Guest (1974), Armytage (1976), Channell (1989), Berlow (1998), Rogers and Fredrich (2001).
Note: The exact time of a particular type of project is unable to achieve, but the time the projects were dominant in the locations is estimated according to historical records.

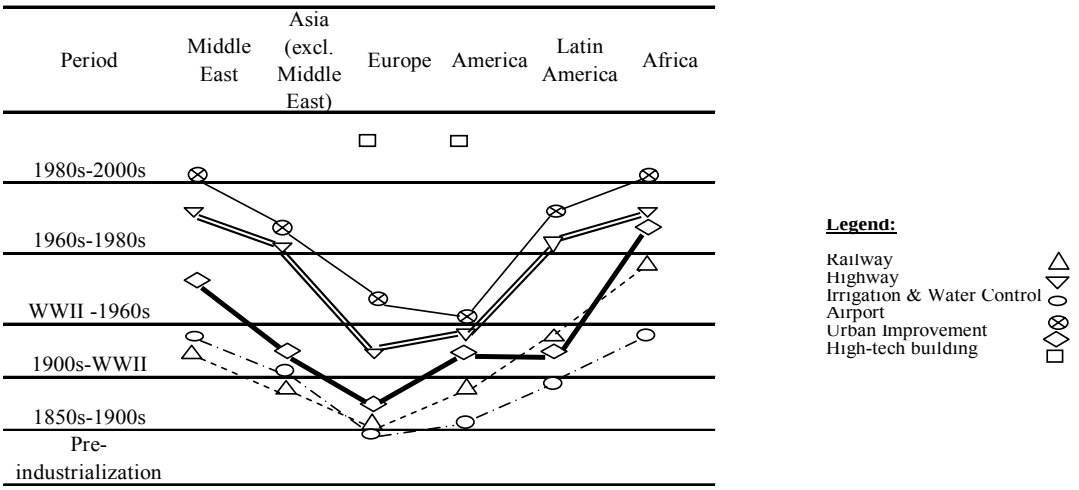


Figure 4.7b Figurate trend of dominant construction project types in international construction

Source: based on various literatures about engineering and construction history, including: Linder (1994), Toynbee (1972), Guest (1974), Armytage (1976), Channell (1989), Berlow (1998), Rogers and Fredrich (2001).

4.4 Nature of international construction: demand and supply

In economic terms, international construction business is centralized by the supply and demand of construction products and services in construction process, and this involves the questions of how construction MNCs supply their services in internationalization process, and how clients in host countries demand these services in international market. The first aspect is related to market entry modes and business strategies of construction MNCs, and the second links to the procurement methods through which the clients demand services from international contractors. Internationalization approaches have been extensively studied in international business and MNC theories as reviewed in Chapter 2; however, in line with some unique characteristics of construction business, the approaches adopted in internationalization of construction business may not be completely the same as in other sectors. The traditional way to analyze the different procurement approaches in construction project concentrates on risk analysis and contractual perspectives. In this section, analyses of the two above-mentioned aspects

are built on internalization theory (see section 2.2.3). Based on this theory, two transaction chains in international construction business are identified, namely the transaction chain of construction MNCs' internationalization and the transaction chain of international project procurement. Therefore, the demand from clients and the supply from CMNCs in international construction are integrated into one framework, from which how clients and contractors internalize or externalize their involvements with construction production processes can be illustrated and further analyzed.

4.4.1 Internalization theory in international construction industry

The internationalization theories have been applied to international construction business. Seymour (1987) analyzed the FDI, licensing and exporting in international construction industry. Enderwick (1993) elaborated on multinational contracting in international construction. Ofori (1996) proposed an analysis of the development path of international construction firms in host developing countries. It is possible to integrate the various existing internationalization approaches adopted by construction MNCs into a common platform based on internalization theory. This platform would provide a full picture of how CMNCs supply their services in international market.

There are various approaches on how clients demand for construction services in international construction market through different procurement methods, and the internalization theory may provide an insight to better understand the underpinning mechanism of various procurement approaches. In fact, some attempts have been made to establish the theoretical underpinnings of construction business transactions by applying the general transaction cost analysis (TCA) to the governance of construction

project procurement and processes (e.g. Winch, 2001; Turner and Simister, 2001; Bajari and Tadelis, 2001). Winch (2001) proposed a conceptual framework to cover all different transactions throughout the project life-cycle based on transaction cost economics. Vertical and horizontal transaction governance were used to illustrate the construction project value system, as well as the relationship of different actors. Turner and Simister (2001) argued that transaction cost analysis demonstrated that it is not risk which determines the appropriate type of contract, but the uncertainty of the eventual product. TCA may not provide an approach for procurement selection since transaction cost is only one of many aspects in project performance. Although it is normally unmeasurable, it remains a good analytical instrument. It was also argued that if the purpose of a contract is to create a project organization, and that should be based on a system of cooperation and not conflict, then the need for goal alignment is more significant (Turner and Simister, 2001). This requires that all parties to a contract should be properly incentivized. It may further imply that from project procurement to construction, internalization and externalization of clients and contractors into the project organization are dynamic processes. Hence, it is important to ease the degree of internalization of clients and contractors into the process properly through appropriate procurement methods. By doing so, some of the problems related to the high degree of fragmentation in construction industry may be addressed.

4.4.2 Transaction chain of CMNCs' internationalization

Different modes of internationalization are identified when a MNC ventures into international market. These may be reflected as market entry modes or business strategies. In MNC theories, four major modes were extensively studied (Caves, 1982;

Buckley and Casson, 1981, 1996), namely Foreign direct investment (FDI), licensing and franchising, joint venture, and exporting. Joint venture is sometimes referred to as one of the modes of strategic alliance, which also include partnering, contracting and other cooperative arrangements. Where their relevance to the international construction industry is concerned, Seymour (1987), Low and Abdul Aziz (1993), Enderwick (1993), Cuervo and Low (2003), Ling (2003), Ofori et al (2001) have provided valuable analysis of business strategies in the international construction industry from different perspectives.

Foreign direct investment (FDI)

In terms of FDI, MNCs normally set up wholly owned subsidiaries or branches in other countries, and the project production process may be undertaken by these subsidiaries or branches. This approach was found to be common in the international construction market (Ling, 2003). Acquisition is another form of FDI, and MNCs may adopt acquisition to enjoy both the advantage of a controlling position as in FDI and the locational advantage brought about through the local firm acquired.

Licensing and franchising

Licensing and franchising involve the MNC licensing the rights to others to produce products by using its production processes, or the MNC hiring out its name to others. This may provide the licensee with distinct advantages when bidding projects and therefore bring about monetary benefits to the licensor (Seymour, 1987). Licensing the firm's name to other firms may involve considerable risks related to the work quality, firm's reputation, and others. Although Seymour (1987) argued that licensing may not be feasible in construction at the time of his study, nevertheless, the practices in some

developing countries showed that this approach is not uncommon in the international construction market.

Joint venture (JV)

This is a very common method used in international business. Depending on the share of equity involved, a MNC may engage in a JV with majority or minority of share holding and therefore take different controlling power in the JV. In the international construction market, both the JV with company equity engagement and the project JV with a one-off business nature are options opened to construction MNCs. Joint ventures are widely adopted in developing countries because of the benefits of technology transfers, risks sharing, host government incentives, and other factors.

Contractual arrangement

Contractual arrangement is defined by Hennart (1989) as new forms of investment, and includes management contracts, production contracts, and international sub-contracts. The contractual arrangement, along with other internationalization forms such as joint venture and partnering are categorized as strategic alliance. The pure forms of strategic alliances, including contractual arrangements, are differentiated from others as they are non-equity modes of strategic alliance (Sørensen, 1999); they are based on voluntary co-operation or contractual obligation. In the construction industry, contractual arrangement is very commonly used when construction MNCs bid for a project in other countries. Without earlier investments in setting up subsidiaries, these firms undertake international works on a contractual basis. This is also a common market entry strategy used by MNCs to secure the first project, and to use this as the basis to establish a longer term business presence.

Exporting

Because of the immobility of construction products, export is normally considered as not relevant to construction business. However, the immobility of the finished construction products may suggest that it is the production process rather than the finished products that may be exported. In such a case, the export of professional and labor services to other countries may be considered as a part of the internationalization of construction business. Precast concrete structures and other pre-assembled modular products are increasingly traded across national boundaries. These may also form part of international construction business.

Partnering

Partnering is a long-term commitment between two or more organizations for the purpose of achieving specific business objectives by maximizing the effectiveness of each participant's resources (CII, 1991). This requires changing traditional relationships to a shared culture without regard to organizational boundaries. The relationship is based on trust, dedication to common goals and an understanding of each other's individual expectations and values. The concept of partnering is applied to the construction process to achieve efficiency and mutual satisfaction; a philosophy having a particular system of beliefs; or a management process seeking to create a win-win solution (Naoum, 2003). A key issue in partnering is that it focuses on and is based on trust, mutual respect and cooperation, and where the parties are involved to achieve their common goals rather than equity involvement. It appears to be one of the strategies used by MNCs to internationalize their business with least concern on equity involvement.

Transaction chain of internationalization

To supply their services and products, construction MNCs may adopt different approaches to internationalize the business. Among these various modes, a distinction is normally made between equity involvement and non-equity involvement. FDI and JV, including majority JV and minority JV, are modes involving equity participation. In the international construction market, there is a special mode which is different from FDI or JV but nevertheless, invoke equity involvement. Because of the immobility of the finished output (i.e. a building) and the mobility of the construction production process, construction MNCs may invest and maintain some assets in foreign countries, such as machinery and equipment, but ownership of these assets may be vested with the MNC's headquarters rather than with the subsidiaries in the country where the assets are located. The headquarters may allocate these assets according to its overall business strategies in the international market, and transfer them from one location to another to meet various project needs. This mode may be called *Asset Floating*, and is different from FDI because FDI is normally confined to a certain location. It seems Asset Floating is not viable in other industries because of the nature of the production process.

The internationalization modes that invoke non-equity involvement may include contractual arrangement, licensing and franchising, exporting, and partnering. They have different degree of influence on how the MNCs internalize themselves in the process. A transaction chain of internationalization may therefore be constructed as shown in Figure 4.8. This shows the different modes where construction MNCs supply their services and products in the international market.

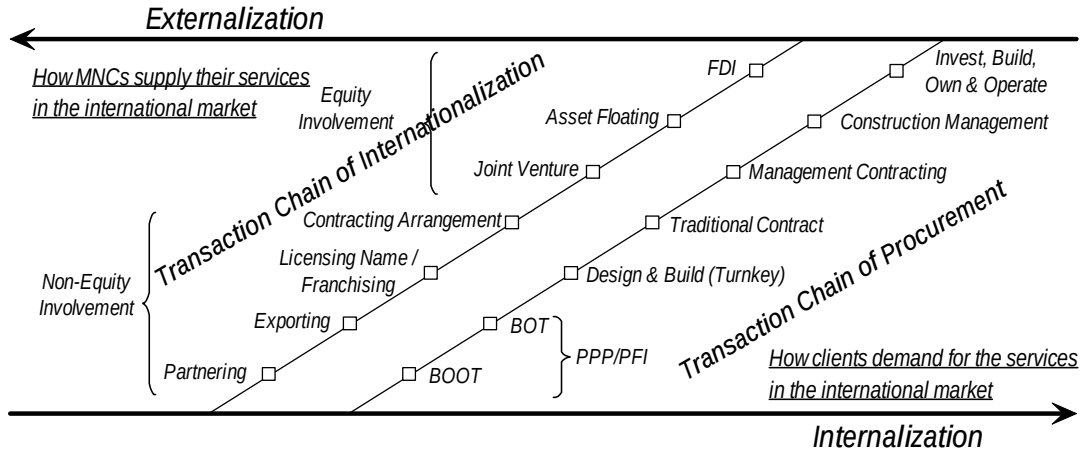


Figure 4.8 Two transaction chains in international construction
Source: Low and Jiang (2004b)

4.4.3 Transaction Chain of International Project Procurement

The procurement method adopted for international construction projects depends on the type of project, client needs, project location, availability of resources and other factors. In fact, the selection of an appropriate procurement method involves the consideration of many issues, and no universally accepted criteria are available. Efforts are being made elsewhere to use the transaction cost analysis (see Endnote 2). Their results are still pending. The analysis in this section focuses on the client's contractual relationship with other parties. This is to find the common basis which underpins the various procurement approaches.

Traditional contracting procurement

In traditional contracting, the client appoints the consultant(s) to prepare the design and to recommend the selection of a contractor. The client then appoints the contractor directly to organize and execute the works. In this approach, it is often assumed that many of the risks to the client normally associated with construction projects are minimized, particularly the final construction costs. The design is developed by the

design team in an orderly manner, and a fixed sum can be agreed with the contractor before he starts work.

In terms of the contractual relationship in traditional contracting, the client normally enters into separate contracts with the design team, contractor, and specialist sub-contractors if necessary. Since this procurement mode is well established and therefore most building consultants and contractors understand and are experienced in using it, the traditional contracting mode of procurement is still widely used in the international construction market.

Management approach

In the management approach, the client sets up a project team of consultants and specialist contractors to work in designing and producing the best possible project to meet the client's requirements. The client appoints the designers and a contractor separately, as with a traditional approach, but pays the contractor a fee for managing the construction works. There are two main forms in the management approach: Construction Management and Management Contracting.

In the management approach, parties do not generally tender in competition for the project based on drawings and specifications. By implication, the client becomes more involved in the delivery of the project than in the traditional approach. However, this high risk procurement route may expose the client to carrying the full responsibility for cost overruns (Howes and Tah, 2002).

The management approach is normally used by experienced clients because they want to be closely involved in making the key decision for the project (Peace and Bennett, 2003). In particular, adopting the Construction Management approach needs more involvement of the client. There is also generally a closer alliance between the construction manager and the client than that in traditional contracting. This type of relationship generally requires the construction manager to gain the owner's trust, a quality that is often obtained only after years of interaction and positive experience between the two parties (Saucerman, 2002). From the client's point of view, in the management approach, the client internalizes himself more in the project production process than in the traditional approach. This may also help to overcome the problems related to direct contracting with each of the parties.

Design and Build approach

In this approach, the client appoints a main contractor to take on the responsibility for the design as well as the construction. The contractor will either use in-house designers or employ consultants to carry out the design. Most of the construction work will be carried out by specialists or sub-contractors. It is generally considered a riskier exercise for the contractor than the traditional approach.

The several variations in the Design and Build approach embody the same concept. One is Develop and Construct, where the client prepares the concept or scheme design and the contractor takes on the design and construction to completion. Another variation is the Package Deal where the contractor provides an off-the-shelf building, especially for the construction of the modular type of building, i.e. farm, factory, warehouse and straightforward office buildings. In the past decade, Design and Build procurement was

generally used by many clients, including inexperienced ones and particularly those who do not want a close involvement in the production process .

A key aspect of the Design and Build approach is that the client has a single point of contact. It is the simplest approach, as one firm is responsible for producing the project rather than this responsibility being shared by several firms, as is the case with the traditional approach (Peace and Bennett, 2003a). By implication, the client in this approach becomes more externalized in the whole production process by transferring more responsibilities and risks to the contractor.

Private Public Partnerships (PPP)

PPP or and Private Finance Initiative (PFI) was recently developed for use by the public sector. The concept behind the initiative was that the private sector is often more efficient, better managed and less bureaucratic than the public sector in the arena of construction procurement. This ranges from just building, to build-own (BO), build-own-operate (BOO), build-own-operate-transfer (BOOT) and design-build-fund-operate (DBFO). The objectives of PFI are to share the potential risks of procuring, operating and maintaining the built facilities, and to achieve the economies of scale that can be obtained through the involvement of the private sector.

One of reasons why the PFI had gained popularity quickly is that some public clients may bring forward projects for which they do not currently have the necessary funds. Projects with the PFI approach are normally by nature with a high degree of certainty over demand and therefore the income stream to be generated over the stated period of time. By adopting PFI, the public clients may reduce public expenditures, at least in the

short term, through outsourcing to the private sector. At the end of the production process, outsourcing the operation of public sector facilities to the private sector may also benefit the clients through the introduction of private capital investment.

A key advantage of this approach is that the public client may obtain the benefit of the end product of the project with least direct involvement. By outsourcing the operation, maintenance and/or investment, the clients may run their core business without having to provide a specialist in-house resource to operate and maintain the built facilities (Howes and Tah, 2002). Hence, in terms of the degree of direct involvement by clients, the PFI approach provides the opportunity for the client to be more externalized in the project production process than in other approaches.

Transaction chain of project procurement

From the analysis of different procurement methods in this section, it may be observed that the procurement approaches have deviated from the traditional contracting approach in terms of how the client internalizes or externalizes himself in the entire project production process. In the management approach, the client is more internalized in the project production process than in the traditional approach. In the Design and Build approach, the client becomes more externalized by transferring more responsibilities and risks to the contractor. At one end of the spectrum, the PFI approach provides an opportunity for the client to have the least degree of direct involvement by externalizing more transaction and production activities. Similarly, at the other end of the spectrum, the client may acquire the built facilities with a high degree of internalization, or without externalization. This is the case when a construction-related conglomerate, which has its own design and construction arms,

invests, develops, constructs, and operates (IDCO) its development projects. In this case, the client or the owner of the projects may not procure the project externally. Hence, this approach may not be considered a procurement approach. However, it is an extreme scenario of internalization when the construction product is demanded by the clients in the market. The transaction chain of international project procurement as discussed above should be read in conjunction with Figure 4.8.

4.5 Two transaction chains in international construction

Different MNCs may adopt different modes of internationalization according to their ownership advantages and certain locational factors of the host markets. The different modes adopted reflect the degree of their internalization in the production process. When MNCs make a selection of the different modes, from exporting, to licensing, joint venture, asset floating and FDI, the degree of internalization is also determined. The transaction chain that explains the internationalization of construction MNCs presents most of the approaches practiced by international contractors in terms of their market entry modes and international business strategies.

In terms of the procurement approaches, clients may select various procurement modes based on many factors, including risks allocation, the availability of resources, etc. Identifying the transaction chain of international procurement enables different procurement modes to be linked together based on the concept of internalization. The transaction chain may not provide a guide for the selection of procurement modes which is determined by many internal and external factors, but it illustrates how the client internalizes or externalizes his involvement in the construction production

process. Departing from traditional contracting to either the more internalized modes, such as the management approaches, or the more externalized modes, such as Design and Build or BOT/BOOT, are options that may be used by clients for different projects. This suggests a movement away from the fragmented nature of the construction industry because the externalization of clients' involvement in the production process would translate into the internalization of the principal contractors' involvement in the same process. However, this movement from fragmentation to integration to some degree does not imply that the fragmented nature of the construction industry is going to be changed. Different objectives, needs and external conditions may determine that both internalization and externalization of international construction business may co-exist. This appears to be one of the reasons why non-traditional procurement approaches were introduced during the past decades. It may also suggest that the options of PPP/PFI or management approaches may not always be the preferred choice for clients, since the degree of involvement in the production process is determined by the nature of the projects and many other factors.

A possible extension for applying the internalization concept in the construction industry is through, on the one hand, lean production or lean construction, and on the other hand, through the flexible production organization. Lean production allows the firms to become leaner in the sense that they concentrate on what they are good at. The firms may specialize in their core businesses while externalizing other non-core businesses to other firms who are good at them. By doing so, the specialty advantages and economies of scale of the firms may be realized. The two prevailing concepts are normally associated with lean production; one is Total Quality Management (TQM) or ISO standardization, which emphasizes the achievement of high quality in construction,

and another is the Just-In-Time (JIT) concept which set out to achieve high efficiency in construction. One way to achieve these objectives is to internalize the firm's business in its core businesses so as to achieve high efficiency and high quality control.

Flexible production indicates that the firm may adapt quickly to new situations both technologically and organizationally (Sørensen, 1999). This may be realized when the firm delegates responsibilities and consolidates competence that are combined with intensive horizontal communication. By doing so, better customer satisfaction may be achieved. Flexible production also means diversification in terms of the services offered to the clients. In other words, firms have to increase their involvement in various related services to be provided in the market, and this means internalizing them into the production process.

Case Study 1:

Chinese CMNC in international market and its transaction chain[2]

In this case study, five international construction projects (Table CS1.1) are presented to analyze how the various approaches as demonstrated in the two transaction chains have been put into practice in international construction. These five case studies were based on fieldwork carried out for this research.

The five projects were undertaken by a Chinese international contractor (Contractor A) who has been active in the international construction market for over 30 years. Due to local legal requirements, and an anticipation of the future potential in the host country

[2] Information and data used in the case study were sourced from fieldwork, company's annual report, unless otherwise stated. Part of this case study was published in Low and Jiang (2004b).

market, the contractor set up a subsidiary in Malaysia in 1994. The Penang Water Supply Project was the first design and build project undertaken by the company that was managed by its subsidiary. Although the investment at the start-up stage of this subsidiary was not very high, Contractor A significantly increased its direct investments in Malaysia as the project was progressing. Meanwhile, Contractor A obtained a Turnkey contract for the Macal/Mollejon Hydroelectric Project in Central America. This project was actually a BOT project undertaken by a leading American energy firm. After evaluating the risks associated with this new market in Belize which is geographically far from China, the contractual issues and other factors, Contractor A decided to enter into a joint venture with another Chinese mechanical and electrical company to contract the project on an Engineering, Procurement and Construction (EPC) basis. Although Contractor A was able to undertake the whole project on its own, it considered the degree of internalizing its own resources into this new project and therefore the exposure to potential risks. Consequently, Contractor A made a decision to embark on a JV for this project.

During the same period, Contractor A had an ongoing project in Pakistan – the Provincial Highway Project - CP2. Before this project commenced, Contractor A had participated and passed the prequalification exercise for several projects in the same country. After the CP2 project had started, another project – the Chashma Right Bank Irrigation Project Stage 3, No.68 was put out for tendering. Based on the resources available at that time, Contractor A made the strategic decision to concentrate on the CP2 project and not to tender for the Chashma project. Just at the same time, another contractor (Contractor B), who was undertaking another irrigation project which was close to the delivery stage, approached Contractor A and expressed its willingness to

take the Chashma project. In actual fact, the two firms had a long standing relationship in overseas projects as partners. Since Contractor A had passed the prequalification exercise, the viable options for both contractors were subcontracting or licensing Contractor A's name to Contractor B. Contractor A did not want to get involved too much on the Chashma project since it already had the CP2 project and four other on-going projects concurrently in the same country. Hence, the two contractors agreed to licensing A's name to B with a fee of 2% of the contract value. Contractor B provided the necessary bank guarantees to Contractor A to counter-guarantee the tendering and project performance under A's name, since A should provide all guarantees to the client under its own name. It is noteworthy to comment here that the licensing name used in construction projects may not be as convenient as in other sectors due to the nature of construction works. Therefore a long term partnering relationship between the parties may be necessary to achieve their common goals.

Asset floating was another mode adopted by Contractor A in its internationalization process. The company invested in some high cost construction machinery that included tunneling and underground mining machinery. The machinery was first used in the Macal/Mollejon Hydroelectric Project in Belize and then transferred to the Penang Water Supply Project in Malaysia. The projects that used the machinery did not financially bear the initial costs, but depreciation of the machinery was included in the financial statement of the projects which used them. By using the asset floating approach, Contractor A also benefited from bidding another new project. As mentioned earlier, some machinery were used in the Penang project, after which they were proposed to be used in the Sai Nullah Hydro-electric Project in Gilgit, Pakistan. In bidding for the Nullah project, the tender price was significantly lowered by taking

these machinery for free transfer. This was because the cost of these machinery had been depreciated on an accelerated basis in the previous projects. The asset floating approach may be an alternative approach to FDI undertaken by the construction MNC. The "floating" nature may be perceived as a unique feature in international construction because of the mobility of the construction production process.

Hence, in all the five case studies, different internationalization approaches were chosen to align the company's goals, and Contractor A was also involved with different modes of procurement. All the different approaches adopted reflect the different degree of the contractor's involvement in internationalization and procurement. The different degree of involvement may be reflected on the two transaction chains as illustrated in Figure 4.8. The criteria for selecting different approaches may rely on various factors which are beyond the scope of discussion in this case study. Nevertheless, the contractor's incentive to either internalize or externalize its resources into the process clearly underpins his involvement.

Table CS1.1 Transaction chains in international construction projects: Chinese CMNCs

Project	Host country	Approximate Contractual value	Contract type
Penang Water Supply Project	Malaysia	US$ 72.5 million	Design and Build
Macal/Mollejon Hydroelectric Project	Belize	US$ 50 million	Engineering, Procurement and Construction (EPC) or Turnkey
Provincial Highway Project - CP 2	Pakistan	US$40 million	Traditional contracting
Chashma Right Bank Irrigation Project Stage 3, No.68	Pakistan	-	Traditional contracting
Sai Nullah Hydro-electric Project	Pakistan	-	Traditional contracting

4.6 Construction MNCs in international construction industry

In connection with construction MNCs in international market, many studies have been completed, including the following:

- Studies on synthesis of construction and marketing in economic development, and the relationship between construction activities, marketing and economic development, as in Low (1991a, 1991b, 1995), Low and Rashid (1993) and Crosthwaite (2000a).
- Based on economic theories as well as theories on Foreign Direct Investment (FDI) and the internationalization of firms, studies on applying these theories to construction practices, as in Seymour (1987), Gruneberg and Ive (2000).
- Studies on competitive advantages, marketing strategies and firm's behavior in various countries as in Strassmann and Wells (1988), Levy (1990), Ofori and Leong (1999), Crosthwaite (2000b), Oz (2001) and Mawhinney (2001).

The rest of this section will review and summarize the OLI advantages of construction MNCs in the international market based on the received literatures for analyzing their international business management and strategies.

4.6.1 Ownership advantages of construction MNCs

Ownership advantages are required by the construction MNCs to internationalize their business in global market. O advantages of construction MNCs may be derived from three sources: firm-specific, industry-specific and country-specific. Enderwick (1993) argued that firm-specific advantages of construction MNCs are likely to reflect the higher returns on managerial and coordinating skills, and considerable specialization of the firms. Seymour (1987) identified the major firm-specific O advantages of

construction MNCs: product differentiation, reputation and name of the contractor, quality of human capital, size of firm, technical expertise, experience of international operations, management expertise and financial resource of the firm. The major country specific O advantages include size of domestic market, nationality of consultant, home government support, and other industry relations. A summary of O advantages which may be possessed by construction MNCs when venturing international market is presented in Table 4.1.

Table 4.1 The eclectic paradigm of international construction: ownership advantages

Firm specific:

- Technological and R&D capacity
- Business development capacity
- Product diversification
- Firm's reputation
- Size of the firm
- Experience and knowledge about international construction market
- Accessibility to financial resource
- Accessibility to technical resource
- Accessibility to construction machinery and materials
- Management expertise
- Marketing and project securing capability
- Networking flexibility of headquarter and other affiliated overseas branches
- Working quality and Total Quality Management capability
- Lower cost in production than international competitors

Country specific

- Size and growth of domestic construction market
- Home government assistance and incentives on overseas contracting
- Governmental and historical relationship with developing countries
- Support from financial sectors and banking system at home
- Support from other related industries at home for international works
- Availability of capable sub-contractors from home
- Availability of professionals from home
- Availability of low-costing workers from home
- Availability of low-costing machinery and materials from home

4.6.2 Locational factors of construction MNCs

Various locational factors which may influence the international operations of construction MNCs were identified in literatures. The factors may be divided in two groups: firm-specific and country-specific. The firm-specific L factors refer to the local factors which are related to the competition between firms and the relationship with local clients. The country-specific L factors refer to the market structure of host country, social and economic conditions in host country, and various other related issues. A summary of L factors influencing construction MNCs' operation is presented in Table 4.2.

Table 4.2 The eclectic paradigm of international construction: location factors

Firm-specific:

- Large number of local competitors
- Large number of competitors from home country
- Large number of other international competitors
- Intensive competition in host countries market
- Lower cost of local contractors
- Lower cost of other international contractors
- Relationship amongst international and local contractors
- Expatriate social and living conditions
- Priority in business strategy of your company's headquarter regarding to the host country market

Country-specific:

- Local construction market demand and potential
- Local government attitudes, intervention and policies towards international contractor, including regulatory barriers of entry.
- Local governmental and regulatory protection for local contractors
- Political and social stability
- Psychic distance between home and host countries, i.e. language, religion, culture difference, etc.
- Availability and capacity of local subcontractors
- Availability and cost of local professionals
- Availability and cost of local workers
- Availability and cost of local machinery and materials
- Local commodity price level
- Local income and corporate taxation level
- Local import and export control and tariff level for construction machinery, equipment and materials
- Accessibility of local financing resources
- Currency conditions and policies, i.e. exchange rate fluctuation and control on transferring of funds.

- Local governmental bureaucratic system and possible corruption
- Interference of local unofficial societies
- Political and historical links between home and host countries

4.6.3 Internalization factors of construction MNCs

Different objectives or internalization incentives may influence the international companies in choosing their business forms and modes of entry in international market. These internalization factors include those of firm-specific, such as the transaction cost and managerial issues, and those of country-specific, such as the policy-related issues, and strategic factors. A summary of I factors is presented in Table 4.3.

Table 4.3 The eclectic paradigm of international construction: internalization factors

Firm-specific:

- To avoid or reduce information search and business negotiation costs
- To utilize international networking of the firm
- To avoid the cost of moral hazard and adverse selection or under-performance of sub-contractors
- To protect the reputation of the firm
- To protect technological know-how of the firm
- To ensure the quality of construction and service provided
- To avoid costs of broken contracts and ensuing litigation
- To facilitate the increasing need of professionals and personals
- To facilitate the need of alternative investment for profits earned
- To better utilize and control resources (construction materials, equipments, technology, human resources, etc.)

Country-specific:

- To meet the host government policy requirement regarding to construction business operation
- To better facilitate the international strategic alliances, partnering and business networking with others
- To avoid client's uncertainty about the nature and value of service being sold and to better facilitate the client's needs
- To overcome price discrimination on projects in host country
- To concrete the market position and to facilitate the future growth and potential of the market
- To avoid or reduce host government intervention, (quotas, tariffs, price controls, tax difference, etc.)
- To exploit host government interventions (quotas, tariffs, price controls, tax difference, etc.)

4.7 Estimation of the performance of construction MNCs: OLI+S model[3]

4.7.1 Estimating degree of internationalization of construction MNCs

Despite the intensive studies on MNCs, the measurement or estimation of the degree of internationalization of a firm appears to remain lacking. This lacuna may be due to many reasons: the complexity of the internationalization process where many factors could be involved; different firms in different countries may employ different organizational structures and approaches to venture overseas; only one or two quantifiable indices may not reflect the entire internationalization picture; human factors and other unquantifiable factors can complicate the estimation/measurement process; and the unavailability of suitable data.

Nevertheless, many past studies have contributed to answer some of the more pressing questions with various approaches adopted. As suggested by Buckley, Dunning and Pearce (1977), Stopford and Dunning (1983), and Daniels and Bracker (1989), a company's foreign sales or revenues are meaningful first-order indicators of its involvement in international business (Sullivan, 1994). This is therefore an important index to examine the degree of internationalization of a firm. However, this indicator cannot reveal the overall situation and many other related aspects of a MNC that must be taken into account in its entirety. Other factors that influence the internationalization of a firm may include: performance (Vernon, 1971), structural (Stopford and Wells, 1972) and attitudinal factors (Perlmutter, 1969). Based on these factors, Sullivan (1994) adopted five variables to measure the degree of internationalization of a firm: FSTS

[3] This section was published in Low and Jiang (2004a).

(Foreign Sales as a percentage of Total Sales), FATA (Foreign Assets as a percentage of Total Assets), OSTS (Overseas Subsidiaries as a percentage of Total Subsidiaries), PDIO (Psychic Dispersion of International Operations) and TMIE (Top Managers' International Experience). Another methodology employed to measure the degree of internationalization of a firm was suggested by Tong (2000) to include six quantifiable factors: pattern of international business management, financial management, marketing, human resource management, management structure and the Transnationality Index (TNI) adopted by the UNCTAD (2001).

In all the above methodologies, the most notable approaches are probably the Transnationality Index (TNI) and the Network Spread Index (NSI) adopted by the United Nations Conference on Trade and Development (UNCTAD) in its research on the largest transnational corporations in the world. The Transnationality Index (TNI) takes the average of the following three ratios of a MNC: foreign assets to total assets, foreign sales to total sales, and foreign employment to total employment, as a measurement of the degree of internationalization (UNCTAD, 2001). This index reveals the relationship between a firm's domestic and international activities, i.e. the higher the ratio of its international to overall activities, the higher the TNI, and therefore the higher its degree of internationalization. The TNI does not, however, reflect the structural factors in a firm's international activities, i.e. it is independent of whether the firm's foreign activities take place in one single foreign country or in many foreign countries. Nevertheless, the TNI is an objective index which does not involve human factors (provided that the data collection process is not biased by human factors), and is therefore widely accepted. In essence, the three components of the TNI: the ratio of foreign assets to total assets, the ratio of foreign sales to total sales, and the ratio of

foreign employment to total employment, exhibit to a great extent, the competitive advantages of a firm who is seeking international business opportunities. These advantages are specific to the ownership of the firm. In general, the greater these competitive advantages – i.e. the ownership advantage – a firm possesses, the more it is likely to engage in internationalization activities. Hence, the firm with a higher degree of internationalization possibly demonstrates better performance in the international market, which is represented by international sales.

Another concept for measuring the degree of internationalization of a firm, suggested by Vernon (1979), is known as the Network Spread Index (NSI). This index focuses on the extent to which firms locate their activities in foreign countries, and thus the extent to which they follow strategies of cross-border geographical diversification (UNCTAD, 2001). The NSI assesses the overall spread of activities in terms of the ratio of the number of foreign countries in which the MNC locates its activities to the number of foreign countries in which it could have the potential to locate. It is an attempt to measure the overall geographical spread of MNCs' subsidiaries/affiliates according to the number of countries in which they established their businesses (Ietto-Gillies and Seccombe-Hett, 1997). In short, the NSI estimates the firm's international business distribution. In UNCTAD's (2001) report, subsidiary enterprises, associate enterprises and branches are all referred to as affiliates (see Endnote 3). The assessment of the NSI therefore reveals the "locational attractions (L) of alternative countries or regions for undertaking the value adding activities of MNCs", which is the explanation of the L-advantages in Dunning (2000).

4.7.2 Construction of OLI+S model

Can the internationalization of a firm be well demonstrated through these two indices (TNI and NSI)? The performance of a firm with its ownership advantages can be represented by the ratios of foreign sales to total sales and foreign assets to total assets, and its international business distribution represented by the NSI. But what is the internal mechanism by which firms can realize their advantages? Following the eclectic paradigm, a firm must internalize its O-advantages in order to capitalize on advantages from L factors. This internalization connects both the O and L advantages, and consequently realizes the firm's internationalization process. The direct representation of this process lies with the firm's internalization options, such as licensing, joint venture, FDI, etc. These options determine the domestic and overseas management structure of the firm, i.e. through the establishment of the firm's subsidiaries, associate offices, branches or others. Hence, a firm's overseas management structure may reflect its I - advantages in the internalization process.

The construction industry is a complex and multi-dimensional one (Ofori, 2000) because of the following characteristics: mobility of foreign assets based on project locations, one-off project nature, heavy involvement of local work force, and so on. The most comprehensive assessment of the performance of international construction MNCs would be the annual surveys conducted by Engineering News-Record (ENR). ENR ranks international contractors according to their absolute value of international revenue, which is possibly one of the best indicators to assess the international performance of construction MNCs. By taking into account total revenue and assets, the ratios of a firm's international revenue to its total revenue, and the international assets to total

assets, are able to reflect the degree of internationalization that are specific to the firm's ownership factors. Because of the uncertainty of foreign employment in different countries on a project basis in construction MNCs, it may not be necessary to incorporate the ratio of foreign employment to total employment of a firm in the assessment.

The activities of construction firms in the international market are very much subject to the location of projects, and may not always be linked to their affiliate offices in any particular countries. Thus the NSI (Network Spread Index), as adopted in the UNCTAD's (2001) study, may not appropriately reflect the business distribution of a construction firm. Hence, the ratio of the number of countries in which the firm worked in during a specified period to the total number of countries in which the firm may have the potential to work in is utilized to better estimate the firm's international business distribution. This ratio better reflects the locational factors in internationalization.

Similarly, the overseas management structure of a firm, in terms of the ratio of the number of overseas affiliates to the number of its total affiliates, can be adopted to estimate the firm's I - advantages. Due to the one-off project nature in construction MNCs, the number of a firm's affiliates calculated here does not include its project offices and country branches. Instead, only its subsidiaries and associates are included. In this way, the firm's internalization factors may be better revealed. The establishment of subsidiaries or associates not only reflects the expansion of a firm within the construction industry, but also frequently demonstrates its strategic diversification of businesses into other sectors, for example financial services, real estate investment, etc.

In summary, the degree of internationalization of a construction firm may be estimated by the following factors to reflect different aspects of the firm's internationalization status:

- Ownership factors – the ratio of international revenue to total revenue (O-IRTR). Due to data unavailability, the ratio of international asset to total asset will not be adopted in this study.
- Locational factors – international business distribution (L-IBD), in terms of the ratio of the number of countries in which the firm has worked in a particular period to the number of countries in which the firm may have the potential to work in.
- Internalization factors – overseas management structure (I-OMS), in terms of the ratio of the number of overseas subsidiaries and associates to the total number of such offices.

Another important factor relates to the market involvement of a firm among different specialized fields in the construction industry, i.e. the specialty – advantages. The international involvement of a construction firm is, to some extent, restricted by its limited technical specialty advantages. In some cases, the more diversified technical specialties a firm possesses, the more business shares it may obtain. But this may not always be the case. Although some firms may possess very strong specialty advantages in just a few specialized fields, they can still achieve high international performance relative to others. Hence, the specialty factors should be considered as an important aspect of a construction MNC. However, specialty factors may not necessarily be as important as the OLI factors within the internationalization envelope. Thus, the ratio of the number of specialized fields that a firm is involved with to the total of ten

specialized fields (see Endnote 4), as classified by ENR (2001), provides an estimation of its involvement in different specialized fields (S - ISF).

In essence, this OLI+S model is an attempt to simplify the eclectic paradigm by identifying the most relevant and quantifiable variables to reflect the ownership, locational, internalization and specialty factors in the internationalization process of a firm. Hence, the degree of a firm's internationalization process may be estimated, and the comparison between firms becomes viable quantitatively. Two points should however be noted here. Firstly, other variables in the eclectic paradigm as elaborated upon by Dunning (2000) for general MNCs and Seymour (1987) for construction MNCs are intentionally omitted in the OLI+S model due to the different emphasis in importance and the difficulties in quantifying certain variables. Secondly, all the four ratios in the model are estimated on a relative basis, instead of on an absolute basis as in the ENR analysis. The OLI+S model therefore examines four different aspects in a firm's internationalization process.

A statistical analysis is presented later in this section to find out the extent to which the model represents the appropriate factors in the internationalization process of construction MNCs.

4.7.3 OLI+S model: sources of data and statistical analysis

Source of data

In this study, the top 225 international contractors in ENR's 2001 ranking were taken to represent the majority of construction MNCs in the world. The data used to calculate O-

IRTR, L-IBD and S- ISF, i.e. the international revenue, the total revenue, the number of countries in which the firms worked in in 2000, the number of countries in which the firm may have the potential to work in, and the number of specialized fields the firm was involved in, were obtained from ENR's 2001 survey (ENR, 2001). The number of countries in which the firm worked in in 2000 can be found in the "*where the top 225 worked*" section of the ENR survey. According to the data in this section, the total number of countries in which the firms may have the potential to work in is 141.

There is, however, a difficulty in estimating I-OMS because there is no one single database that provides details of all the firms' subsidiaries and associates. The ENR's "top 225 subsidiaries list" provides information that is insufficient for this study because very few major subsidiaries were listed. In fact, some other organizations provide such information, and Dun and Bradstreet's (D&B) Who Owns Whom (WoW) ownership tree structure database is probably the most comprehensive one (see Endnote 5). Some of the top 225 firms in ENR's ranking can be found in WoW, but not all. WoW also provides more information for firms from the developed countries than from the developing countries. In addition, because many cross-border mergers and acquisitions have occurred over the past few years among MNCs (UNCTAD, 2000), including the construction-related MNCs, updating the data of companies' family ownership tree structure is needed to ensure data accuracy. Consequently, the annual reports and financial reports of some companies, along with other relevant references (see Endnote 6) were reviewed. Cross-checking between different reference sources was also conducted to ensure that the data collected is as accurate as possible. Nevertheless, not all the family ownership tree structures of the top 225 international contractors were obtained. It should therefore be noted that, in some cases, where a

firm's family ownership tree has more than four and even six hierarchical levels from the top parent company to the bottom subsidiaries/associates, the international contractor being studied could be at the top (first level) of its family ownership tree as the parent company, or it could be at any other level of the tree as a subsidiary/associate. In such cases, it was decided that regardless of the level the international contractor being studied stands in its family ownership tree, tracking the number of its subsidiaries/associates was limited only to the total number of subsidiaries/associates that are within three levels down from the level at which the firm itself stands in its family ownership tree. Other branch and representative offices of the firm were therefore not included for the reason explained above.

Statistical analysis

In order to test the viability of the OLI+S model, correlation and regression analysis are performed on sample data of 64 MNCs which are listed in the ENR's top 225 international contractors. In the top 225 firms, better continuity of achievable O-IRTR, L-IBD, I-OMS and S-ISF was observed in the top 80 firms. Among the top 80 firms, 64 firms were taken as samples by excluding firms without a complete set of O-IRTR, L-IBD, I-OMS and S-ISF. In the statistical analysis, international revenue was taken as a dependent variable to represent the performance of construction MNCs. O-IRTR, L-IBD, I-OMS and S-ISF were taken as four factor variables to examine the extent of their contributions towards the MNC's performance.

The results of the correlation analysis and regression analysis are presented in Table 4.4 and Table 4.5 respectively. As shown in the correlation analysis, at the .05 level of significance, one may conclude that there is a significant relationship between

international revenue and each of the O-IRTR, L-IBD and S-ISF. The relationship between international revenue and I-OMS is not statistically significant at the same level. In addition, there is no statistical evidence of association between any pair of O-IRTR, L-IBD, I-OMS and S-ISF at the .05 level of significance. Therefore, it can be concluded that international revenue is related to the four variables (although I-OMS does not exhibit significant association with international revenue, it is an explanatory variable for the latter as shown in the regression analysis in Table 4.5), and these four variables are statistically independent of each other at the .05 level of significance. It can be further inferred that these four variables reflect different aspects of the MNC's internationalization performance in terms of its international revenue.

Table 4.4 Statistical test on OLI+S model: correlation analysis

	Int'l revenue	*O-IRTR*	*L-IBD*	*I-OMS*	*S-ISF*
Coefficient of correlation:					
Int'l revenue	1				
O-IRTR	0.3580	1			
L-IBD	0.6275	0.1856	1		
I-OMS	-0.0665	0.1552	0.0564	1	
S-ISF	0.2630	-0.2163	0.2063	-0.0485	1
Corresponding test statistic t:					
Int'l revenue	--				
O-IRTR	3.0186	--			
L-IBD	6.3451	1.4876	--		
I-OMS	-0.5249	1.2371	0.4449	--	
S-ISF	2.1466	-1.7441	1.6605	-0.3827	--
Observations:	64				
Critical value of *t* at .05 level of significance:				1.9990	

Table 4.5 Statistical test on OLI+S model: regression analysis

Regression Statistics	
Multiple R	0.7183
R Square	0.5160
Adjusted R Square	0.4832
Standard Error	1422
Observations	64

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-1806.08	740.69	-2.4384	0.0178	-3288.19	-323.96
O-IRTR	2351.29	691.47	3.4004	0.0012	967.66	3734.91
L-IBD	9164.17	1652.43	5.5459	0.0000	5857.67	12470.68
I-OMS	-1100.86	738.80	-1.4901	0.1415	-2579.19	377.46
S-ISF	2063.89	908.46	2.2718	0.0268	246.05	3881.72

But to what extent do these four factors influence the international performance of a MNC? The multiple regression analysis reveals that 51.6% of the variation in international revenues can be explained by the variability in O-IRTR, L-IBD, I-OMS and S-ISF. Alternatively, 48.3% of the variation can be explained by the four variables if the number of variables and the size of the sample are taken into account.

4.7.4 Internationalization of top contractors in the world: OLI+S analysis at country level

The results of the computations for the OLI+S model for firms from major countries are presented in Table 4.6 and Table 4.7. All the O-IRTR, L-IBD, I-OMS and S-ISF values were averaged to be country-specific. Table 3 is based on all the top 225 firms while Table 4 is based on the top 100 firms. The analysis of Table 4.6 and Table 4.7 is given below.

In terms of the average of ratios of international revenue to total revenue (O-IRTR), firms from the UK, Netherlands and Sweden exhibited higher averages as shown in Figure 4.9. Firms from these three countries, on average, generated more than 50% of their total revenue from the international market. This suggests that construction MNCs from countries with relatively small domestic market, (e.g. the Netherlands and Sweden)

Table 4.6 OLI+S model analysis for ENR's top 225 international contractors: 2000

Country of origin	No of firms	Average O-IRTR	Average number of foreign countries in which the firms worked in	Average L-IBD	Average number of overseas subsidiaries /associates	Average number of total subsidiaries /associates	Average I-OMS	Average number of sub-fields the firms are involved with	Average S-ISF
All firms	225	0.34	12.67	0.09	18.41	38.79	0.41	3.70	0.37
Australia	3	0.48	12.00	0.09	23.33	47.00	0.55	6.00	0.60
Canada	5	0.32	2.60	0.02	NA	5.00	NA	2.00	0.20
France	7	0.48	42.86	0.30	81.60	131.80	0.67	5.86	0.59
Germany	11	0.40	22.36	0.16	14.13	29.78	0.43	6.64	0.66
Italy	10	0.49	10.22	0.07	NA	19.60	NA	3.10	0.31
Japan	21	0.17	14.29	0.10	14.50	25.94	0.57	4.75	0.48
Korea	7	0.26	9.86	0.07	8.60	25.67	0.43	3.71	0.37
Netherlands	2	0.63	32.50	0.23	21.00	83.50	0.25	5.50	0.55
Spain	8	0.34	15.00	0.11	49.25	108.80	0.33	4.50	0.45
Sweden	2	0.61	36.50	0.26	10.50	31.00	0.45	9.00	0.90
UK	7	0.58	20.43	0.14	17.71	49.57	0.51	4.67	0.47
US	73	0.21	9.39	0.07	17.30	39.48	0.45	2.68	0.27
Brazil	2	0.44	13.00	0.09	4.50	9.50	0.28	4.50	0.45
China	35	0.49	11.69	0.08	6.29	24.50	0.27	3.34	0.33
Turkey	7	0.43	4.14	0.03	NA	3.00	NA	3.71	0.37

Notes: 1. The numbers of subsidiaries/associates were not available for all firms in the following countries, hence the calculation of average I-OMS was based only on the data available: China (the figures for 17 firms were available), France (5), Germany (8), Japan (16), Korea (3), Spain (4) and the US (18).

2. NA - not available

Table 4.7 OLI+S model analysis for top 100 international contractors in ENR's ranking: 2000

Country of origin	No of firms	Average O-IRTR	Average number of foreign countries in which the firms worked in	Average L-IBD	Average number of overseas subsidiaries /associates	Average number of total subsidiaries /associates	Average I-OMS	Average number of sub-fields the firms are involved with	Average S-ISF
Top 100 firms	100	0.43	20.78	0.15	22.71	44.20	0.44	5.24	0.52
Australia	3	0.48	12.00	0.09	23.33	47.00	0.55	6.00	0.60
Canada	1	0.19	6.00	0.04	NA	5.00	NA	4.00	0.40
France	5	0.53	55.00	0.39	81.60	131.80	0.67	6.80	0.68
Germany	9	0.46	26.00	0.18	14.13	29.78	0.43	7.44	0.74
Italy	5	0.63	14.40	0.10	NA	22.00	NA	3.40	0.34
Japan	16	0.21	16.56	0.12	15.00	26.64	0.59	5.20	0.52
Korea	4	0.32	15.00	0.11	14.33	25.67	0.43	5.00	0.50
Netherlands	2	0.63	32.50	0.23	21.00	83.50	0.25	5.50	0.55
Spain	7	0.32	16.57	0.12	49.25	108.80	0.33	4.86	0.49
Sweden	2	0.61	36.50	0.26	10.50	31.00	0.45	9.00	0.90
UK	5	0.65	25.60	0.18	23.80	66.00	0.59	6.25	0.63
US	19	0.42	22.21	0.16	21.31	42.72	0.50	4.68	0.47
Brazil	2	0.44	13.00	0.09	4.50	9.50	0.28	4.50	0.45
China	10	0.45	16.70	0.12	6.57	27.00	0.26	4.00	0.40
Turkey	3	0.51	5.00	0.04	NA	3.00	NA	4.67	0.47

Notes: 1. The numbers of subsidiaries/associates were not available for all firms in the following countries, hence the calculation of average I-OMS was based only on the data available: China (the figures for 7 firms were available), Germany (8), Japan (14), Korea (3), Spain (4) and the US (16).

2. NA - not available

are more likely to venture into overseas markets to generate revenues to overcome the constraints of their small domestic market and to optimize the use of their ownership advantages. Among the AICs, France, Germany, Italy and Australia also exhibited above-average O-IRTR. In contrast, firms from Japan, Korea and the US have lower O-IRTR. This seems to suggest that although MNCs from these countries possessed high competitive advantages and have large proportion of shares in the international market, revenues from their domestic market still accounted for a majority of their total revenues (more than 70%). Because a larger number of firms from the US were ranked among the top 225 contractors, a closer look based on firms ranked in the top 100 international contractors may be more pertinent in this part of the analysis. As shown in Figure 4.9, the average O-IRTR of US firms ranked in the top 100 contractors pushes them ahead of the overall-average O-IRTR of US firms in the top 225 contractors.

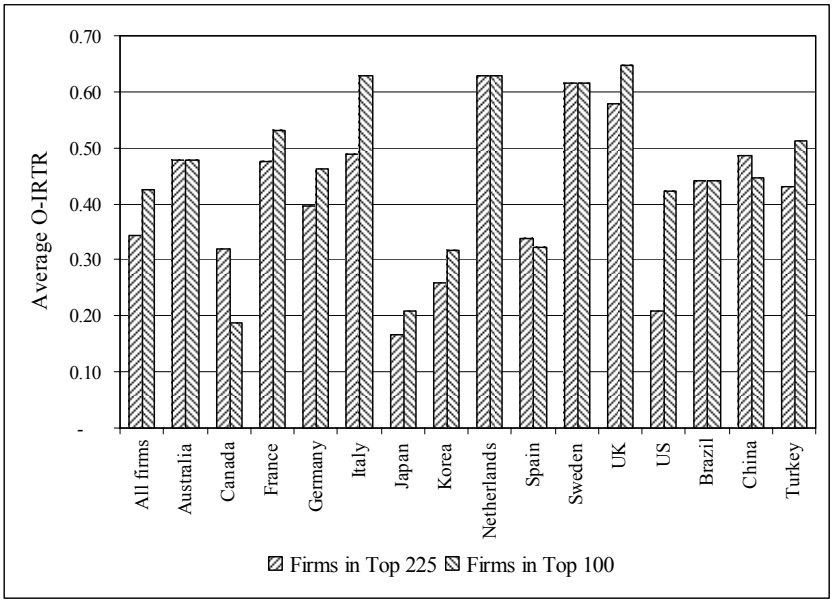


Figure 4.9 Average O-IRTR by countries in 2000

It is notable that firms from the NICs, i.e. Brazil, China and Turkey also exhibited above-average O-IRTR that are at similar levels with France, Italy, Germany and Australia. This is consistent with the earlier observation in the paper that while construction MNCs from the NICs, as ranked in the top 225 international contractors,

have enjoyed an expanding domestic market, their international revenues still accounted for a large proportion of their total revenues, i.e. by more than 40%.

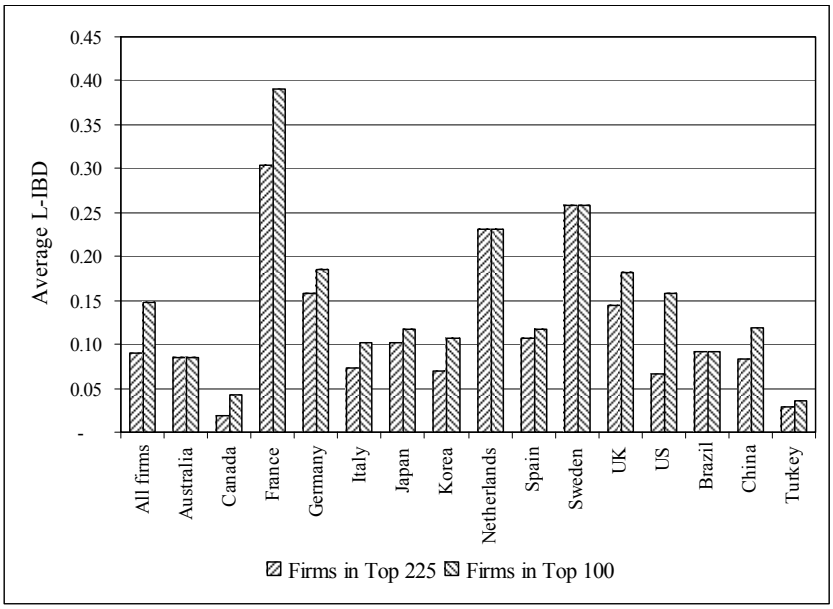


Figure 4.10 Average L-IBD by countries in 2000

The average L-IBD by countries shown in Figure 4.10 indicates that firms from France, Sweden and the Netherlands exhibited very high level of international business distribution. The number of countries these firms have worked in, on average, exceeded 30 in 2000. For the reason mentioned above, firms from countries with a small domestic market (in terms of construction spending), i.e. Sweden and the Netherlands, have to venture abroad to develop wider international business distribution to optimize their O and L advantages. Along with firms from France, Sweden and the Netherlands, their counterparts from the UK, the US (focusing on firms in the top 100 rankings in the case of the US) and Germany have also exercised their locational advantages well with their wide-spread presence in the global market. Firms from Italy, Japan, Korea, Spain and Australia showed an average L-IBD. This may be explained by the fact that most of the MNCs from these countries are more likely to focus on certain countries or regional markets. In addition, some firms exhibited relatively low L-IBD because of their large

domestic market where they may have the potential to utilize the O and L advantages, such as in Canada and Australia. Another observation that can be seen in Figure 4.10 is that firms from countries with a long history of internationalization, i.e. the UK, France and the Netherlands, have exhibited higher L-IBD over others. Firms from the NICs exhibited around or below average L-IBD. This demonstrates that their main focus in terms of international business distribution relied on certain countries or regional markets.

The I-OMS reveals another aspect of the internationalization of MNCs – the measures of internalization – as discussed above. The overseas management structure of a firm, in terms of the ratio of its number of overseas subsidiaries and associates to its total subsidiaries and associates, reveals not only the measures through which the MNCs manage their overseas business, but also their diversified business strategies. As shown in Figure 4.11, firms from France, Japan, the UK and Australia exhibited higher I-OMS. This is followed by firms from the US, Germany, Korea and Sweden where their I-OMS demonstrated the expansion of their business establishments overseas, as well as the degree of diversification of their international business involvement. For example, many firms from France, the UK, or Germany established their overseas management structure tree in over 4 and even 6 levels of the parent-subsidiary relationship. Many of these subsidiaries are involved with businesses that are beyond the construction industry. Firms from China showed lower I-OMS; this may imply that in terms of the measures for internalizing their ownership advantages, most Chinese construction MNCs are relying on their main business line rather than diversifying into other sectors. To a great extent, they are managing their business on a project-based structure rather than

expanding business establishments through investments. This suggestion is consistent with the current situation of Chinese construction MNCs.

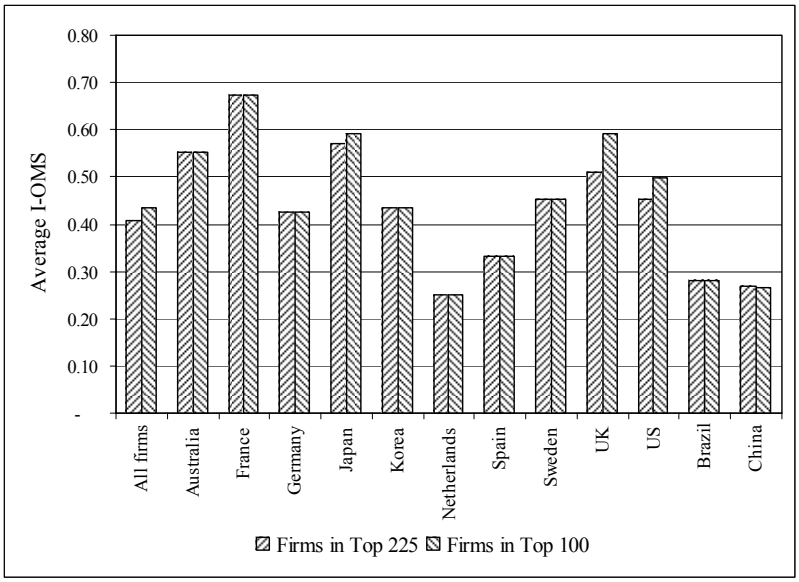


Figure 4.11 Average I-OMS by countries in 2000

As shown in Figure 4.12, firms from Sweden, Germany, Australia and France possessed higher level of specialty advantages in terms of the average S-ISF. They are followed by firms from Japan, the UK and the Netherlands. In fact, most of the firms from these countries worked on multi-specialty projects with competent technical expertise in the construction industry.

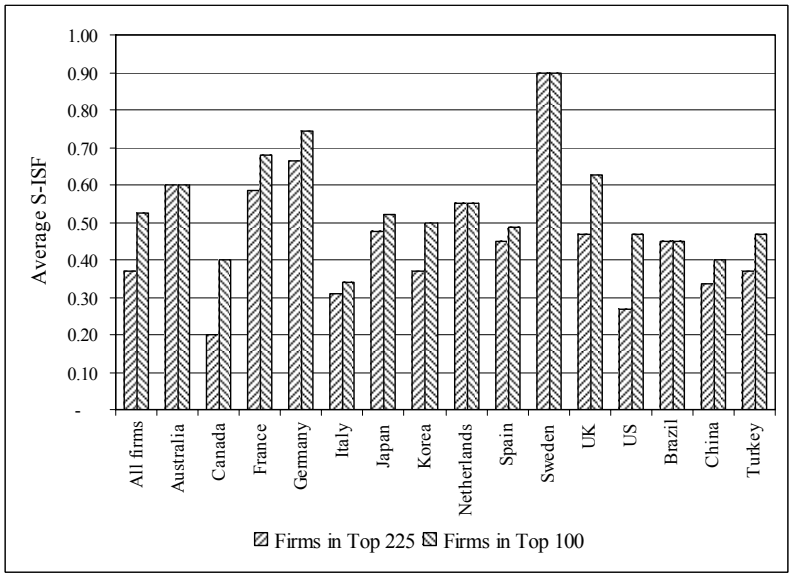


Figure 4.12 Average S-ISF by countries in 2000

A more detailed illustration about firms' involvement in different specialized fields is presented in Figure 4.13 according to the average O-IRTR, L-IBD and I-OMS of the top 10 contractors in the 8 sub-markets (ENR, 2001). Figure 4.13 shows that the top 10 firms in the general building sub-market and the industrial/petroleum sub-market exhibited higher average O-IRTR which exceeds 0.5. The firms from these two sub-markets, along with those from the transportation sub-market also demonstrated higher business distribution geographically in terms of L-IBD. The firms from the industrial/petroleum, manufacturing and water project sub-markets have higher I-OMS. These firms, on average, set up more than 50% of their subsidiaries/ associates overseas.

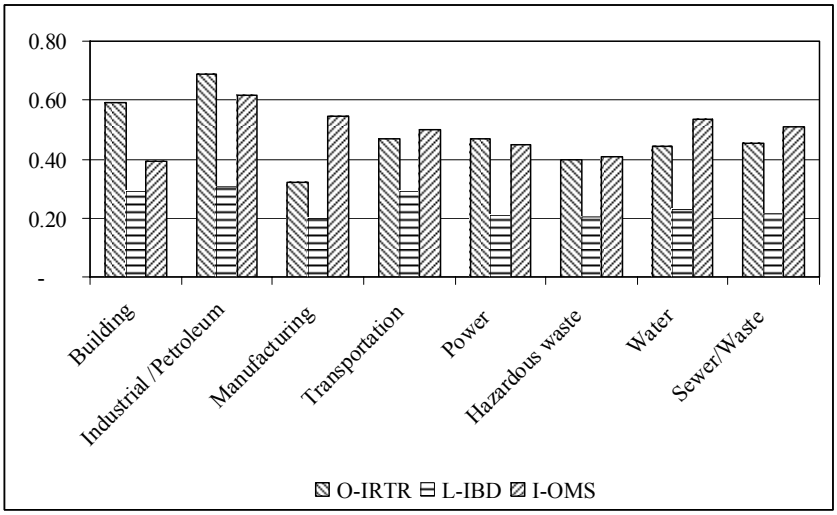


Figure 4.13 OLI+S model analysis: the top 10 contractors in the 8 sub-markets: 2000

In the cross-country OLI+S analysis shown in Figure 4.14, one may find that firms from the UK and France appeared in a similar pattern: higher O-IRTR, L-IBD, I-OMS and S-ISF. Firms from the Netherlands and Sweden likewise appeared in a similar fashion: higher O-IRTR, L-IBD and S-ISF but relatively lower I-OMS. Firms from the US and Japan also appeared in a similar pattern: relatively lower O-IRTR and L-IBD but higher I-OMS. Firms from Brazil and China also exhibited a similar pattern: relatively higher O-IRTR but lower L-IBD and I-OMS.

It appears that although 35 firms from China were ranked among the top 225 international contractors, their absolute international revenues are still very low compared with firms from the AICs. From the above OLI+S analysis based on a relative basis, it seems that although a large proportion of their revenues was generated from overseas, Chinese construction MNCs only managed to demonstrate both the locational advantages and internalization advantages at a very low level.

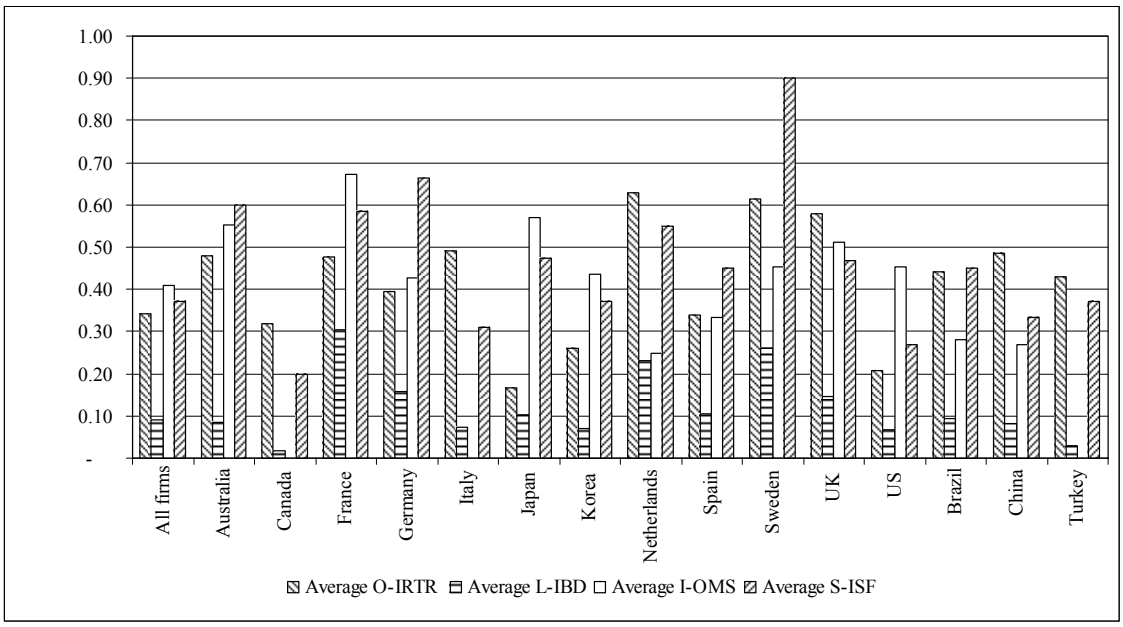


Figure 4.14 OLI+S model analysis: cross-countries comparison (2000)
Note: The average I-OMS of firms from Canada, Italy and Turkey are not available.

Part II

Chinese CMNCs in International Market

Chapter Five

CHINESE CONSTRUCTION MNCS IN INTERNATIONAL MARKET[4]

5.1 Introduction

This chapter presents the development of Chinese international contractors and their overall performance in international market. Their market shares, productivity, profitability, and geographical expansion in international market are analyzed. Horizontal and vertical analysis are conducted to investigate the performance of top Chinese international contractors, and this is followed by a case study on a Chinese CMNC.

5.2 Development of Chinese international contractors

In China, enterprises in construction industry are organized into three categories: State Owned Enterprises (SOEs); Urban and Rural Collectives (URCs); and Rural Construction Teams (RCTs). The construction state owned enterprises in China dominate the domestic construction market as well as the majority of the shares of Chinese enterprises in international construction market. Therefore, Chinese construction SOEs involving with international operations are chosen to illustrate the developmental path of Chinese construction MNCs. The development of Chinese construction MNCs in international construction market may generally be divided into three stages as described below.

[4] Contents in this chapter was published in Low and Jiang (2003).

5.2.1 Chinese government's economic and technical aid: pre-1979

The economic and technical aid (ETA) to foreign countries, also referred to as “development aid” in international journals, commonly refers to the endowments or the favorable loans with no less than 25% of endowments from one nation’s government to the developing countries or to the international multilateral organizations, in order to improve economic development in these countries. The Chinese government’s ETA for some developing countries prior to the 1970s was perceived as an important means for its international politics and foreign relationships in the particular historical background. China’s ETA in this stage was to achieve the so-called objective of "liberation and independence of brother countries in the third world", other than to pursue as international business. During the time, the international involvement of Chinese construction firms is mainly for ETA projects in developing countries with the funds provided by Chinese government. These projects were agreed upon by the two governments and administered by the corresponding government authorities instead of independent enterprises. The Chinese construction enterprises undertaking ETA projects during this time became the pioneers of the Chinese international construction MNCs later on.

The ETA projects funded by the Chinese government normally included technical aid, financial aids, or a complete package of project aids. The complete package of a project normally consisted of project investigation, design, construction, and permanent equipments supply and installation. From 1954 to 1978, China had provided more than 1,300 complete packages of projects under ETA for about 70 developing countries, including North Korea, Viet Nam, Albania, Cambodia, Yemen, and Tanzania. Of these

projects, 884 projects were completed and 10 of which were with over Yuan 100 million investments (EOMC, 1989)(Table 5.1).

Table 5.1 Chinese government's ETA pre-1979

Period	Projects undertaken			Projects completed		
	Number	Investment over 10 million RMB	Investment over 100 million RMB	Number	Investment over 10 million RMB	Investment over 100 million RMB
1954-1963	234	32	1	101	6	-
1964-1970	555	70	10	313	31	3
1970-1978	509	101	8	470	59	7
Total	1307	202	19	884	96	10

Source: EOMC, 1989

Essentially, these ETA projects did not technically constitute a part of works in international construction market for the following reasons: (i) the enterprises undertaking the projects were not motivated by the market place or profit-driven for the firms; (ii) all project costs and other expenditure was funded by the Chinese government, therefore, the firms did not bear any business risks, nor had they any decision-making activities on the managerial issues; and (iii) they also could not earn profit from the projects management whether the project cost went beyond the budget or not. However, the ETA projects during this stage did bring some intangible benefits for the Chinese construction enterprises involved in. These enterprises obtained the very rare chances in light of the then economic environment in China to secure the information about the international construction market and to set up the international connections with various foreign organizations, all of which became their advantages to contract overseas projects when they were allowed to bid the international projects later on. Meanwhile, the ETA projects also trained many technical and managerial personnel who became the elites when the Chinese construction firms would contract overseas.

5.2.2 Emergence of Chinese international construction enterprises

The Chinese construction enterprises began to contract the international construction projects and to export the contracted labor in the international construction market from the late 1970s. The affluent labor resources and the sufficient engineering and construction expertise in Chinese construction enterprises provided them the basic requirements to venture into the international market. Nevertheless, the large Chinese construction enterprises had accumulated some international working experiences through the ETA projects during the 1960s and 1970s, and the third boom of the international construction market in the late of the 1970s helped the initiation of the international involvement of Chinese construction enterprises. However, in strict terms, the international construction projects contracted with the Chinese construction enterprises in the very early stage may not be classified as the transnational business. Almost all the enterprises contracting overseas were organized by the Chinese government and the participation of the international contracting had to be strictly approved by the related government departments whether the project would be profitable or not.

The Chinese construction industry started to reform in the early 1980s following China's open-door policy. On 13 August 1979, China's State Council introduced an Act which allows Chinese specialized companies to invest in other countries. In the construction industry, the government started to introduce regulations to help set the basic ground rules. At the enterprise level, the companies were gradually given the flexibility to operate as "commercial entities". Subsequently, several SOEs were separated from governmental departments, but they continued to work primarily for overseas financial aid projects until the mid-1980s. Soon after, SOEs at the central

government level (under the direct administration of the corresponding Ministries) were able to obtain licenses issued by the Ministry of Foreign Economic Relations and Trade to bid for projects in the international market. The operations of these enterprises from then on became independent of financial aid from the Chinese government. They participated in international bidding, tendered for commercial projects and negotiated with their foreign counterparts. Their motivation soon turned to one that is profit-driven from going abroad.

In November 1978, the first international construction enterprise in China - China Construction Engineering Corporation (formerly the China State Construction Engineering Corporation) was set up under the administration of the Ministry of Construction. During the same period, a few other SOEs in the fields related to construction under the administration of various ministries were actively initiating their international businesses; and these firms eventually emerged as the largest construction firms from China in the international construction market. For the sake of qualifications in bidding the international tendering projects, most of these firms could date their initiations back to the 1960s, when they were assigned many ETA works by the Chinese government as mentioned above. In fact, they were evolved from various government departments where their functions were taking the construction works in different specialized fields. Some of them had built up their expertise from their domestic working experience all over China, but some had accumulated their track records only from the overseas construction of ETA projects since they were originally established by the government as the windows to the foreign countries. Wherever they were originated from, their growth was phenomenal and their work scopes were not restricted to the original fields since the end of the 1970s. In 1979, 27 international engineering/

construction contracts and 9 labor contracts were signed by the Chinese international contractors with the contract value of only US$ 33.52 million and US$ 17.65 million respectively (Li, 1995), and most of these projects located in Middle East. Up to 1982, 27 Chinese construction companies were actively involving in the international construction market and they secured 755 international contracts with the total contract value of US$ 1.2 billion. Their business lines had covered about 45 countries' market in Asia, Africa, America and Europe. The management of projects was eventually transformed to that of profit-driven and of independent from the governmental administration. This signaled the first stage of the transition and reform of the Chinese SOEs including those in the construction related sectors, and the prelude of the development of Chinese construction enterprises towards the MNCs began.

5.2.3 Development towards multinational enterprises

Since the early 1990s, some of the largest Chinese state owned construction enterprises had gained considerable experience in the international market. Subsequently, provincial-level and some other local companies from various areas in China were allowed to apply for the licenses to contract overseas. A number of Chinese international contractors were contracting a variety of construction projects in many developing countries, and their business grew fast in the international construction market. Soon after, the price-war among Chinese companies in some traditional markets in the developing countries such as Pakistan, Iraq and other Middle Eastern and African countries also commenced. The more experienced and larger companies expanded their businesses rapidly into the new markets in Central and South America, and Europe. By 1994, several Chinese construction firms recognized as the international contactors had

shaped up including the 23 Chinese firms listed among the top 225 international contractors by ENR (ENR, 1995). Thereafter, the more profitable firms were encouraged to list in the stock market following a strict evaluation exercise, which means they would no longer be protected by the government. Between 1997-1998, many construction SOEs were completely separated from their respective government organizations. Large scale SOEs were supervised by the Office of Large Scale State-Owned Enterprises under the State Council, while other SOEs were under the provincial or local governments. In terms of the management structure and the business strategies, the Chinese international construction enterprises have become a multinational development perspective from this stage. The top management set the long term and international business development strategies. They established the international networking in the construction market through their subsidiaries, representatives and project offices over the world. Although the foreign direct investment (FDI) of the Chinese international contractors are still very low comparing with their western counterparts, they have expanded their business presence in many countries with long term operating strategy, other than based on the one-off project running as before.

Figure 5.1 shows the value and components of overseas contracts won by the Chinese international construction firms in 1980-2000. It exhibits an average annual increase of 20% in 1990-1999 in terms of the contract value of overseas works. Up to 2001 the cumulative dollar amount of overseas contracts undertaken by Chinese construction firms since 1976 was reported to be US$127.867 billion (DFEC, 2002). Most of these overseas contracts were for civil engineering works in the developing countries. The involvement of Chinese construction enterprise in the international construction market are mainly in three categories: the construction project contracting, labor service and the

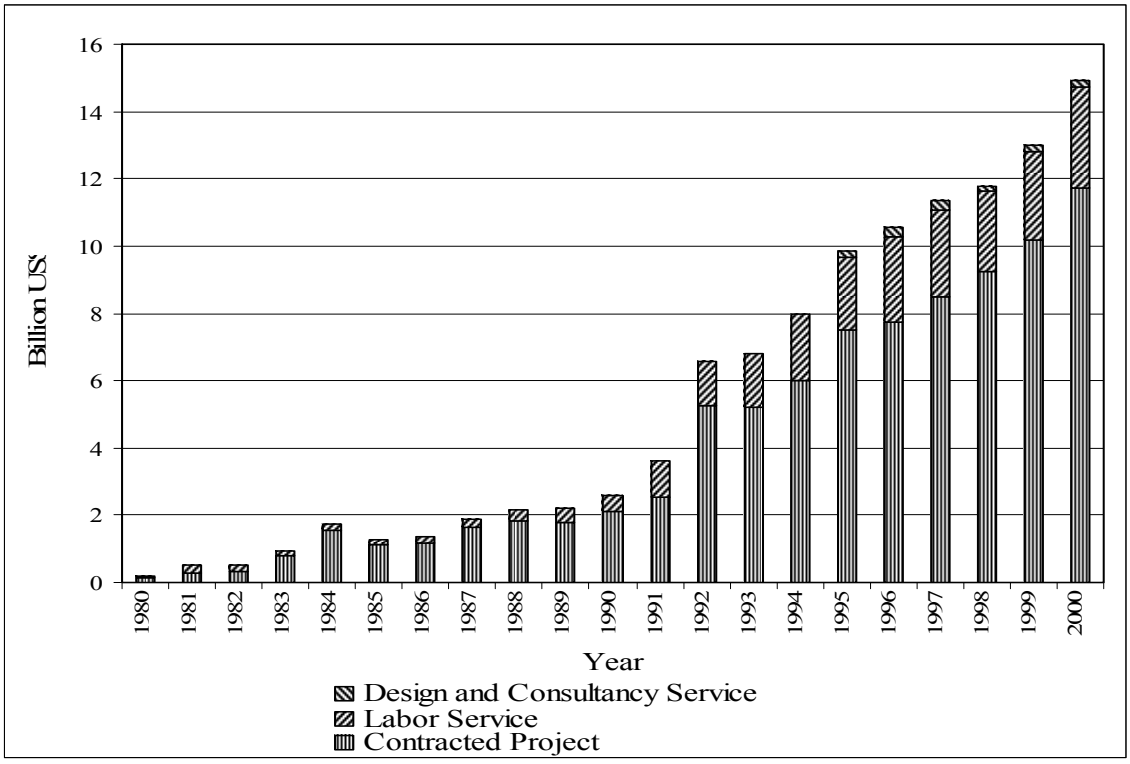


Figure 5.1 Components of overseas contracts won by Chinese international construction companies

Source: China Statistical Yearbook, 2000 and Department of Foreign Economic Cooperation (2001)

design & consultancy services. Overseas design and consultancy services were first offered by Chinese international construction companies in 1995. However, as shown in Figure 5.1, the amount from design and consultancy services contracts was small relative to the overall contract value.

5.3 Performance of Chinese CMNCs in international market

5.3.1 Overall performance of Chinese CMNCs in international market

As mentioned earlier, Chinese CMNCs were not gaining substantial market share in the international market until recent decades. However, the performance of Chinese CMNCs in the international market is perceived as being an increasing global contender.

The overall performance of Chinese CMNCs in international construction market may be examined from various perspectives, including the annual international turnover value, regional market share, sectoral market share, productivity and profitability. One case study regarding international performance of a Chinese CMNC is also presented in this chapter.

Annual turnover and contract value from international operation

Figure 5.2 shows the annual turnover value completed by Chinese CMNCs and contract value and number of contracts won by them during the past 20 years. A significant increase can be observed during the 1990s. Their annual turnover value generated from international market was increased by about 6.5 times during the period from US$ 1.867 billion in 1990 to US$ 12.14 billion in 2001. The annual turnover value of contracted projects was increased from US$ 1.644 Billion to US$ 8.38 billion during the same period. In 2001, Chinese CMNCs had expanded their businesses in more than 190 countries with 39,400 new contracts (Department of Foreign Economic Cooperation, 2002).

During the past ten years, the average increase of annual contract value was at 20%. There is a sharp drop in 1998, 1999 and 2000 in terms of turnover value; this is because of the Asian financial crisis in 1997 which brought about the shrinkage of the value in nominal currency terms. Asia is the major revenue-generating region for Chinese CMNCs in international market.

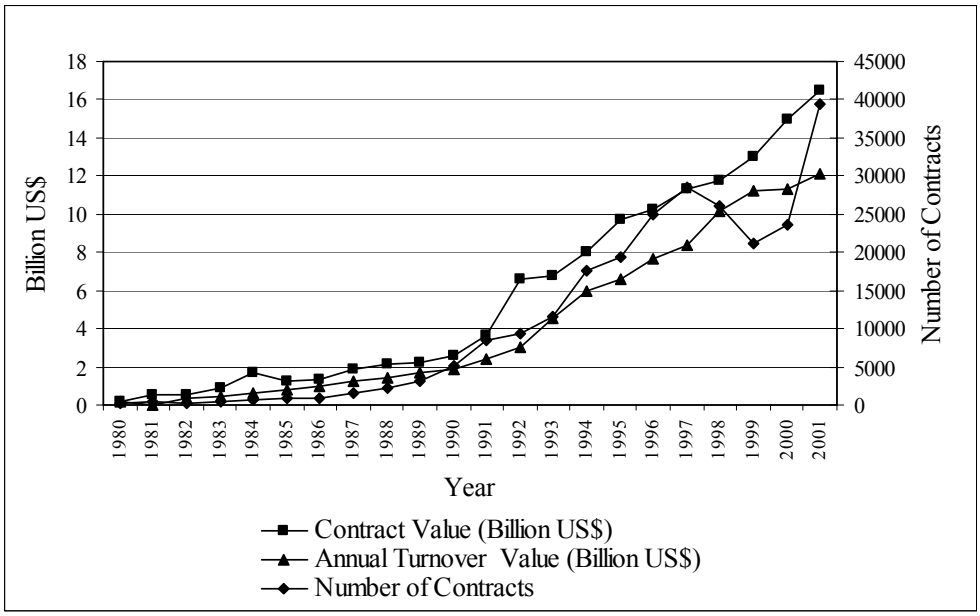


Figure 5.2 Chinese construction enterprises in international market
Sources: China Statistical Yearbook, 2000 and Department of Foreign Economic Cooperation (2001, 2002)

Regional market share

The projects undertaken by Chinese CMNCs were distributed mainly in Asia and Africa, where about 56% and 18% of the total turnover value respectively came from in 1999, and the turnover value of contracting projects reached at US$ 4.5 billion and US$ 1.8 billion. The turnover value took a share of 2.7% and 2.9% respectively in European and North American market (see Table 5.2). This may reflect that the Chinese CMNCs' international operation mainly concentrates in Asian and African market, while they have not yet gained considerable presents in others regions. This is because European construction markets are mainly open for the construction firms from members of the European Union. The European and North American countries pose many legal regulations to restrict the entry of contractors from developing countries, and relatively high technical and investment requirements in these countries also place a barrier to the contractors from the third world. In addition, there are some difficulties for the

contractors from developing countries in these markets due to the influence of political, cultural and religion factors. In Asian market, the competitors for Chinese CMNCs are those from Japan, US, Germany and Korea, while in African market, the competitors are mainly from France, US, Germany and Japan.

Table 5.2 Annual turnover of Chinese CMNCs: local and overseas (in US$ Million)

Region	1998				1999			
	Sum	Contracting Projects	Labor Service	Design and Consultancy Works	Sum	Contracting Projects	Labor Service	Design and Consultancy Works
Asia	6,900	5,322	1,548	30.2	6,247	4,502	1,711	34.1
Africa	2,019	1,871	144	4.3	2,036	1,828	203	5.5
Europe	489	239	246	4.2	306	126	171	9.2
Latin-America	153	104	48	0.9	144	72	70	2.1
North America	322	111	204	6.8	331	104	225	1.9
Oceania and Pacific Islands	150	100	48	2.0	182	120	63	0.2
Others	52	36	16	-	59	44	14	0.1
Inside China	1,688	1,461	136	92.0	1,930	1,727	166	36.5
Total	11,773	9,243	2,390	140.5	11,235	8,522	2,623	89.6

Source: *China Statistical Yearbook, 2000*

In overall, besides the four key players, i.e. firms from US, Japan, France and Germany in international construction market, Chinese CMNCs have gained some shares in Asian and African market. They have started to develop themselves towards the dominant position in Asia despite CMNCs from developed countries still dominating in the market. In Africa, Chinese CMNCs are maintaining their traditional shares, while facing the competition from European and US firms. Chinese CMNCs have started to compete in Latin American market, such as in Brazil, Peru, and Argentina.

Sectoral market share

Due to the lack of information regarding the overall distribution of Chinese CMNCs' international revenue generated from international market, the sectoral market analysis in ENR's data is adopted to analyze the sectoral market shares.

In 2001, Chinese CMNCs' revenues generated from international market are shown in Figure 5.3 according to different type of works. It shows that general building, and transportation works took a major portion of the works done by Chinese CMNCs in international market, which is at 57.7% of the total works or US$ 3107 million. The other works including manufacturing, power, water and industrial process/petroleum works were averaging at about 6.5% to 8%. Figure 5.4 shows the total revenues of all ENR top 225 international contractors generated from international market in 2001 according to different sectors. The major works done by international contractors are general building, industrial process/petroleum works and transportation works. From the comparison between Chinese CMNCs and all top ENR 225, as illustrated in Figure 5.5, one may find that the percentage shares of Chinese CMNCs taken in terms of different type of works are consistent with the percentage distributions done by all ENR 225 firms, except that of industrial process/petroleum works and telecommunication works. For these two types of works, Chinese CMNCs took lower percentage shares compared with the total firms. The percentage shares of general building, transportation, and water supply works taken by Chinese CMNCs are higher that that of all firms. This may imply that Chinese CMNCs generally undertook the works with less technology-content, and they were weak in competing with their counterparts from other countries

for the works with high technology-content, such as industrial process, petroleum and telecommunication works.

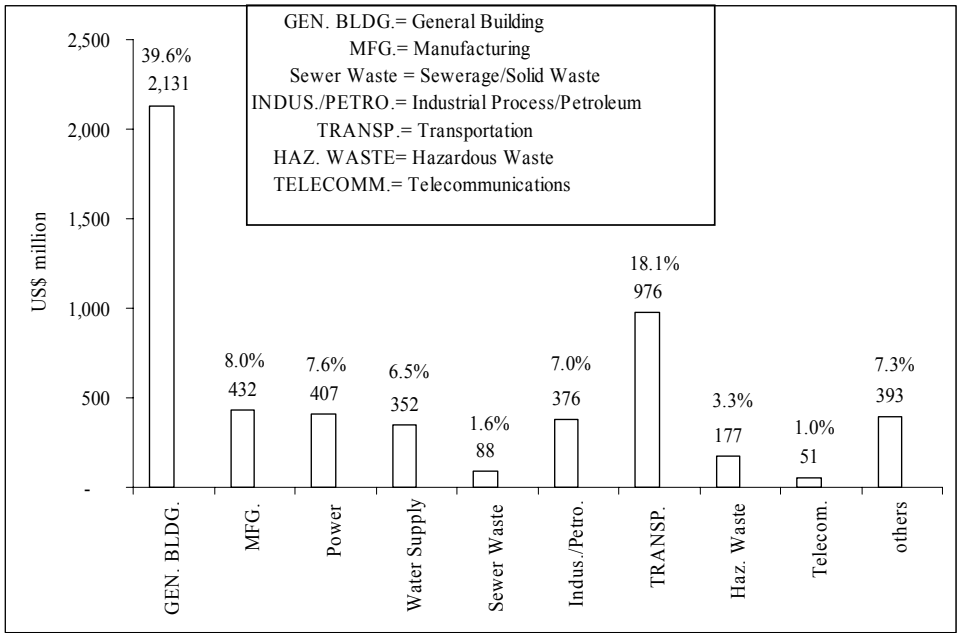


Figure 5.3 Sectoral market shares of Chinese CMNCs in international market: 2001

The Chinese CMNCs normally have a specialty in certain sectors of construction due to historical reasons. For general building, China State Construction and Engineering Corporation, China Civil Engineering Construction Corporation, Shanghai Construction (Group) General Corporation, China Wanbao Group and China Jiangsu International Economic Technology Cooperation Corporation are the most important representatives. For petroleum sector, China Petroleum Engineering Construction (Group) Corporation, China National Chemical Engineering Corporation; for water sector, China International Water and Electric Corporation and China National Water Resource & Hydraulic Engineering Corporation; for transportation sector, China Railway Construction Corporation, China Road & Bridge Corporation, China Harbour Engineering Corporation (Group), have considerable competitive advantages in international market.

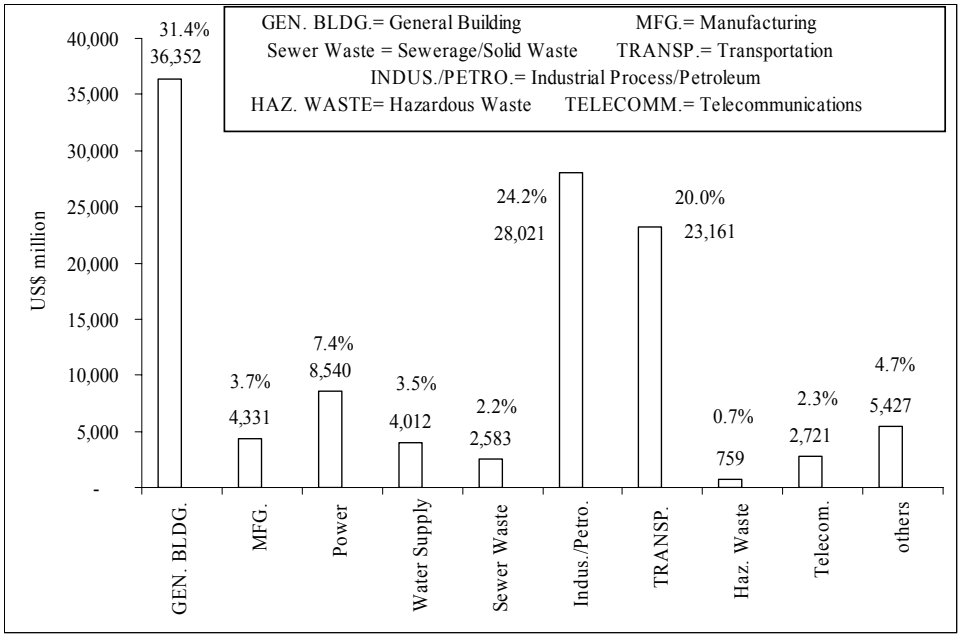


Figure 5.4 Sectoral market shares of all ENR top 225 international contractors: 2001

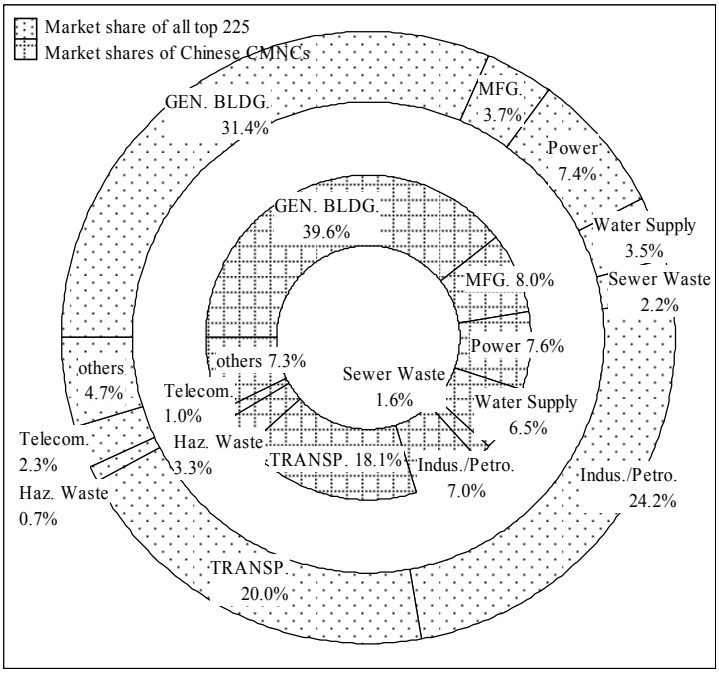


Figure 5.5 Analysis of sectoral market shares: 2001

Productivity

It is generally acknowledged that low cost of production including labor and machinery cost, is the most important competitive arms of Chinese CMNCs in international market.

However, productivity may further help to analyze the issue. According to the Annual Report of Development of Chinese MNCs, the productivity of Chinese construction MNCs was much lower than their competitors from developed countries, and therefore they were in inferior positions when working with projects with high technology-content (EC, 2002). From Table 5.3, one may find that Chinese staff's wages were much lower than those of other countries. However, in line with the increasing utilization of new technology in construction industry, Chinese CMNCs are experiencing the transformation from labor intensive to investment or technology intensive. Therefore, improving productivity is a key issue in this regard. Table 5.4 shows the comparison of labor productivities in terms of turnover per employee of selected international contractors. It reveals a significant disadvantage of Chinese CMNCs, represented by CSCEC, in terms of labor productivity.

Table 5.3 Average wages in construction industry

Country	US	Japan	UK	Singapore	China	India	Malaysia
Year	1996	1994	1996	1996	1998	1993	1994
Average wages	2130	1991	2334	1657	90	32	363

Source: EC (2002)
Note: in US$ per month

Table 5.4 Labor productivities of selected CMNCs

CMNCs	Nationality	Year	Productivity in terms of turnover per employees (thousand US$)
Shimizu	Japan	1997	954
Flour	US	1997	234
Bourcues	France	1994	173
Holzman	Germany	1994	222
CSCEC	China	1998	21

Source: EC (2002)

Profitability and financial performance

The key objective of MNCs' operation in international market is to generate high profitability, and Chinese CMNCs have been pursuing this objective as soon as the

economic reform started in the earlier 1980s. We will examine and analyze their financial performance in this section, in terms of profitability and asset and debit ratios.

According to the data provided by Ministry of Finance, China, the development of Chinese CMNCs had demonstrated a stable trend from 1983 to 1992 and an increasing trend from 1993 to 1998 in terms of revenue generated from international market (Figure 5.6). But during the same period, the profit generated from international had a relative decreasing trend comparing with revenue. Figure 5.7 shows the profitability in terms of the ratio of international profit to international revenue. The profitability of Chinese CMNCs dropped four times from 1990 to 1998. The cause of this situation may be due to various factors; one of the major reasons may be the rapid expansion of the scale of economy in some Chinese CMNCs during the past decade.

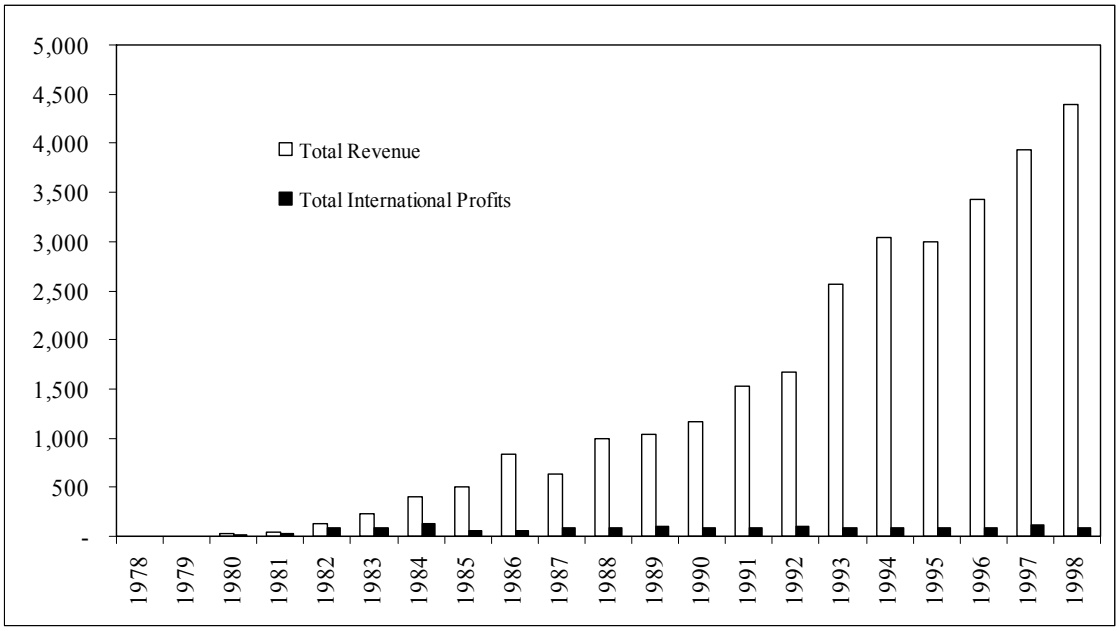


Figure 5.6 Total revenue and total international profits of Chinese CMNCs: 1978-1998
Source: Zhao (2002)
Note: in US$ million

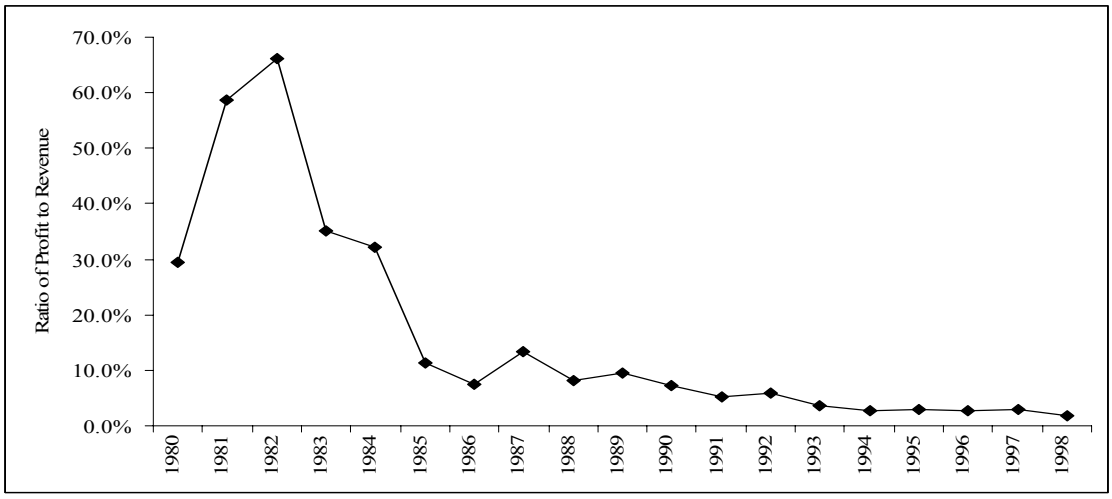


Figure 5.7 Profitability of Chinese CMNCs: 1978-1998
Source: Zhao (2002)

The increase of international revenue was a result of the rapid expansion of asset scale of Chinese CMNCs. Figure 5.8 shows a strong increase in terms of assets of Chinese CMNCs since 1986. This is the result of open and reform policy in China, and more and more construction enterprises went out to seek works in international market with the help from central and local governments. They mobilized a large number of assets which were owned by state owned enterprises and invested by government. But the increasing investment and assets did not bring in the deserved economic benefits for the Chinese CMNCs (Zhao, 2002). Figure 5.9 shows the changes of the three key financial ratios of Chinese CMNCs during the two decades. These three ratios are the ratio of profit to asset, the ratio of profit to net asset and the ratio of debt to asset.

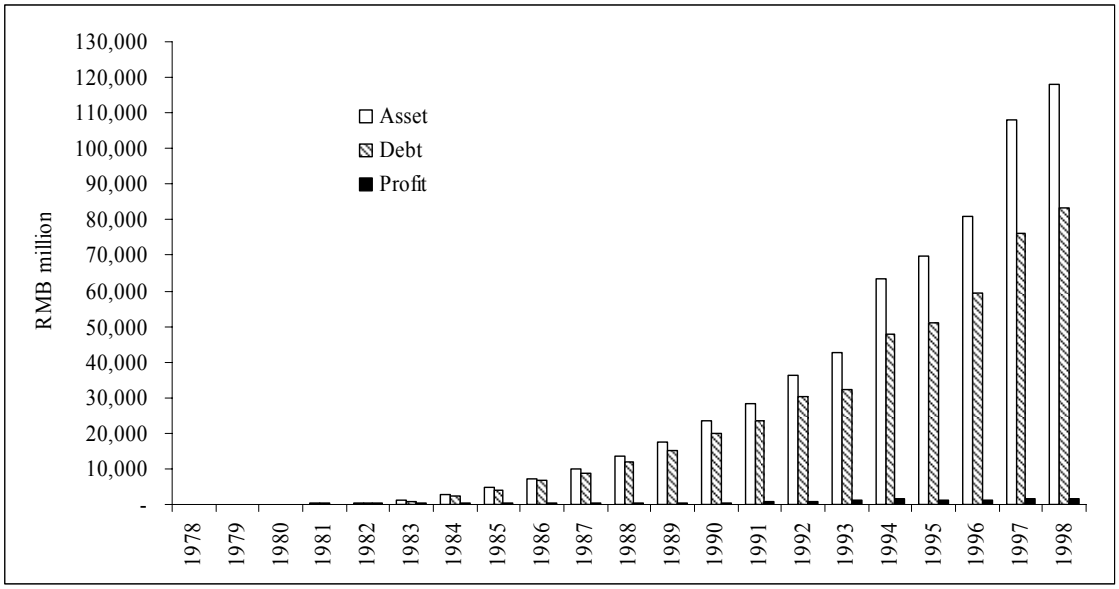


Figure 5.8 Asset, debt and profit of Chinese CMNCs: 1978-1998
Source: Zhao (2002)

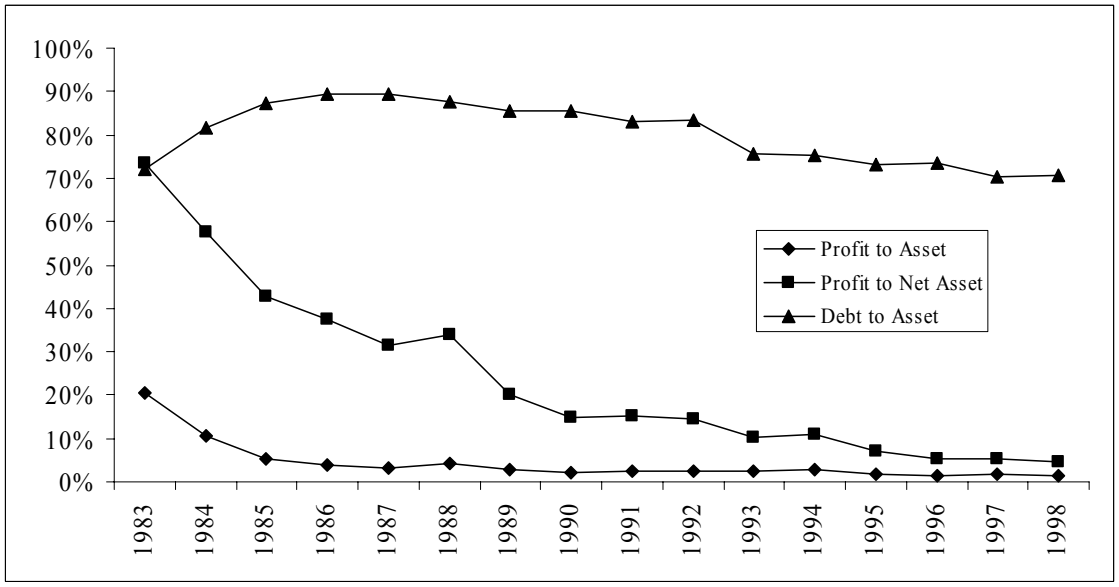


Figure 5.9 Three key financial ratios of Chinese CMNCs: 1978-1998
Source: Based on data in Figure 5.7 and Figure 5.8.

From Figure 5.9, one may find that the ratio of debt to asset of Chinese CMNCs are at a relatively high level, with an average of 75.43% during the past 20 years. It indeed shows a decreasing trend, but still above 70% at the turn of the century. If considering that a number of "unrecoverable accounts" were not reflected in the official statistics, the ratios may be much higher than what is presented here. The high debit to asset ratio reveals the high cost of capital in international operations of Chinese CMNCs. It may

cause restrictions on the firms to further obtain capital from banks when taking more international projects. Consequently, if the bidding price is not advantaged, and direct cost of construction remains relatively stable, then the ratio of profit to asset and profit to net asset would be constantly decreased as shown in Figure 5.9. If the gross profit of international projects cannot bear the cost of interest, management fee and relevant financial fees, loss will occur. From Figure 5.9, one may find that Chinese CMNCs profit to asset (5.42%) began to be less than the contemporary loan interest from 1985, and the ratio of profit to net asset (7.17%) began to be less than the contemporary loan interest from 1995. This reflects a major problem in Chinese CMNCs: operations are highly relying on loans. This may also imply that Chinese CMNCs are short of capital in contracting international projects, and therefore they are heavily relying on bank loan and government help in funding. The average of ratio of profit to asset during the past decades was at 2.54%.

5.3.3 The performance of top Chinese international contractors

Although Chinese international construction companies have gained great stride in the global market, the economic scale of their overseas operations is still smaller comparing with their European, Japanese and North American counterparts. Meanwhile, a few largest Chinese construction firms generally played a very significant role in the international contracting projects. The penetration of the largest Chinese construction firms in the international construction market gained significant growth during the past 15 years. In the ENR survey in 1985, only two Chinese firms (China Road & Bridge Engineering Co. and China State Const. Engineering Corp.) were ranked into top 250 international contractors with their total foreign contract awards of US$ 140 million

only, accounting for 0.17% of the total foreign contract awards of the top 225 (ENR, July 17, 1986). However, in 1996, 23 Chinese construction firms were ranked among the ENR top 225 international contractors with 2.8% of the total international billings of all the top 225, or US$ 2.9 billion. The share was increased to 5.58%, or US$ 5.947 billion with 40 firms were ranked in 2002 among the top 225 international contractors (ENR, Aug. 26, 1996 and Aug. 26, 2002). Both of the number of the Chinese contractors ranked among the top 225 international contractors by ENR and their total international revenue generated from the international construction market had almost doubled from 1995 to 2002 (see Figure 5.10).

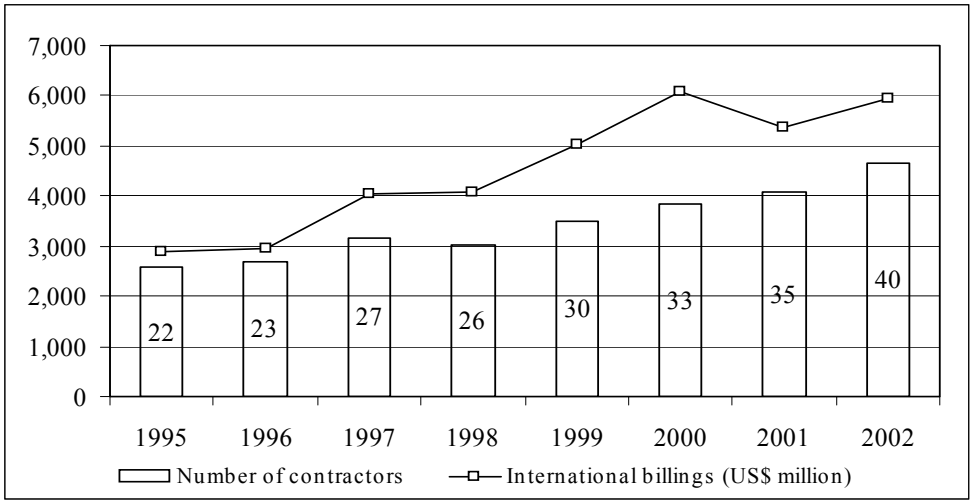


Figure 5.10 The number and international billings of the top Chinese contractors in ENR top 225 international contractors: 1995-2002
Source: ENR, 1995-2002
Note: US$ million at current prices

Table 5.5 The top Chinese international contractors in domestic and international market

Rank	Firm	ENR Rank	Domestic Revenue in US$ Million	International Revenue in US$ Million	OII	International Strength
1	China State Const. Engineering Corp.	19	3425.1	1278.7	2.81	3598
2	China Harbour Engineering Co. Group	42	1231.2	631.2	2.99	1885
3	Paul Y. - ITC Construction Holdings Ltd., HK	44	842	615.0	2.36	1450
4	China Civil Engineering Construction Corp.	70	15.8	272.2	2.42	659
5	China National Chemical Engineering Corp.	76	387.9	212.1	2.47	524
6	China Road & Bridge Corp.	74	937.6	243.5	1.77	432
7	China Jiangsu Int'l Econ-Tech. Coop. Corp.	94	32.6	133.3	2.73	364
8	China Int'l Water & Electric Corp. (CWE)	101	55.4	120.3	2.73	328
9	China Nat'l Complete Plant Imp. & Exp. Corp.	87	0	166.2	1.92	319
10	China Metallurgical Const. (Group) Corp.	103	1434.2	116.1	2.47	287
11	China Shanghai SFECO	119	5.5	89.8	3.07	275
12	China National Overseas Engineering Corp.	115	0	98.1	2.34	230
13	China Wanbao Engineering Corp.	125	9.4	78.5	2.64	207
14	CMEC	110	51.7	104.0	1.87	194
15	Shanghai Construction General Co.	78	2022.6	201.4	0.92	185
16	China Railway Engineering Corp.	88	3549.9	165.9	1.09	182
17	Dongfang Electric Corp.	109	12.7	104.2	1.69	176
18	China Petroleum Engineering Const. Corp.	114	67.3	100.0	1.38	138
19	China Elec. Power Tech. Import & Export Corp.	146	210.8	45.3	2.14	97
20	China Zhongyuan Engineering Corp.	142	1.6	54.7	1.67	92
21	Harbin Power Engineering Co. Ltd.	123	29.2	82.1	1.07	88
22	China Wu Yi Corp.	135	37.4	63.6	1.25	79
23	China Nat'l Water Res. & Hydropower Eng'g	136	1240.9	61.7	1.26	78
24	China Tianjin Int'l Eco. & Tech. Coop. Corp.	161	8.6	30.1	1.95	59
25	China Shenyang Int'l Eco. & Tech. Coop. Corp.	178	3.2	19.9	2.61	52
26	China Huanqiu Chemical Engineering Corp.	159	7.2	33.3	1.47	49
27	Zhejiang Construction Eng'g Group	150	420.2	41.1	1.12	46
28	China Railway Construction Corp.	154	3799.2	37.9	1.16	44
29	China Liaoning Int'l Coop. Holdings Ltd.	173	6.9	24.4	1.65	40
30	China Dalian Int'l Cooper'n Holdings Ltd	158	48.5	34.2	0.98	33
31	Sinopec Engineering Inc.	132	520	65.2	0.50	33
32	Beijing Chang Cheng Construction Corp.	193	639	12.4	1.33	16
33	China Huashi Enterprises Corp.	199	513.2	9.8	0.86	8
34	TEC China	196	29.2	10.9	0.61	7
35	Beijing Urban Construction Group Co. Ltd.	169	1447.5	27.0	0.23	6

Source: ENR (2001) (Ranked by the international strengths of firms), Low and Jiang (2003)

The following analysis is drawn in two directions: horizontal analysis (i.e., comparison between firms) and vertical analysis (i.e., comparison of common attributes across firms).

Horizontal analysis

A comparison of these 35 firms suggests that their business strategies appear to rely on different dominant market (Table 5.5).

- The dominant business line lies in overseas markets

Due to historical reasons, some Chinese international firms developed their businesses mainly in the overseas market. This appears to contradict traditional MNE theories which suggest that enterprises could expand their businesses beyond the border only if they had already achieved a certain capacity in their home country. A few Chinese construction firms were mainly engaged in overseas markets. These include:

- China Civil Engineering Construction Corporation, Beijing, China
- China National Complete Plant Import & Export Corporation, Beijing, China
- China Jiangsu International Economic & Technical Cooperation Corporation, Nanjing, China
- China International Water & Electric Corporation (CWE), Beijing, China
- Dongfang Electric Corporation, Chengdu, Sichuan Province, China
- China National Overseas Engineering Corporation, Beijing, China
- China Shanghai SFECO, Shanghai, China

These firms only have a small portion or even no revenue from their domestic home markets in China. While this situation may change after China's entry into the WTO, it may remain the same for yet some time to come.

- The business mainly relies on the domestic market

A majority of these firms mainly rely on the home market for businesses. They may be engaged in a small way in the international market as a strategy to diversify some risks or to seek other long term developments. These firms include:

  - Shanghai Construction General Corporation, Shanghai, China
  - China Railway Engineering Corporation, Beijing, China
  - China Metallurgical Construction (Group) Corporation, Beijing, China
  - China National Water Resources & Hydropower Engineering Corporation, Beijing, China
  - China Railway Construction Corporation, Beijing, China
  - Beijing Urban Construction Group Co. Ltd., Beijing, China

- The business developed and is balanced in both markets

Some firms have developed their businesses which are balanced in both the international and domestic market. These are also some of the most prominent companies in China. These firms include:

  - China State Construction Engineering Corporation, Beijing, China
  - China Harbour Engineering Co. Group, Beijing, China
  - Paul Y. - ITC Construction Holdings Ltd., Kowloon, Hong Kong
  - China Road & Bridge Corporation, Beijing, China
  - China National Chemical Engineering Corporation, Beijing, China

- Firms with high internationalization index but relatively lower foreign revenues

OII is a relative index which reflects the various aspects of a firm related to international business development. Hence, the index may not be consistent with the absolute level of a firm's performance in the international market. One reason is that some firms, with the backing of the government, ventured into other countries not to

pursue profit, i.e. they are not profit-driven businesses. It would appear that this situation will improve as economic reforms in China take effect further.

Vertical analysis

- International business distribution

From an overview of the international business distribution of these 35 firms, it can be observed that some of them have concentrated their businesses in a few key countries, while others have developed their scope of business in many countries. This may be related to the firm's business strategy to either maintain a few important overseas markets, where they may have operated for a few years, or to expand their businesses in many countries to capture more potential opportunities. Examples of these two groups of companies are shown below:

Businesses developed in a few key countries:

- Harbin Power Engineering Co. Ltd., Harbin, China
- China Wu Yi Corporation, Fuzhou City, China
- China Zhongyuan Engineering Corporation, Beijing, China
- China Dalian International Cooperation Holdings Ltd., Dalian, China
- Beijing Urban Construction Group Co. Ltd., Beijing, China

Businesses developed in many countries:

- China State Construction Engineering Corporation, Beijing, China
- China Harbour Engineering Co. Group, Beijing, China
- China National Chemical Engineering Corporation, Beijing, China
- China Jiangsu International Economic & Technical Cooperation Corporation, Nanjing, China

- China Shanghai SFECO, Shanghai, China

- Overseas management structure

Due to the nature of construction works, most of the Chinese construction firms operate their overseas businesses through representative offices on a project basis. Some of these firms may set up a local branch office or joint venture company to pursue interests in countries where restrictions are imposed. For example, in some countries, the local or joint venture companies may enjoy a 7% discount off the bidding price. Hence, this may force the foreign firm to set up a joint venture with a local firm. In addition, the foreign direct investments (FDI) to other countries by Chinese international construction firms are not very significant. It is only in a few countries where they have operated for many years with an intent for a longer stay, may they then establish a subsidiary or solely owned company. For example, as one of its overseas business strategies, China State Construction Engineering Corporation usually develops and operates its overseas businesses on a project basis through its 19 representative offices throughout the world. For example, because of existing business opportunities in Singapore and the Southeast Asian market, the Singapore branch company is an active subsidiary of China State Construction Engineering Corporation.

- Involvement of specialized fields in the construction industry

Most Chinese international construction firms have focused on general building projects overseas. A few firms, with their specialized background in China, have executed other specialized projects. For example, apart from general building projects, China Civil Engineering Construction Corporation (formerly under the administration of the Ministry of Railway, China) had engaged in transportation projects; China International Water & Electric Corporation (formerly under the

administration of the Ministry of Water Resources, China) is adept in power and water supply projects; China Petroleum Engineering Construction Corporation (formerly under the administration of the Ministry of Petroleum, China) is skilled in industry/petroleum projects, and so on.

However, a few Chinese international construction firms are developing their own specialty in a more diversified manner. For example, projects undertaken in 2000 by China State Construction Engineering Corporation covered seven specialized fields out of ten, while China Harbor Engineering Co. Group was involved in five fields; China Metallurgical Construction Corporation in seven specialized fields; China Shanghai SFECO in six fields, etc.

Geographical distribution

Over the past two decades, the top Chinese CMNCs rapidly expanded their geographical presences in international construction market (Figure 5.11). The major overseas markets of these firms were in Asia which accounted for over 70% of their total international billings. Over the time, Chinese CMNCs expanded their international presence all over the world, to Asia first, then to Africa, North America, Australasia and East Europe, and finally to Latin America. In terms of the intensity of the number of firms, 17 countries were with at least eight top Chinese firms involved in 2000 (ENR, 2001).

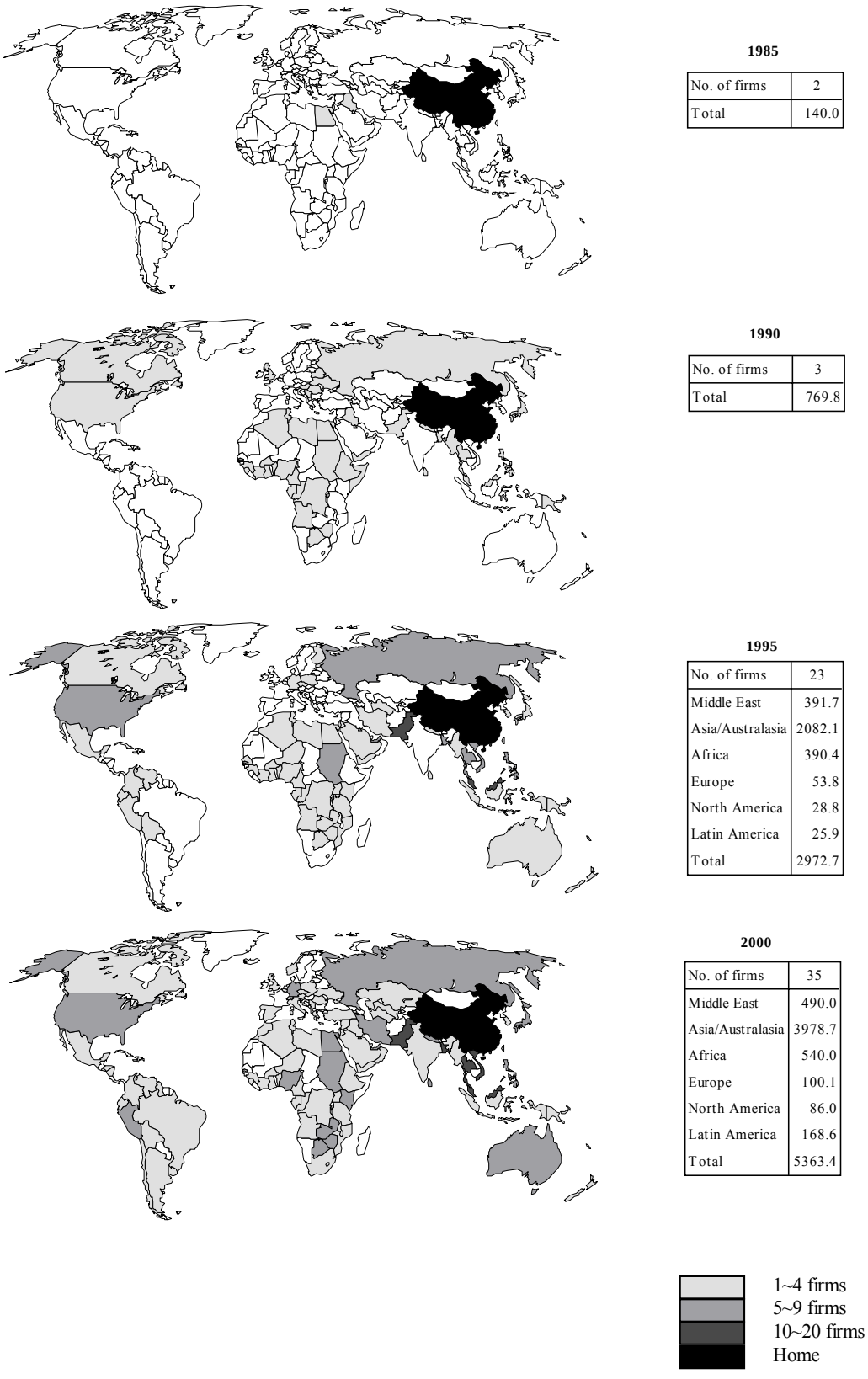


Figure 5.11 Global expansion of top Chinese construction firms in intentional construction market: 1985-2000

Source: the author; based on data from ENR 1986-2001 various issues.

Note: Figure in tables show the values of foreign contract (1985 & 1990) and international billings (1995 & 2000) in US$ million at current prices.

Case Study 2:

International performance of China State Construction Engineering Corporation (CSCEC)[5]

China State Construction Engineering Corporation (CSCEC) is one of the largest state-owned construction enterprises in China under the direct administration of the Office of Large Scale State-Owned Enterprises in the State Council. The business scope of CSCEC covers the design and construction of both building and civil engineering projects, as well as the installation and supply of construction plant, goods and materials. In 2000, CSCEC's total assets were US$ 8.34 billion (CSCEC, 2002) with over 239,000 employees (UNCTAD, 2000) and 58 overseas representative organizations in 52 countries. Its turnover from overseas projects made up 27.2% (ENR, 2001) of its total turnover in 2000.

With about 50 years of experience in development in China, CSCEC is now a powerful force in China's construction industry in terms of technology, finance and manpower that is now strongly dominating the indigenous construction market.

As one of the earliest Chinese state-owned enterprises to go abroad, its venture into the international construction market could be dated back to 1978. It gained its track record from overseas construction projects financed by the Chinese government's economic and technical aid to Mongolia in the 1950s, to Africa in the 1960s and to Kuwait in the 1970s. From the early 1980s, CSCEC started to participate in the international

[5] Information used in the case study was sourced from fieldwork, the company's annual report and its website, unless otherwise stated. This case study was published in Low, Jiang and Leong (2004).

construction market on a commercial basis with labor exporting services, and later as a sub-contractor for companies from the West. From the mid-1980s, CSCEC became a main contractor and participated in international biddings. It did not, however, mature as a true breed international contractor until the end of the 1980s. From then on, CSCEC realized its transition from being a government-linked enterprise into commercialization and internationalization (Meng, 2000). Its strategies for developing markets in the Asia-Pacific, Middle East and Northern Africa were phenomenal for CSCEC's development during the 1990s for it to emerge as a multinational construction enterprise.

In less than 20 years until 1998, CSCEC's total assets increased about 30 times to reach US$ 7.3 billion with 45.59% of these assets overseas (including Hong Kong). As shown in Figure CS2.1, from 1998 to 2000, both CSCEC's total sales and foreign sales stabilized at about US$ 5.8 billion and US$ 1.9 billion respectively.

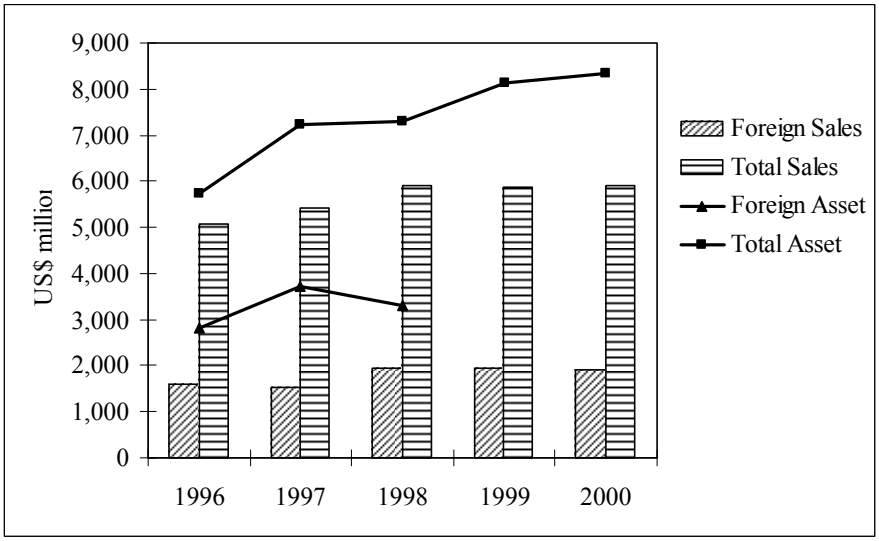


Figure CS2.1 Sales and assets of CSCEC
Source: UNCTAD's *World Investment Report*, 1998, 1999, 2000 and company website
Note: The value of foreign assets in 1999 and 2000 are not available.

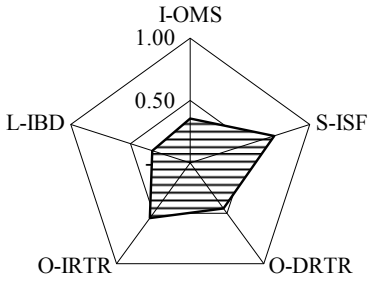
In the development of its internationalization drive towards other locational factors, CSCEC adopted the strategy of deriving its market in Hong Kong and Macau before other geographically and culturally close regions in South-east Asia. It then expanded to Africa and other Pacific countries, and ultimately to Europe and Latin-America. In its internationalization process, CSCEC is presently at a stage with a regional focus.

In terms of its internalization measures, CSCEC gained experience from sub-contracting to main contracting, and had attempted design and build, while its main business line is still in building construction. Most of its overseas management organizations were established on a project-oriented basis through project offices or country representative offices. Its diversification of businesses had developed rapidly in recent years but is still in an infancy stage when compared with firms from the West. One feature that can be observed from its company family ownership tree is that while a majority of CSCEC's traditional subsidiary enterprises is located in mainland China, many of its diversified investments were led back to the mainland from Hong Kong through its Hong Kong subsidiary – China Overseas Holding Ltd. In fact, this is a common strategy adopted by many Chinese MNCs in order to enjoy the favorable conditions set out in Chinese government policies for investments from overseas. As shown in the company family ownership tree, CSCEC has also set up strategic alliances with top MNCs from the developed countries, such as Taisei Corporation of Japan and Philipp Holzmann AG. of Germany.

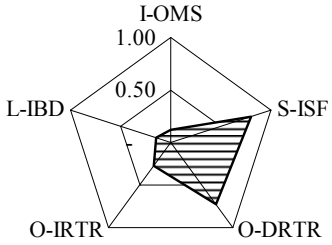
A comparative analysis based on the OLI+S model was conducted between CSCEC and some of its major international competitors. The results are presented in Figure CS2.2 through OLI+S star models. Bechtel Group Inc., US, whose rank in ENR's top 225

international contractors in 2001 is No.3, was chosen as a preferred model to compare with others. The other two firms, Foster Wheeler Corporation and Kajima Corporation with the closest ranked positions in the top 225 contractors from the US and Japan, were also chosen for comparison with CSCEC. As shown in the figure, it may be reasonably inferred that Bechtel Group Inc. exhibited balanced development in both the domestic and international market based on its ratios of international revenue to total revenue (IRTR) and domestic revenue to total revenue (DRTR). On the other hand, both CSCEC and Kajima Corporation have relied on the domestic market while Foster Wheeler Corporation's business line concentrated on the international market. In terms of international business distribution (IBD), overseas management structure (OMS) and involvement with specialized fields (ISF), Bechtel Group Inc. showed all-round strengths. CSCEC stands at a similar level with Kajima Corporation in international business distribution, but with the least overseas subsidiaries/associates presence compared with the other three. Since Foster Wheeler Corporation's business line primarily lies with projects in energy, industrial process and environmental fields (Factiva, 2002), its overall S-ISF was reflected at a lower level in Figure CS2.2.

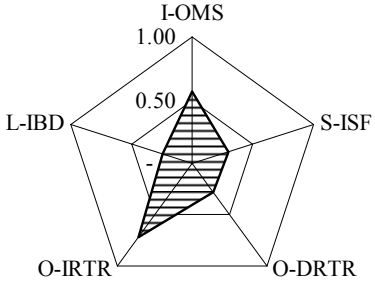
In summary, CSCEC, as one of China's strongest construction enterprises, is at a rapidly expanding phase of its business internationalization process. Following the consolidation of its dominant position in the indigenous market, the exploitation and optimization of its OLI+S advantages in the international market is now an important issue for its top management.



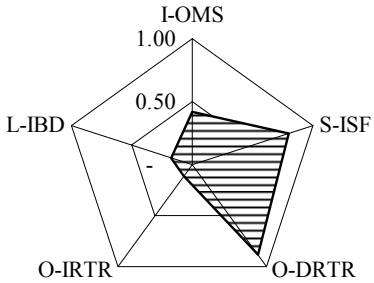
Bechtel Group Inc. US
Ranked at No.3



CSCEC, China
Ranked at No. 19



Foster Wheeler Corp. US
Ranked at No. 15



Kajima Corp. Japan
Ranked at No. 18

Figure CS2.2 Comparative analysis of CSCEC with Bechtel Group Inc., Foster Wheeler Corp. and Kajima Corp.

Note: O-DRTR represents the ownership factor in terms of the ratio of domestic revenue to total revenue.

Chapter Six

COMPETITIVE ADVANTAGES OF CHINESE INTERNATIONAL CONTRACTORS

6.1 Introduction

The general status of Chinese international contractors and their overall performance in construction international market were analyzed in the previous chapter. In this chapter, the detailed examinations on the competitive advantages of Chinese CMNCs are presented. The international operations of Chinese CMNCs are analyzed following the OLI framework, through which ownership advantages and disadvantages, locational factors and internalization factors are identified using the data collected from fieldwork. The field study was designed to include two parts, i.e. Chinese CMNCs in international construction market and in domestic construction market. This chapter presents the results regarding international construction market, and Chapter 9 presents the results regarding domestic market.

In this chapter, sampling method is firstly introduced along with the profiles of sample firms. Then the empirical study on the competitive advantages of Chinese CMNCs in international market is presented. The analysis is structured according to the OLI model, and various statistical methodologies are adopted. A general analytical procedure for data analysis used in this chapter and Chapter 9 is outlined below:

Step one: Factors description and preprocessing tests. In this step, various factors are briefly introduced, followed by one-way Chi-square test. In a social

science study, the one-way Chi-square test may be used to indicate the degree of influence by chance factors in the responses (Siegel and Castellan, 1988; David, 2002). A significant test result may imply that the responses obtained were unlikely to be the result of chance factors, and consequently the reliability of the data can be justified (Siegel and Castellan, 1988).

Step two: Identification of advantages/ disadvantages and their degree of significance when construction firms work in international and domestic market. One-tailed t test is utilized to test the significance of the factors and to find out the advantages and disadvantages. In addition, the median view is used when necessary.

Step three: Correlation analysis of the factors. This is to analyze the possible relationship between the factors within the same group, and therefore provide some explanation or implication for the factors. Pearson's correlation coefficients of the pair factors are calculated and the statistical significance is used to distinguish the possible relationship.

Step four: Variation analysis. This is to examine the variation of views on the factors among the firms according to their different OLI+S indices. In this step, the OLI+S model introduced in Chapter 4 is incorporated into the OLI factor analysis. The Spearman's Rank-Order correlation coefficient and the related tests of significance are adopted.

6.2 Descriptive analysis

6.2.1 Response rate and representativeness of data

To analyze the OLI advantages of Chinese construction MNCs in the international market, a fieldwork was conducted with large Chinese construction enterprises to understand their modes of operations. In the fieldwork, responses were reviewed from 31 Chinese construction MNCs. These MNCs represented over half of China's total construction revenue generated from the international market in 2001. Information was captured through questionnaire surveys, interviews and archival or secondary sources of data. In the fieldwork, the different groups of O, L and I factors identified from the literature review were rated on a Likert scale. These factors were further classified under firm-specific and country-specific categories.

In the fieldwork, 65 Chinese CMNCs were approached through email, telephone and personal contact. After the initial contact, the addresses of on-line questionnaires were sent to the intended persons. During October 2003 to June 2004, a total of 31 responses (62 sets) were received after several reminders and personal discussions. The response rate is 47.7%, which is at acceptable level comparing with other similar studies such as the follows[6]:

- Ling (2003), where 34 samples were selected for the study of Singapore construction multinational companies, 26 samples for USA with a total response rate of 20%;
- Cuervo (2002), where 22 respondents with a response rate of 33.8% were received for the study of Singapore international contractors;

[6] Other studies with the similar nature can be found in section 3.3.2 and 3.3.3 in literature reviews.

- Seymour (1987), where 20 companies were taken as samples for the study of multinational construction industry world-wide with the focus of UK firms;
- Mansfield (1988), where 20 samples were taken to examine the strengths of UK international construction sector.

The 31 sample firms had been involved with various fields in international construction industry. The diversified profiles as described below, including the positions of the respondents, the years for which they had worked in international construction, and the countries where they had worked in, provided a good representativeness of data for this study. Hence, together with the published data for the sample firms, data in the study provides a fair representation for Chinese CMNCs.

6.2.2 Profile of sample firms and respondents

In this section, the profiles of the sample firms and respondents are described, and these include the characteristics of individual respondents for the questionnaire, the business profiles of the sample firms, and the determinant ratios of O-IRTR, L-IBD, I-OMS and S-ISF in the OLI+S model of the sample firms. The determinant ratios in OLI+S model are referred as O, L, I and S indices hereinafter, and will be used to group the sample firms in the OLI analysis later.

Characteristics of respondents

All of the 31 respondents of the questionnaire are at the managerial or high professional level in the CMNCs. They have considerable international experience in construction industry and had been or were still working overseas for 5 to 15 years. A summary of the profiles of respondents is shown in Table 6.1.

Table 6.1 Profile of respondents

Respondents		Number	%
Designation or position			
	Top management	5	16%
	Senior professionals	4	13%
	Department or branch managers	10	32%
	Project managers	12	39%
	Total	31	100%
Years in international working			
	1-10 years	13	42%
	10-20 years	15	48%
	>20 years	3	10%
	Total	31	100%
Countries worked in			
	1-5 countries	10	32%
	5-10 countries	16	52%
	>10 countries	5	16%
	Total	31	100%

Source: Fieldwork

Table 6.1 shows that about 30% of the respondents are at top management position or the senior professional staffs, while the others are either the department or project managers. They have an average of 11.45 years with international construction experience, while about half of them had been working in overseas market for 10-20 years. In terms of the countries they had been working in, 52% of the respondents had been working in 5 to 10 countries, and the others had been working in at least 3 countries. They had been working in foreign countries either being expatriated at a long-term working station such as appointed as project managers or directors, managers or directors of overseas branches/subsidiaries, etc., or having worked in a foreign country for a short term assignment, such as several months of project tendering, site inspection, or project crisis management.

The basic profiles of the respondents provide a fair representativeness of the data they provided. They have good experience and knowledge about Chinese CMNCs' working in international market. The information provided by these respondents with well-mixed

background, in terms of the years working overseas and the number of countries working in, may fairly support this study, and thus a comprehensive analysis about Chinese CMNCs may become viable.

Characteristics of the sample firms

The 31 sample firms in this study are all state owned enterprises (SOEs). In terms of the administrative system, they are either directly under the administration of Chinese central government through the Office of Large Enterprises of State Council, or under the administration of provincial-level governments. The ownership of the firms is of the state, and in general, the top management teams of the firms are appointed by their upper level administrative government agents.

During the fieldwork, it was found that there was an ambiguous issue regarding to the number of employment in the firms. Most of the Chinese CMNCs at central government level have close relationship with the respective ministry, and accordingly the CMNCs work closely together with a number of specialized construction and/or engineering bureaus under the respective ministry. This gives a good advantage to the CMNCs that they may declare they possess a large number of employment, which include the staffs in the construction or engineering bureaus. By doing so, the CMNCs significantly enhanced their strengths in terms of technical capacity and human resource, which are critical for international projects. As a result, it was found that some of the firms indicated that they had the number of employment of over hundred thousands, while others indicated that number was in between 100 to 400. Because of the structural reforming in these Chinese construction firms that are still undergoing, in actual fact it is difficult to argue that they own such a huge number of employment. These firms

normally have the number of employment at around 100 to 500 by excluding the employment in various construction and engineering bureaus. Due to these reasons, the researcher decided that the number of employment of the firms would not be used as a determinant index in this study because of the ambiguity mentioned above.

A profile of the sample firms may be presented in terms of the project and service they undertake in international market. According to source of project funds, a list of project types was investigated in the fieldwork, and the results are shown in Table 6.2.

Table 6.2 Types of project and service provided by Chinese CMNCs in international market

Project types undertaken in terms of project funding:			
Q. No.	Type	Frequency	%
1.3.1	Projects funded by host country government	25	26.9%
1.3.2	Projects funded by foreign private sectors	17	18.3%
1.3.3	Projects funded by home country government and home clients	14	15.1%
1.3.4	Projects initiated by international financing institutions (World Bank, Asian Development Bank, etc)	28	30.1%
1.3.5	Projects funded by Non-Government Organizations (NGO)	6	6.5%
1.3.6	Others (e.g. funded by the firm)	3	3.2%
	Total	93	100.0%
Types of service provided:			
Q. No.	Type	Frequency	%
1.4.1	Project feasibility studies	12	9.7%
1.4.2	Design works	15	12.1%
1.4.3	Construction works	30	24.2%
1.4.4	Consultancy works	12	9.7%
1.4.5	Project financing	6	4.8%
1.4.6	Exporting of labor service	13	10.5%
1.4.7	Supply of construction material	4	3.2%
1.4.8	Supply and installation of construction machinery and equipment	18	14.5%
1.4.9	Operation and maintenance	11	8.9%
1.4.10	Others	3	2.4%
	Total	124	100.0%

From Table 6.2, one may find that the projects undertaken by the Chinese firms are mostly initiated by the international financing institutions including World Bank, Asian Development Bank, etc., and by the host country governments. The projects funded by these two sources took a part of over 50% of the total projects. Other important categories are the projects funded by foreign private sectors and by home country government and home clients. In terms of the services provided by Chinese CMNCs, Table 6.2 shows that a big portion of the services provided are construction works. The other major works include supply and installation of construction machinery and equipment, design works and consultancy works, project feasibility studies. Exporting of labor services is also part of the services provided by Chinese CMNCs because of the low cost of Chinese technical workers. Project financing is not widely applicable for the Chinese CMNCs in international market; this is one of the major differences between Chinese CMNCs and the western firms, and this is discussed further in Chapter 10 and 11.

The OLI+S indices of the sample firms

OLI+S model and indices are good indicators of construction firms in terms of the ownership, locational, internalization and specialty advantages in international performance (Low and Jiang, 2003; 2004a; 2004c; Low, Jiang and Leong, 2004). The OLI+S model was applied to the sample firms, and the OLI+S indices including O-IRTR, L-IBD, I-OMS and S-ISF were calculated. The procedure of the calculation of OLI+S indices refers to Section 4.7 in Chapter 4. The data used in the calculation are based on data from fieldwork and Low and Jiang (2003, 2004a). The results are shown in Table 6.3.

Table 6.3 The OLI+S indices of the sample firms

No. of Firm	O-IRTR	L-IBD	I- OMS	S-ISF
1	0.27	0.72	0.82	1.00
2	0.34	0.93	1.00	0.71
3	0.42	0.58	0.79	0.57
4	0.95	0.48	0.71	0.29
5	0.35	0.76	0.36	1.00
6	0.21	0.57	0.57	0.43
7	0.80	1.00	0.64	0.29
8	0.68	0.65	0.82	0.57
9	1.00	0.17	0.46	0.29
10	0.07	0.54	0.86	1.00
11	0.94	0.91	0.36	0.86
12	1.00	0.34	0.57	0.43
13	0.67	0.24	0.39	0.57
14	0.09	0.51	0.18	0.14
15	0.04	0.55	0.21	0.29
16	0.89	0.15	0.36	0.29
17	0.60	0.21	0.29	0.29
18	0.18	0.61	0.50	0.86
19	0.97	0.24	0.18	0.29
20	0.74	0.09	0.11	0.14
21	0.05	0.36	0.43	0.43
22	0.82	0.25	0.25	0.14
23	0.01	0.54	0.32	0.29
24	0.11	0.18	0.07	0.14
25	0.02	0.56	0.46	0.29
26	0.02	0.38	0.18	0.29
27	0.02	0.03	0.04	0.14
28	0.56	0.35	0.26	0.32
29	0.27	0.01	0.04	0.29
30	0.09	0.43	0.21	0.14
31	0.32	0.33	0.14	0.14
Average	0.44	0.44	0.41	0.42
Number of firms with high index	14	20	23	21
Number of firms with low index	17	11	8	10

In Table 6.3, the averages of the four OLI+S indices were selected as criteria of whether a firm is with higher or lower indexes. A firm with a high O-IRTR (O index) means that its revenue generated from international market is at a higher level than the average level of all the firms, and therefore this is regarded as the firm with a higher ownership index. A firm with a higher L-IBD (L index) means that the firm has a larger coverage

of international business distribution in terms of the ratios of the number of countries in which the firm has worked in a particular period to the number of countries in which the firm may have the potential to work in; therefore, this reflects the locational advantages the firm owns. A firm with a higher I-OMS (I index) means that the firm has a larger scale of overseas management structure in terms of the ratio of the number of overseas subsidiaries and associates to the total number of such offices; and this reflects a higher degree of influence of internalization factors to the firm's international performance. A firm with a higher S-ISF (S index) means that the firm has a higher involvement in different specialized fields in construction. The table shows that over half of the sample firms are at higher level of L-IBD, I-OMS and S-ISF, while over half of them have lower O-IRTR. According to high or low OLI+S indices, the sample firms can be grouped, and the grouping may be used for comparative analysis of various OLI factors among the different firms.

6.3 Incentives of internationalization of Chinese CMNCs

A fundamental issue about internationalization of Chinese CMNCs is to find out the incentives or motivations of their movement to international market. Generally there are many reasons or incentives driving them to go internationally, and these factors include organizational, financial incentives and market-related issues. Some important incentives were identified in this study, for example, (i) the financial-related incentives may be to improve the company's profits, to maintain a better cash and/or capital flow for the firm as a whole, and to increase the foreign currency reserve; (ii) the market-related incentives may include to diversify their business risks, to alleviate the pressure from competition in domestic market, to follow other contractors from home country

who have been working overseas; (iii) other incentives may include that the firms may pursue home government incentives to work overseas -- the "Going out" policy advocated by Chinese government; they may be invited by joint venture partners to venture overseas, or be invited by the host country's government; and (iv) another important driver of internationalization may be their intention to utilize surplus capacity, i.e. employment, machinery, capital, etc.

6.3.1 The key incentives of undertaking international works

Various incentives of undertaking international works by Chinese CMNCs were identified in the fieldwork, and the results are presented in Table 6.4. As shown in the table, the following factors are found to be significantly driving the Chinese CMNCs to go overseas:

- To improve profits
- To diversify business risks
- To maintain a better cash and/or capital flow for the firm as a whole
- To alleviate the pressure from competition in the domestic market in China

In addition, the median view shows that the following factors are moderately important:

- To increase the foreign currency reserve
- To pursue home government incentives to work overseas, i.e. the "Going out" policy
- To be invited by joint venture partners or other partners to venture overseas

The other incentives were found to be not significant statistically. The most important incentive is to improve profit, while factors 2.1.2, 2.1.3, and 2.1.5 were found to be significant statistically at level of 5%.

Table 6.4 Key incentives of Chinese CMNCs undertaking international works

Q. No.	Factors	Mean	SD	t test	
				t	Sig. (1-tailed)
2.1.1	To improve profits	4.55	0.62	13.82	0.000**
2.1.2	To diversify business risks	3.77	1.02	4.21	0.000**
2.1.3	To maintain a better cash and/or capital flow for the firm as a whole	3.81	0.98	4.58	0.000**
2.1.4	To increase the foreign currency reserve	3.19	1.05	1.03	0.156
2.1.5	To alleviate the pressure from competition in the domestic market in China	3.65	0.84	4.28	0.000**
2.1.6	To follow other contractors from home country who have been working overseas	2.84	1.32	-0.68	0.749
2.1.7	To pursue home government incentives to work overseas, i.e. the "Going out" policy	2.97	0.75	-0.24	0.594
2.1.8	To be invited by joint venture partners or other partners to venture overseas	2.74	1.03	-1.39	0.913
2.1.9	To be invited by the host country's government	2.71	1.10	-1.47	0.924
2.1.10	To utilize surplus capacity, i.e. employment, machinery, capital, etc.	2.65	0.95	-2.08	0.977

Note: *p<0.05, **p<0.01, 1-tailed.

According to different OLI+S indices of the firms, the variations of internationalization incentives were analyzed and the results are presented in Table 6.5. A total of 40 pairs of Spearman's ranking-order correlation coefficients were calculated and the statistical tests provide the level of significance as shown in Table 6.5. Factor 2.1.1 is perceived as the most important incentives regardless of the different OLI+S indices among the firms. Factor 2.1.2 and factor 2.1.4 were viewed differently. Factor 2.1.3 was viewed similarly as important factor by the firms with different levels of O and L indexes.

Table 6.5 Variation of internationalization incentives

Q. No.	High O vs. Low O		High L vs. Low L		High I vs. Low I		High S vs. Low S	
	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)
2.1.1	0.918	0.028*	0.918	0.028*	0.918	0.028*	1.000	0.000**
2.1.2	0.000	1.000	0.667	0.219	0.707	0.182	0.300	0.624
2.1.3	0.918	0.028*	0.918	0.028*	-0.250	0.685	0.684	0.203
2.1.4	0.667	0.219	0.564	0.322	0.816	0.092	0.632	0.252
2.1.5	0.900	0.037*	0.763	0.133	0.872	0.054	0.872	0.054
2.1.6	0.649	0.236	0.821	0.089	-0.500	0.391	0.616	0.269
2.1.7	0.973	0.005**	0.895	0.040*	0.917	0.029*	0.649	0.236
2.1.8	0.763	0.133	0.821	0.089	1.000	0.000**	0.671	0.215
2.1.9	0.649	0.236	0.368	0.542	0.354	0.559	0.316	0.604
2.1.10	0.649	0.236	0.921	0.026*	0.892	0.042*	0.949	0.014*

Note: *p<0.05, **p<0.01, 1-tailed.

6.3.2 Key components in incentives of internationalization: a further study using Factor Analysis

It is helpful to understand the underlying notions of internationalization incentives of Chinese CMNCs using the factor analysis. Although factor analysis was designed to reduce the manageable number of many variables that belong together and may have overlapping measurement characteristics, it is also useful to identify the underlying latent or unobservable factors for the analysis (David, 2002; Willie, 2001). Two points should be noted here. One is about the requirement of sample size in factor analysis. Many literatures mentioned that the sample size in factor analysis should be large (Comrey and Lee, 1992; Tabachnick and Fidell, 1983), however, many recent researches suggest that when the number of variables and factors are not large and the communalities are generally high, the sample size issue should not be overly concerned (Kristopher and MacCallum, 2002; MacCallum, et. al., 1999 and MacCallum, et. al., 2002). Another point should be mentioned that the interpretation of factor analysis is largely subjective (Donald and Pamela, 2001). There is no way to calculate the meanings of factors; they are what one sees on them. Therefore, bearing these notes in mind, the researcher conducted the factor analysis on the data in this study, and

provided one of the possible explanation on the results by incorporating the statistical results with his understanding of practices of Chinese CMNCs.

A factor matrix of incentives of Chinese CMNCs going overseas using principal components analysis with iterations is presented in Table 6.6. The matrix was constructed by selecting three components in the analysis. The component number of three was selected through several trials with rotation using different number, and finally three was chosen in order to give the most appealing structure of factors (Darlington, 2004). As shown in Table 6.6, the three components account for about 66.3% (the communality) of the variance in ranking the importance of factor 2.1.1, while 70.6% of the factor 2.1.2, 71.1% of factor 2.1.4, etc. Factor 2.1.7 and 2.1.8 are not well explained by the components as indicated by the communalities. The explanatory power of the selected each component are denoted by the eigenvalue. Component 1 is the most important one with eigenvalue of 2.24 and component 3 is the least important with eigenvalue of 1.396. It also shows that both of component 1 and component 2 explain about 20% of the pooled variance and the three components account for a total of about 56.4% of the total variance in viewing the incentives of undertaking international works.

Table 6.6 Factor Analysis of incentives of internationalization using Principal Component Analysis

Q.No.	Item	Component Matrix				Rotated Component Matrix		
		Component			Communality Extraction	Component		
		1	2	3		1	2	3
2.1.1	To improve profits	0.613	-0.534	0.041	0.663	-0.800	0.147	-0.031
2.1.2	To diversify business risks	-0.765	0.340	-0.072	0.706	0.764	-0.316	-0.148
2.1.3	To maintain a better cash and/or capital flow for the firm as a whole	0.409	0.525	0.344	0.561	0.048	0.299	0.685
2.1.4	To increase the foreign currency reserve	0.162	0.803	-0.202	0.711	0.518	0.584	0.319
2.1.5	To alleviate the pressure from competition in the domestic market in China	0.628	0.298	-0.377	0.625	-0.123	0.776	0.084
2.1.6	To follow other contractors from home country who have been working overseas	-0.272	0.251	-0.776	0.739	0.510	0.395	-0.568
2.1.7	To pursue home government incentives to work overseas, i.e. the "Going out" policy	-0.219	0.405	0.083	0.219	0.423	-0.016	0.199
2.1.8	To be invited by joint venture partners or other partners to venture overseas	0.429	0.332	0.138	0.313	-0.066	0.351	0.431
2.1.9	To be invited by the host country's government	-0.620	-0.085	0.362	0.522	0.276	-0.668	0.018
2.1.10	To utilize surplus capacity, i.e. employment, machinery, capital, etc.	0.036	0.498	0.575	0.580	0.230	-0.100	0.719
	Eigenvalue	2.240	2.004	1.396				
	% of Variance	22.396	20.036	13.963				
	Cumulative %	22.396	42.432	56.395				

Note: Extraction Method: Principal Component Analysis; 3 components extracted;
Rotation Method: Varimax with Kaiser Normalization; Rotation converged in 6 iterations.

In an effort to find the principal factors, a varimax (orthogonal) rotation is used to secure the matrix as shown in Table 6.6. The heavy factor loadings for the three components are as following:

Component 1	Component 2	Component 3
• To improve profits • To diversify business risks	• To alleviate the pressure from competition in the domestic market in China • To increase the foreign currency reserve • To be invited by the host country's government	• To maintain a better cash and/or capital flow for the firm as a whole • To follow other contractors from home country who have been working overseas • To utilize surplus capacity, i.e. employment, machinery, capital, etc.

The total of 56.4% of the explanation power is applausive for the study; however, the interpretation of the results of factor analysis is subjective. The following is one possible explanation:

- The factors of “To improve profits” and “To diversify business risks” are the primary incentives for Chinese CMNCs to go overseas. This is consistent with the general view in the industry, i.e. a firm is firstly driven by profit to pursue international business, while the diversification of business risks may service as a second primary objective.
- At the second level of importance among the incentives, component 2 includes the most important market-related factor: to alleviate the pressure from competition in the domestic market in China. This is consistent with the current situation in China, where the competition in construction industry is intensive. The construction enterprises with internationalization advantages have to explore more shares in international market in order to alleviate the pressure at home. To increase forex and to be invited by host country’s government are also part of the Component 2; they are incentives of the CMNCs but may not provide practical meanings of their relationship with 2.1.5.
- Component 3 possibly illustrates the important motivations on financial-driven factors. To maintain a better cash and/or capital flow for the firm as a whole, and to utilize surplus capacity, i.e. employment, machinery, capital, etc. are increasingly becoming important when a MNC has completed its initial capital accumulation. The cash flow is specially a key issue in construction enterprise when it undertakes many construction works with large amount of contract value. International works and the contract volume of a firm may also provide better support for the firm to approach bank loans, and consequently the cash flow situation in the firm may be improved.

6.4 Ownership factors of Chinese CMNCs in international market

Following the OLI framework, the ownership factors of Chinese CMNCs in international construction market are structured in two groups: the firm-specific factors and the home country specific factors. Each of the two groups is analyzed in two aspects, i.e.: (a) the Chinese CMNCs vs. other international contractors and (b) Chinese CMNCs vs. the local contractors.

6.4.1 Firm specific ownership factors: Chinese CMNCs vs. other international contractors

The firm specific ownership factors may influence the firm's operation in various areas, such as that of technical, management, finance, business development and working quality. Each of the factors may be of an advantage or a disadvantage for the firm, and should be examined in the both aspects. The fieldwork results are presented in Table 6.7.

Table 6.7 Firm specific ownership factors: Chinese CMNCs vs. other international contractors

Q.No.	Factors	Mean	SD	Chi-square		t test		
				Chi square	Sig.	t	Sig. (1-tailed: Lower)	Sig. (1-tailed: Upper)
2.2.a.1	Technological and R&D capacity	3.52	1.12	25.23	0.000	-2.40	0.011*	0.989
2.2.a.2	Business development capacity	4.42	1.29	23.42	0.001	1.82	0.960	0.040*
2.2.a.3	Product diversification	3.90	1.27	18.90	0.004	-0.42	0.338	0.662
2.2.a.4	Firm's reputation	4.52	1.46	13.94	0.030	1.97	0.971	0.029*
2.2.a.5	Size of the firm	5.10	1.11	25.68	0.000	5.52	1.000	0.000**
2.2.a.6	Experience and knowledge about international construction market	5.35	1.20	30.19	0.000	6.29	1.000	0.000**
2.2.a.7	Accessibility to financial resources	3.58	1.43	19.35	0.004	-1.63	0.057	0.943
2.2.a.8	Accessibility to technical resources	4.52	1.34	21.16	0.002	2.15	0.980	0.020*
2.2.a.9	Accessibility to construction machinery and materials	4.39	1.31	16.65	0.011	1.65	0.945	0.055
2.2.a.10	Management expertise	3.35	1.45	11.23	0.082	-2.48	0.010**	0.990
2.2.a.11	Marketing and project securing capability	4.19	1.17	26.58	0.000	0.92	0.818	0.182
2.2.a.12	Networking flexibility of headquarter and other affiliated overseas branches	4.23	1.06	27.48	0.000	1.19	0.879	0.121
2.2.a.13	Working quality and Total Quality Management capability	3.52	1.48	19.35	0.004	-1.82	0.039*	0.961
2.2.a.14	Lower costs in production compared with other international competitors	5.84	1.32	33.81	0.000	7.76	1.000	0.000**

Note: *p<0.05, **p<0.01, 1-tailed.

In Table 6.7, the statistically significant results from one-way Chi-square tests may imply the responses obtained were unlikely to be the result of chance factors. All of the factors except 2.2.a.10 received statistically significant Chi-square value at level of 5%, while the factor 2.2.a.10 is significant at the level of 10%. Using t tests, the significant advantages and disadvantages are identified regarding Chinese CMNCs in international market:

- Business development capacity;
- Firm's reputation;
- Size of the firm;
- Experience and knowledge about international construction market;
- Accessibility to technical resources;
- Lower costs in production compared with other international competitors.

Meanwhile, the following three factors are recognized as disadvantages when competing with other international contractors:

- Technological and R&D capacity;
- Management expertise;
- Working quality and Total Quality Management capability.

The other five factors are of no significant influence to CMNCs' international operation. From the correlation analysis shown in Table 6.8, statistically significant correlations between the factors may be found, and some of these relationships may provide practical implications. The close relationship between factor 2.2.a.6 and 2.2.a.11 may indicate the experience and knowledge about international construction market significantly influence the firm's marketing and project securing capability in the

market. The correlation between factor 2.2.a.10 and 2.2.a.11 further imply that the management expertise of the firm also links to its marketing and project securing capability. Therefore, the analysis may suggest that improving the marketing and project securing capability requires the firm to enhance its management expertise and knowledge about international market. The relatively close relationship between factor 2.2.a.8 and 2.2.a.9 may possibly imply that the accessibility to technical resources of Chinese CMNCs in international market largely links to its accessibility to construction machinery and materials; in other words, the use of construction machinery and materials reflects the firm's technical levels.

Table 6.8 Correlation analysis of firm specific ownership factors

Q. No.	2.2.a.1	2.2.a.2	2.2.a.3	2.2.a.4	2.2.a.5	2.2.a.6	2.2.a.7	2.2.a.8	2.2.a.9	2.2.a.10	2.2.a.11	2.2.a.12	2.2.a.13	2.2.a.14
2.2.a.1	-	0.246	0.412	0.396	0.424	0.211	0.121	0.613	0.922	0.972	0.220	0.262	0.572	0.944
2.2.a.2		-	0.850	0.059	0.172	0.695	0.531	0.065	0.049*	0.272	0.207	0.902	0.904	0.238
2.2.a.3			-	0.467	0.469	0.913	0.036*	0.315	0.273	0.995	0.428	0.400	0.884	0.309
2.2.a.4				-	0.864	0.054	0.174	0.172	0.088	0.190	0.607	0.611	0.087	0.884
2.2.a.5					-	0.218	0.554	0.250	0.397	0.259	0.954	0.179	0.961	0.953
2.2.a.6						-	0.277	0.940	0.671	0.531	0.017*	0.286	0.664	0.931
2.2.a.7							-	0.092	0.388	0.757	0.959	0.411	0.718	0.257
2.2.a.8								-	0.027*	0.950	0.724	0.579	0.947	0.012*
2.2.a.9									-	0.797	0.755	0.868	0.530	0.472
2.2.a.10										-	0.039*	0.599	0.169	0.943
2.2.a.11											-	0.926	0.177	0.295
2.2.a.12												-	0.221	0.113
2.2.a.13													-	0.331
2.2.a.14														-

Note: The table presents the p-values of the corresponding Pearson's correlation coefficients of the pair factors.
*p<0.05, **p<0.01

Variation analysis is conducted to examine the different views of the factors among the firms by incorporating the firms' different OLI+S indices. A total of 56 pairs of the tests of Spearman's rho and the corresponding t tests are presented in Table 6.9.

Table 6.9 Variation analysis of firm specific ownership factors: Chinese CMNCs vs. other international contractors

Q. No.	High O vs. Low O		High L vs. Low L		High I vs. Low I		High S vs. Low S	
	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)
2.2.a.1	0.54	0.212	0.41	0.364	0.83	0.021*	0.72	0.070
2.2.a.2	0.55	0.204	0.12	0.805	0.44	0.327	0.36	0.429
2.2.a.3	0.54	0.207	0.40	0.379	0.20	0.664	-0.19	0.682
2.2.a.4	0.70	0.081	0.64	0.118	0.25	0.584	0.54	0.213
2.2.a.5	1.00	0.000**	0.83	0.020*	0.74	0.059	0.68	0.093
2.2.a.6	0.70	0.082	0.60	0.154	0.72	0.067	0.65	0.115
2.2.a.7	0.90	0.006**	0.55	0.203	0.79	0.034*	0.74	0.056
2.2.a.8	0.79	0.034*	0.48	0.280	0.58	0.174	0.63	0.127
2.2.a.9	0.79	0.035*	0.56	0.186	0.35	0.438	0.82	0.023*
2.2.a.10	0.46	0.295	0.38	0.401	0.60	0.154	0.41	0.364
2.2.a.11	0.93	0.002**	0.76	0.046*	0.61	0.147	0.56	0.190
2.2.a.12	0.74	0.059	0.52	0.227	0.93	0.003**	0.65	0.116
2.2.a.13	0.73	0.063	0.82	0.024*	0.63	0.127	0.71	0.074
2.2.a.14	0.96	0.001**	0.77	0.043*	0.73	0.061	0.68	0.096

Note: *p<0.05, **p<0.01

The results in Table 6.9 show that:

- The firms with different level of O indexes viewed the factor 2.2.a.5, 2.2.a.8 and 2.2.a.14 as advantages similarly, while they varied their views on factor 2.2.a.2, 2.2.a.4, and 2.2.a.6 as advantages and factors 2.2.a.1, 2.2.a.10 and 2.2.a.13 as disadvantages. This is evident that there is no difference in viewing the importance the factors of "size of firm", "technical resources' and "low cost in production" among the Chinese CMNCs having either high or low ownership advantages;
- Both the firms with high and low L indexes viewed the factor 2.2.a.5 and 2.2.a.14 as advantages and 2.2.a.13 as disadvantage similarly, while they varied their views of factor 2.2.a.2, 2.2.a.4, 2.2.a.8, and 2.2.a.6 as advantages and factors 2.2.a.1, 2.2.a.10 and 2.2.a.13 as disadvantages. This further confirms that the factors of "size of firm" and "low cost of production" are regarded important in international contracting by the CMNCs either having high or low locational advantages. The firms share the same view on the factor of "working quality and TQM capacity" as disadvantages;

- The firms with different I indexes viewed only the factor 2.2.a.1 as disadvantage similarly; while they varied their views on all other factors. They share common view on "Accessibility to financial resources" as a moderate disadvantage if taking the significant level at 10%;
- The firms with different S indexes varied their views on most of the factors as advantages or disadvantages, except that on factor "accessibility of construction machinery and materials" as a moderate advantage if taking the significant level at 10%. This is evident that different ownership and accessibility to specialized construction machinery may determine the degree of specialty advantages of the firms.

6.4.2 Firm specific ownership factors: Chinese CMNCs vs. local contractors

Different advantages may be perceived when the CMNCs compete with other international contractors and with local contractors. 14 firm specific ownership factors are analyzed in this section for Chinese CMNCs competing with local contractors. The fieldwork results are presented in Table 6.10.

Table 6.10 Firm specific ownership factors: Chinese CMNCs vs. local contractors

Q.No.	Factors	Mean	SD	Chi-square		t test		
				Chi square	Sig.	t	Sig. (1-tailed: Lower)	Sig. (1-tailed: Upper)
2.2.b.1	Technological and R&D capacity	4.58	0.92	40.58	0.00	3.50	1.00	0.001**
2.2.b.2	Business development capacity	4.90	1.11	24.77	0.00	4.55	1.00	0.000**
2.2.b.3	Product diversification	4.03	1.05	40.13	0.00	0.17	0.57	0.433
2.2.b.4	Firm's reputation	5.39	1.09	36.52	0.00	7.11	1.00	0.000**
2.2.b.5	Size of the firm	4.90	1.11	29.29	0.00	4.55	1.00	0.000**
2.2.b.6	Experience and knowledge about international construction market	5.87	0.99	34.71	0.00	10.51	1.00	0.000**
2.2.b.7	Accessibility to financial resources	5.19	1.33	21.16	0.00	5.01	1.00	0.000**
2.2.b.8	Accessibility to technical resources	5.55	0.96	37.42	0.00	8.98	1.00	0.000**
2.2.b.9	Accessibility to construction machinery and materials	4.26	1.24	27.03	0.00	1.16	0.87	0.127
2.2.b.10	Management expertise	5.03	1.17	32.00	0.00	4.92	1.00	0.000**
2.2.b.11	Marketing and project securing capability	4.16	1.19	22.97	0.00	0.76	0.77	0.227
2.2.b.12	Networking flexibility of headquarter and other affiliated overseas branches	4.71	0.97	31.10	0.00	4.06	1.00	0.000**
2.2.b.13	Working quality and Total Quality Management capability	5.61	1.09	33.35	0.00	8.27	1.00	0.000**
2.2.b.14	Lower costs in production compared with other international competitors	4.71	1.16	22.97	0.00	3.41	1.00	0.001**

Note: *p<0.05, **p<0.01, 1-tailed.

The statistic test results from one-way Chi-square tests indicate that the responses from fieldwork are unlikely to be the result of chance factors since all the Chi Square are significant at level of 5%. Table 6.10 shows that the following factors were regarded as advantages for Chinese CMNCs in international market when competing with local contractors:

- Technological and R&D capacity
- Business development capacity
- Firm's reputation
- Size of the firm
- Experience and knowledge about international construction market
- Accessibility to financial resources
- Accessibility to technical resources
- Management expertise
- Networking flexibility of headquarter and other affiliated overseas branches
- Working quality and Total Quality Management capability
- Lower costs in production compared with other international competitors

The remaining three factors are of no significant influence. The most significant ownership advantage competing with local contractors is factor 2.2.b.6, followed by factor 2.2.b.13, 2.2.b.8, 2.2.b.4 and 2.2.4.7. No significant disadvantages are perceived in this section. The correlation analysis in Table 6.11 shows that the firm's reputation links to various aspects of the firms including the factors of 2.2.b.6, 2.2.b.7, 2.2.b.8, 2.2.b.10, 2.2.b.12 and 2.2.b.13. In addition, it also suggests the accessibility to financial resources of Chinese CMNCs is related to the firm's reputation, the networking

flexibility of headquarter and other affiliated overseas branches and the working quality and Total Quality Management (TQM) capability. The analysis also indicates that the working quality and TQM capability is related to the firm's management expertise and its management expertise links to the networking flexibility of headquarter and other affiliated overseas branches. This may imply the high interdependency among the headquarter of Chinese CMNCs and its overseas branches, and this is consistence with the actual fact. In contrast, many CMNCs from Japan and US in international market demonstrate relatively high independency in terms of their overseas business management.

Table 6.11 Correlation analysis of firm specific ownership factors

Q. No.	2.2.b.1	2.2.b.2	2.2.b.3	2.2.b.4	2.2.b.5	2.2.b.6	2.2.b.7	2.2.b.8	2.2.b.9	2.2.b.10	2.2.b.11	2.2.b.12	2.2.b.13	2.2.b.14
2.2.b.1	-	0.406	0.314	0.042*	0.170	0.006**	0.086	0.299	0.920	0.157	0.614	0.144	0.597	0.137
2.2.b.2		-	0.208	0.124	0.150	0.051	0.153	0.098	0.674	0.880	0.452	0.393	0.384	0.164
2.2.b.3			-	0.228	0.208	0.289	0.001**	0.057	0.607	0.140	0.011*	0.140	0.134	0.966
2.2.b.4				-	0.167	0.003**	0.004**	0.027*	0.183	0.022*	0.157	0.005**	0.008**	0.522
2.2.b.5					-	0.452	0.018*	0.140	0.154	0.013*	0.542	0.058	0.003**	0.986
2.2.b.6						-	0.103	0.431	0.186	0.743	0.837	0.877	0.459	0.337
2.2.b.7							-	0.005**	0.961	0.000**	0.303	0.015*	0.002**	0.186
2.2.b.8								-	0.588	0.005**	0.140	0.050	0.001**	0.515
2.2.b.9									-	0.225	0.088	0.731	0.343	0.591
2.2.b.10										-	0.377	0.000**	0.006**	0.865
2.2.b.11											-	0.137	0.268	0.943
2.2.b.12												-	0.010**	0.309
2.2.b.13													-	0.619
2.2.b.14														-

Note: The table presents the p-values of the corresponding Pearson's correlation coefficients of the pair factors.
*p<0.05, **p<0.01

The variation analysis according to different OLI+S indices is presented in Table 6.12. The results may be explained as follows:

Table 6.12 Variation analysis of firm specific ownership factors: Chinese CMNCs vs. local contractors

Q. No.	High O vs. Low O		High L vs. Low L		High I vs. Low I		High S vs. Low S	
	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)
2.2.b.1	0.77	0.042*	0.80	0.032*	0.59	0.161	0.63	0.126
2.2.b.2	0.83	0.021*	0.77	0.043*	0.87	0.010*	0.78	0.040*
2.2.b.3	0.50	0.258	0.56	0.193	0.56	0.189	0.91	0.004**
2.2.b.4	0.98	0.000**	0.42	0.346	0.17	0.708	0.47	0.286
2.2.b.5	0.85	0.017*	0.67	0.102	0.67	0.100	0.12	0.804
2.2.b.6	0.50	0.258	0.80	0.032*	0.59	0.159	0.96	0.001**
2.2.b.7	0.79	0.036*	0.90	0.006**	0.44	0.328	0.40	0.371
2.2.b.8	0.93	0.003**	0.89	0.008**	0.79	0.034*	0.70	0.080
2.2.b.9	0.91	0.005**	0.85	0.016*	0.81	0.027*	0.78	0.041*
2.2.b.10	0.78	0.038*	0.79	0.034*	0.80	0.029*	0.45	0.305
2.2.b.11	0.59	0.159	0.17	0.708	0.78	0.038*	0.64	0.125
2.2.b.12	0.87	0.010*	0.85	0.014*	0.82	0.023*	0.82	0.023*
2.2.b.13	0.86	0.014*	0.64	0.121	0.60	0.155	0.85	0.014*
2.2.b.14	0.76	0.048*	0.86	0.013*	0.78	0.039*	0.67	0.099

Note: *p<0.05, **p<0.01

- All firms with different O indexes viewed the significant advantages similarly except that for factor 2.2.b.6. If taking the significant level slightly lower than 5%, they viewed the advantages of "low cost of production" and "technical and R&D capacity" differently;
- Firms with different L indexes viewed the factor 2.2.b.1, 2.2.b.2, 2.2.b.7, 2.2.b.9, 2.2.b.10, 2.2.b.12, and 2.2.b.14 as advantages and factor 2.2.b.6 and 2.2.b.8 as significant advantages similarly, while they varied their views of factor 2.2.b.4, 2.2.b.5, and 2.2.b.13 as advantages;
- The firms with different I indexes have different views on the factors such as "Technological and R&D capacity", "Accessibility to financial resources", "Accessibility to technical resources" and "Working quality and Total Quality Management capability";
- The firms with high S and low S shared their views on the factors 2.2.b.2, 2.2.b.6, 2.2.b.12, and 2.2.b.13 similarly as advantages, while they varied their views on other factors.

6.4.3 Home country specific O-factors: Chinese CMNCs vs. other international contractors

The eclectic paradigm suggests that firm-specific factors are originated from country specific factors, and the home country specific factors are major component of the characteristics of MNCs when competing in international market. In general, the home country specific factors are examined at macro level, and the firm specific factors function at micro level for MNCs. Home country specific ownership factors include most of the resource-originated factors from home country, including the availability of

capital and financial support from home country, the availability of professionals and low-cost workers, the machinery and materials, and so on. Other factors, such as the governmental relationship with host countries and the governmental assistance for MNCs going overseas, also should be taken into account. Based on literature reviews and practices of Chinese CMNCs in international market, nine major home country specific ownership factors were identified and analyzed in this and next section.

Table 6.13 Home country specific ownership factors: Chinese CMNCs vs. other international contractors

Q. No.	Factors	Mean	SD	Chi-square		t test		
				Chi square	Sig.	t	Sig. (1-tailed: Lower)	Sig. (1-tailed: Upper)
2.3.a.1	Size and growth of the domestic construction market in China	4.68	0.98	-	0.00	3.85	1.000	0.000**
2.3.a.2	Home government assistance and incentives on overseas contracting	4.87	1.43	14.39	0.03	3.39	0.999	0.001**
2.3.a.3	Governmental and historical relationship with developing countries	4.90	1.22	24.32	0.00	4.12	1.000	0.000**
2.3.a.4	Support from the financial sector and banking system at home	3.61	1.20	28.39	0.00	-1.79	0.042*	0.958
2.3.a.5	Support from other related industries at home for international works	4.23	1.15	23.87	0.00	1.10	0.859	0.141
2.3.a.6	Availability of capable sub-contractors from China	4.13	1.18	26.13	0.00	0.61	0.727	0.273
2.3.a.7	Availability of professionals from China	4.16	1.39	11.68	0.07	0.64	0.738	0.262
2.3.a.8	Availability of low-cost workers from China	4.48	1.06	-	0.00	2.54	0.992	0.008**
2.3.a.9	Availability of low-cost machinery and materials from China	5.94	0.77	-	0.00	13.96	1.000	0.000**

Note: *p<0.05, **p<0.01, 1-tailed.

Table 6.13 shows the details of home country specific ownership factors. The results show the following five factors as advantages for Chinese CMNCs in international market when competing with other international contractors:

- Size and growth of the domestic construction market in China
- Home government assistance and incentives on overseas contracting
- Governmental and historical relationship with developing countries
- Availability of low-cost workers from China

- Availability of low-cost machinery and materials from China

The factor 2.3.a.4 “Support from the financial sector and banking system at home” was found to be a disadvantage for Chinese CMNCs. The other three factors were found to be no significant influence. The correlation analysis in Table 6.14 indicates close relationships between factors of 2.3.a.2 and 2.3.a.3, 2.3.a.6 and 2.3.a.8, 2.3.a.8 and 2.3.a.9. The home government assistance to venture overseas market is evidently related to the government historical relationship with the host country. It is understandable that the availabilities of capable sub-contractors, low-cost workers, machinery and materials from China are closely related each other.

Table 6.14 Correlation analysis of country specific factors

Q. No.	2.3.a.1	2.3.a.2	2.3.a.3	2.3.a.4	2.3.a.5	2.3.a.6	2.3.a.7	2.3.a.8	2.3.a.9
2.3.a.1	-	0.038*	0.366	0.351	0.552	0.411	0.546	0.012*	0.301
2.3.a.2		-	0.038*	0.645	0.594	0.146	0.745	0.193	0.716
2.3.a.3			-	0.404	0.074	0.426	0.957	0.056	0.056
2.3.a.4				-	0.123	0.855	0.286	0.910	0.312
2.3.a.5					-	0.280	0.566	0.955	0.770
2.3.a.6						-	0.360	0.016*	0.521
2.3.a.7							-	0.243	0.581
2.3.a.8								-	0.012*
2.3.a.9									-

Note: The table presents the p-values of the corresponding Pearson's correlation coefficients of the pair factors.
*p<0.05, **p<0.01

Table 6.15 Variation analysis of home country specific ownership factors: Chinese CMNCs vs. other international contractors

Q. No	High O vs. Low O		High L vs. Low L		High I vs. Low I		High S vs. Low S	
	Sig. (2-tailed)	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)
2.3.a.1	0.85	0.016*	0.80	0.032*	0.92	0.003**	0.80	0.032*
2.3.a.2	0.58	0.174	0.84	0.018*	0.36	0.425	0.43	0.341
2.3.a.3	0.75	0.053	0.56	0.187	0.18	0.698	0.69	0.087
2.3.a.4	0.92	0.003**	0.86	0.014*	0.92	0.003**	0.91	0.004**
2.3.a.5	0.66	0.109	0.48	0.280	0.69	0.085	0.74	0.059
2.3.a.6	0.82	0.024*	0.47	0.290	0.16	0.737	0.51	0.242
2.3.a.7	0.45	0.312	0.26	0.571	0.55	0.198	0.53	0.217
2.3.a.8	0.70	0.083	0.57	0.182	0.46	0.298	0.34	0.449
2.3.a.9	0.90	0.006**	0.90	0.006**	0.90	0.006**	0.84	0.019*

Note: *p<0.05, **p<0.01

Variation analysis in Table 6.15 shows the firms do not vary significantly on their views of factor 2.3.a.1, 2.3.a.4 and 2.3.a.9 according to their different OLI+S indices. In addition, the following implication may be made:

- The firms with different O indexes viewed the factor 2.3.a.1 and 2.3.a.9 as advantages and factor 2.3.a.4 as disadvantage similarly, while they varied their views on factor 2.3.a.2 and 2.3.a.3 as advantages. In other words, there is no difference in viewing the importance of "low-cost machinery and material from China" and "Size and growth of domestic construction market in China" as advantages for the Chinese CMNCs;
- The firms with high or low L indexes regarded the factor 2.3.a.1, 2.3.a.2 and 2.3.a.9 as advantages and factor 2.3.a.4 as disadvantage similarly. They only varied their views of factor 2.3.a.3 as a disadvantage. This reveals that the governmental and historical relationship with host countries should be considered as a location specific factors, i.e. in some countries, it may be an advantage helping the Chinese CMNCs in international contracting, but in other countries, it may not;
- The firms with different I indexes viewed the factor 2.3.a.1 and 2.3.a.9 as advantage, and 2.3.a.4 as disadvantage similarly, while they varied their views for all other factors;
- The firms with specialty indexes varied their view the factor 2.3.a.1and 2.3.a.9 as advantages and 2.3.a.4 as a disadvantage similarly, while they varied their views for all other factors.

6.4.4 Home country specific ownership factors: Chinese CMNCs vs. local contractors

Regarding the home country specific ownership factors influencing Chinese CMNCs competing with local contractors, the fieldwork results are presented in Table 6.16.

Table 6.16 Home country specific ownership factors: Chinese CMNCs vs. local Contractors

Q. No.	Factors	Mean	SD	Chi-square		t test		
				Chi square	Sig.	t	Sig. (1-tailed: Lower)	Sig. (1-tailed: Upper)
2.3.b.1	Size and growth of the domestic construction market in China	4.61	0.92	34.71	0.00	3.71	1.000	0.000**
2.3.b.2	Home government assistance and incentives on overseas contracting	5.52	1.03	26.13	0.00	8.21	1.000	0.000**
2.3.b.3	Governmental and historical relationship with developing countries	4.77	0.96	39.23	0.00	4.51	1.000	0.000**
2.3.b.4	Support from the financial sector and banking system at home	5.48	0.96	30.19	0.00	8.59	1.000	0.000**
2.3.b.5	Support from other related industries at home for international works	5.00	1.26	17.55	0.01	4.40	1.000	0.000**
2.3.b.6	Availability of capable sub-contractors from China	4.32	1.11	36.52	0.00	1.62	0.942	0.058
2.3.b.7	Availability of professionals from China	5.87	1.02	34.71	0.00	10.17	1.000	0.000**
2.3.b.8	Availability of low-cost workers from China	4.29	1.42	15.29	0.02	1.14	0.868	0.132
2.3.b.9	Availability of low-cost machinery and materials from China	5.42	1.59	19.35	0.00	4.98	1.000	0.000**

Note: *p<0.05, **p<0.01

One-way Chi-square tests give acceptable confidence for the data to be used in analysis. The one-tailed statistical t tests in Table 6.16 shows the following factors as advantages for Chinese CMNCs in international market when competing with local contractors:

- Size and growth of the domestic construction market in China
- Home government assistance and incentives on overseas contracting
- Governmental and historical relationship with developing countries
- Support from the financial sector and banking system at home
- Support from other related industries at home for international works

- Availability of professionals from China
- Availability of low-cost machinery and materials from China

The other two factors were regarded as neither advantages nor disadvantages for Chinese CMNCs competing with local counterparts. According to the views of the respondents, there is no significant home country specific ownership disadvantage faced by Chinese CMNCs when competing with local contractors. The correlation analysis as shown in Table 6.17 indicates relationship between factor 2.3.b.2, 2.3.b.3 and 2.3.b.a, 2.3.b.8 and 2.3.b.9, which may provide similar suggestions as in previous section.

Table 6.17 Correlation analysis of country specific factors

Q. No.	2.3.b.1	2.3.b.2	2.3.b.3	2.3.b.4	2.3.b.5	2.3.b.6	2.3.b.7	2.3.b.8	2.3.b.9
2.3.b.1	-	0.002**	0.030*	0.871	0.442	0.148	0.770	0.452	0.460
2.3.b.2		-	0.111	0.255	0.334	0.856	0.081	0.937	0.257
2.3.b.3			-	0.643	0.555	0.704	0.842	0.796	0.633
2.3.b.4				-	0.660	0.596	0.064	0.314	0.842
2.3.b.5					-	0.610	1.000	0.129	0.208
2.3.b.6						-	0.098	0.130	0.776
2.3.b.7							-	0.313	0.463
2.3.b.8								-	0.001**
2.3.b.9									-

Note: The table presents the p-values of the corresponding Pearson's correlation coefficients of the pair factors.
*p<0.05, **p<0.01

Table 6.18 Variation analysis of home country specific ownership factors: Chinese CMNCs vs. local contractors

Q. No	High O vs. Low O		High L vs. Low L		High I vs. Low I		High S vs. Low S	
	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)
2.3.b.1	0.99	0.000**	0.50	0.258	0.70	0.080	0.98	0.000**
2.3.b.2	0.87	0.010*	0.68	0.093	0.75	0.055	0.73	0.064
2.3.b.3	0.91	0.004**	0.91	0.004**	0.71	0.076	0.80	0.031*
2.3.b.4	0.81	0.028*	0.88	0.009**	0.80	0.032*	0.81	0.028*
2.3.b.5	0.55	0.202	0.55	0.203	0.83	0.020*	0.83	0.021*
2.3.b.6	0.82	0.023*	0.78	0.038*	0.95	0.001**	0.82	0.025*
2.3.b.7	0.94	0.001**	0.89	0.007**	0.92	0.003**	0.91	0.005**
2.3.b.8	0.65	0.111	0.60	0.153	0.29	0.534	0.84	0.017*
2.3.b.9	0.41	0.361	0.30	0.519	0.66	0.106	0.90	0.006**

Note: *p<0.05, **p<0.01

The variation analysis of home country specific ownership factors according to OLI+S indices in the case of Chinese CMNCs vs. local contractors is summarized in Table 6.18. The results are analyzed as follows:

- All respondents viewed the factors similarly regardless of their different O indexes except factor 2.3.b.5 and 2.3.b.9. They viewed the factor 2.3.b.1, 2.3.b.3, 2.3.b.4, 2.3.b.2 and 2.3.b.7 as advantage similarly, while they varied their views on factor 2.3.b.5 and 2.3.b.9 as advantages. This implies that there is no difference in arguing the importance of "availability of professionals from China" and "home government assistance and incentives on overseas contracting" as significant advantages among the respondents regarding to the Chinese CMNCs competing with local contractors in international market;
- The firms with different L indexes viewed the factor 2.3.b.3, 2.3.b.4 and 2.3.b.7 as advantages or significant advantage similarly, while they varied their views on factor 2.3.b.1, 2.3.b.2 and 2.3.b.5 and 2.3.b.9 as advantage. This may imply that the advantages, such as "Home government assistance and incentives on overseas contracting", "Support from other related industries at home for international works", and "Availability of low-cost machinery and materials from China" were considered differently by the Chinese firms working in many countries and those concentrating in few foreign countries;
- The firms with different I indexes viewed the factor 2.3.b.4, 2.3.b.5 and 2.3.b.7 as advantage similarly, while they varied their views on all other factors;
- The firms with different specialty indexes varied their views only on the factor 2.3.b.2 as a significant advantage, and they took similar views on all other factors. This may imply that the Chinese governmental assistant and incentives

on construction firms' overseas contracting may result in different effects depending on the specialty level of the firms. In actual fact, Chinese government assistance for firm's going overseas is normally focusing on particular fields in construction rather than on all areas in the industry.

6.5 Locational factors of Chinese CMNCs in international market

Locational factors may be analyzed in two aspects, the firm specific and host country specific. Firm specific locational factors refer to the locational factors which may be directly originated from the firms' operation in the location. Host country specific factors refer to the locational factors such as the host country government policy, economy, financial and foreign exchange regulations, and others related to local resources. To evaluate and analyze the host country locational factors is part of the locational factors analysis for a CMNC.

Figure 6.1 shows the locational distributions of the sample firms. It shows that most of the firms are operating in Asian and African countries, and some are working in Europe, Northern and Southern America. The locational distribution of the Chinese CMNCs business coverage indicated in Figure 6.1 is consistent with the analysis in Chapter 5.

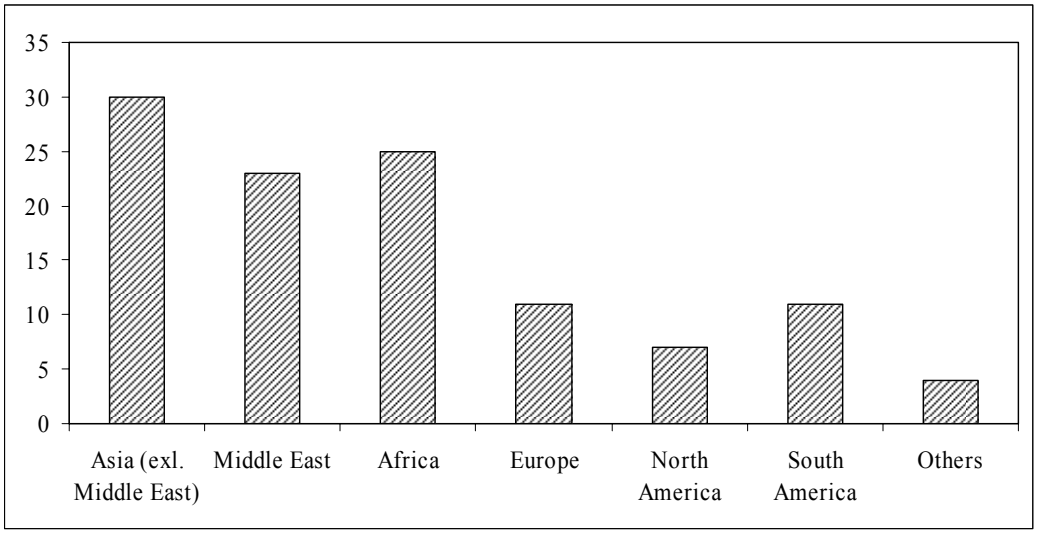


Figure 6.1 Locational distribution of Chinese CMNCs' international operation

6.5.1 Firm-specific locational factors

There are nine locational factors taken into consideration for the study of Chinese CMNCs in international market. The fieldwork results are presented in Table 6.19.

The results of one-way Chi-square test show that the responses from the fieldwork were unlikely to be the result of chance factors. According to t tests, the significant locational factors were as follows:

Table 6.19 Firm specific locational factors

Q. No.	Factors	Mean	SD	Chi-square		t test	
				Chi square	Sig.	t	Sig. (1-tailed)
3.1.1	Large number of local competitors in the host countries	2.58	1.03	14.97	0.00	-2.28	0.985
3.1.2	Large number of competitors from China in the host countries	4.35	0.84	31.42	0.00	9.00	0.000**
3.1.3	Large number of other international competitors in the host countries	4.00	1.06	18.19	0.00	5.23	0.000**
3.1.4	Intensive competition in the hosting country's market	3.71	0.86	18.19	0.00	4.57	0.000**
3.1.5	Lower cost of local contractors in the host countries	3.84	0.93	15.94	0.00	5.00	0.000**
3.1.6	Lower cost of other international contractors in the host countries	4.19	0.95	23.03	0.00	7.03	0.000**
3.1.7	Relationship amongst international and local contractors in the host countries	3.03	0.98	12.71	0.01	0.18	0.428
3.1.8	Expatriate social and living conditions in the host countries	1.97	0.87	21.42	0.00	-6.57	1.000
3.1.9	Priority in the business strategy of your firm's headquarter relating to the host country market	3.26	0.96	14.65	0.01	1.49	0.073

Note: **p<0.01

- Large number of competitors from China in the host countries
- Large number of other international competitors in the host countries
- Intensive competition in the hosting country's market
- Lower cost of local contractors in the host countries
- Lower cost of other international contractors in the host countries

The statistical results indicate the other four locational factors with less importance and not significant. The correlation analysis of locational factors as shown in Table 6.20 indicates that the competitions faced by Chinese CMNCs in international market are mainly from other Chinese international contractors, and the competitions with other international contractors and local contractors are largely due to the lower cost of the counterparties. It also suggests that the competition in host market plays significant role in determining the priority in business strategy of the firm's headquarter relating to the host country market, as implied by the relatively close relationship between factors 3.1.2 and 3.1.9, 3.1.6 and 3.1.9.

Table 6.20 Correlation analysis of firm specific locational factors

Q. No.	3.1.1	3.1.2	3.1.3	3.1.4	3.1.5	3.1.6	3.1.7	3.1.8	3.1.9
3.1.1	-	0.452	0.027*	0.515	0.021*	0.228	0.433	0.934	0.054
3.1.2		-	0.156	0.489	0.183	0.102	0.770	0.689	0.004**
3.1.3			-	0.560	0.145	0.016*	0.494	0.442	0.111
3.1.4				-	0.141	0.064	0.951	0.106	0.352
3.1.5					-	0.010*	0.068	0.080	0.515
3.1.6						-	0.161	0.697	0.018*
3.1.7							-	0.138	0.422
3.1.8								-	0.428
3.1.9									-

Note: The table presents the p-values of the corresponding Pearson's correlation coefficients of the pair factors.
*p<0.05, **p<0.01

Variation analysis of the firm-specific locational factors is shown in Table 6.21, and the results are analyzed as follows:

Table 6.21 Variation analysis of firm specific locational factors

No.	High O vs. Low O		High L vs. Low L		High I vs. Low I		High S vs. Low S	
	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)
3.1.1	0.82	0.089	0.60	0.285	0.97	0.005**	0.62	0.269
3.1.2	0.95	0.014*	0.95	0.014*	0.97	0.005**	0.89	0.041*
3.1.3	0.89	0.042*	0.95	0.014*	0.76	0.133	0.87	0.058
3.1.4	0.79	0.112	0.41	0.498	0.67	0.215	0.14	0.828
3.1.5	0.47	0.423	0.05	0.931	0.71	0.179	0.92	0.026*
3.1.6	0.95	0.014*	0.67	0.215	0.80	0.102	0.76	0.133
3.1.7	0.56	0.322	0.67	0.219	0.65	0.236	0.60	0.285
3.1.8	0.90	0.037*	0.87	0.054	0.89	0.041*	0.97	0.005**
3.1.9	0.82	0.089	0.68	0.210	0.29	0.640	0.82	0.089

Note: *p<0.05, **p<0.01

- Factor 3.1.2 was viewed as the most important factor by all respondents from different firms with different OLI+S indices. This implies that the competitions between Chinese firms in international construction market are severe currently.
- Factor 3.1.3 was viewed as important locational factors similarly by the respondents from the firms with different O and L indexes.
- Factor 3.1.4 was viewed differently by all the respondents from different firms. This may imply that when venturing into overseas market, different Chinese CMNCs considered the factor “the intensive competition in host country market” in different ways. This is consistent with the actual fact that some Chinese firms still squashed into some particular developing countries in spite of the intensive competition in the market. This phenomenon can not be fully

explained by the traditional "Bandwagon effect" theory (refer to section 2.2.1). The game theory may provide some reasoning (refer to section 2.3.4).

- Factor 3.1.5 was examined differently among different firms. This factor is about the advantage of lower cost in production of local contractors in host countries. In actual fact, different Chinese CMNCs have different strategies to deal with this situation, and for some Chinese firms, this factor may not be deemed as a threat to them. Similar implication can be drawn for factor 3.1.6.

6.5.2 Country-specific locational factors

Host country specific locational factors are of very important when construction firms take international works. To examine economic, financial and social conditions in host country market are critical for a CMNC to establish its long-terms strategies in international market. Seventeen host country specific locational factors were identified and taken into the analysis in the fieldwork, and the results are presented in Table 6.22.

The statistical results of one-way Chi-square tests show that responses from respondents were unlikely to be the result of chance factors, except that for factor 3.2.6. Results in Table 6.22 shows that the following factors are regarded as important locational factors by the Chinese CMNCs in international market:

Table 6.22 Host country specific locational factors

Q. No.	Factors	Mean	SD	Chi-square		t test	
				Chi square	Sig.	t	Sig. (1-tailed)
3.2.1	Local construction market demand and potential in the host countries	3.81	1.05	12.71	0.01	4.29	0.000**
3.2.2	Local government attitudes, intervention and policies towards international contractors, including regulatory barriers of entry in the host countries.	4.35	0.71	31.10	0.00	10.63	0.000**
3.2.3	Local governmental and regulatory protection for local contractors in the host countries	3.50	0.90	15.19	0.00	3.04	0.002**
3.2.4	Political and social stability in the host countries	3.52	0.96	12.71	0.01	2.99	0.003**
3.2.5	Psychic distance between home and host countries, i.e. language, religion, culture difference, etc.	2.61	1.09	11.10	0.03	-1.99	0.972
3.2.6	Availability and capacity of local subcontractors in the host countries	3.23	1.31	3.68	0.45	0.96	0.172
3.2.7	Availability and costs of local professionals in the host countries	3.50	1.07	8.74	0.07	2.55	0.008**
3.2.8	Availability and costs of local workers in the host countries	4.43	0.57	-	0.00	13.81	0.000**
3.2.9	Availability and costs of local machinery and materials in the host countries	3.63	1.13	10.35	0.03	3.07	0.002**
3.2.10	Local commodity price levels in the host countries	2.10	0.98	18.84	0.00	-5.14	1.000
3.2.11	Local income and corporate taxation levels in the host countries	3.23	0.88	20.45	0.00	1.42	0.083
3.2.12	Local import and export control and tariff levels for construction machinery, equipment and materials in the host countries	3.68	1.17	9.16	0.06	3.24	0.001**
3.2.13	Accessibility to local financing resources in the host countries	3.74	0.93	14.65	0.01	4.44	0.000**
3.2.14	Currency conditions and policies in the host countries, i.e. exchange rate fluctuation and control on transferring of funds.	3.71	1.10	9.81	0.04	3.59	0.001**
3.2.15	Local governmental bureaucratic system and possible corruption in the host countries	2.00	0.86	18.84	0.00	-6.50	1.000
3.2.16	Interference of local unofficial societies in the host countries	1.97	0.75	30.13	0.00	-7.64	1.000
3.2.17	Political and historical links between home and host countries	2.26	0.82	23.03	0.00	-5.07	1.000

Note: *p<0.05, **p<0.01

- Local construction market demand and potential in the host countries.
- Local government attitudes, intervention and policies towards international contractors, including regulatory barriers of entry in the host countries.
- Local governmental and regulatory protection for local contractors in the host countries.
- Political and social stability in the host countries.
- Availability and costs of local professionals in the host countries.
- Availability and costs of local workers in the host countries.
- Availability and costs of local machinery and materials in the host countries.

- Local import and export control and tariff levels for construction machinery, equipment and materials in the host countries.
- Accessibility to local financing resources in the host countries.
- Currency conditions and policies in the host countries, i.e. exchange rate fluctuation and control on transferring of funds.

The other locational factors were found to be less important or not statistically significant. To further examine the factors using median view approach, the degrees of importance of the factors are identified as the follows:

- No single factor was regarded as most important.
- The more important locational factors include 3.2.1, 3.2.2, 3.2.4, 3.2.7, 3.2.8, 3.2.9, 3.2.12, 3.2.13 and 3.2.14.
- The important locational factors include 3.2.3, 3.2.6, and 3.2.11.

The correlation analysis as shown in Table 6.23 indicates a number of relationships between the country specific locational factors. Factor 3.2.13 links to 3.2.1, and 3.2.1 also relates to 3.2.2. This possibly implies that local market demand relates to government attitudes and interventions, and this may further bring some influences to the accessibility of Chinese CMNCs to local financing resources in host countries. It is also suggested that, for Chinese CMNCs in international market, there are certain relationships between factors regarding the taxation, import and export control, foreign currency policies and the firm's accessibility to local financial resources. This implies that when evaluating local financial sources for construction projects, the Chinese firms consider the possible impact of local taxation system and import and export controls. In addition, political and historical links between home and host countries may influence

the accessibility to local financing resources in host countries. The consideration of import and export controls of construction machinery and materials in host countries also connects with the currency conditions and policies. It is also found that, for Chinese CMNCs, the consideration of local governmental bureaucratic system and possible corruption in host countries links to that of the local taxation system, import and export system and the foreign currency controls. Correlation between factor 3.2.7 and 3.2.8 suggest the availability and costs of local professionals and local workers in host countries is related each other.

Table 6.23 Correlation analysis of country specific locational factors

Q. No.	3.2.1	3.2.2	3.2.3	3.2.4	3.2.5	3.2.6	3.2.7	3.2.8	3.2.9	3.2.10	3.2.11	3.2.12	3.2.13	3.2.14	3.2.15	3.2.16	3.2.17
3.2.1	-	0.000**	0.116	0.607	0.185	0.485	0.872	0.572	0.003**	0.942	0.517	0.552	0.048*	0.562	1.000	0.272	0.457
3.2.2		-	0.385	0.333	0.864	0.286	0.331	0.206	0.004**	0.596	0.666	0.582	0.441	0.680	0.769	0.218	0.327
3.2.3			-	0.668	0.178	1.000	0.779	0.515	0.929	0.077	0.495	0.932	1.000	0.788	1.000	0.169	0.902
3.2.4				-	0.515	0.099	0.855	0.868	0.745	0.932	0.583	0.652	0.408	0.139	0.384	0.101	0.513
3.2.5					-	0.830	0.517	0.267	0.720	0.484	0.751	0.986	0.737	0.600	0.701	0.428	0.407
3.2.6						-	0.435	0.644	0.053	0.003**	0.067	0.043*	0.288	0.538	0.633	0.443	0.714
3.2.7							-	0.000**	0.410	0.444	0.849	0.430	0.474	0.598	0.699	1.000	0.252
3.2.8								-	0.742	0.823	0.949	0.929	0.875	0.754	0.957	0.709	0.057
3.2.9									-	0.338	0.015*	0.754	0.224	0.742	0.854	0.829	0.270
3.2.10										-	0.007**	0.023*	0.253	0.003**	0.027*	0.827	0.099
3.2.11											-	0.044*	0.048*	0.192	0.027*	0.952	0.017*
3.2.12												-	0.002**	0.012*	0.042*	0.891	0.065
3.2.13													-	0.124	0.066	0.221	0.026*
3.2.14															0.000**	0.879	0.056
3.2.15																0.404	0.000**
3.2.16																	0.715
3.2.17																	

Note: The table presents the p-values of the corresponding Pearson's correlation coefficients of the pair factors.
*p<0.05, **p<0.01

Table 6.24 shows the variation analysis of host country specific locational factors, and the results are explained as follows:

- Factor 3.2.2 - Local government attitudes, intervention and policies towards international contractors, including regulatory barriers of entry in the host countries, was regarded as a very important locational factors by all firms regardless of their different OLI+S indexes. In actual factor, local laws and regulations in host countries are the first lesson to be learned by the firms when starting business in the country.

Table 6.24 Variation analysis of host country specific locational factors

Q. No.	High O vs. Low O		High L vs. Low L		High I vs. Low I		High S vs. Low S	
	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)
3.2.1	0.78	0.118	0.41	0.493	0.79	0.112	0.79	0.111
3.2.2	0.97	0.005**	0.97	0.005**	0.97	0.005**	0.92	0.028*
3.2.3	0.75	0.144	0.41	0.493	0.41	0.493	0.72	0.172
3.2.4	0.87	0.054	0.79	0.112	0.41	0.498	0.21	0.734
3.2.5	0.38	0.530	0.00	1.000	0.58	0.308	0.72	0.172
3.2.6	-0.03	0.966	0.03	0.966	0.14	0.828	0.63	0.260
3.2.7	0.10	0.873	0.68	0.203	-0.10	0.870	0.67	0.219
3.2.8	0.80	0.102	0.80	0.102	0.80	0.102	0.89	0.044*
3.2.9	0.76	0.133	0.00	1.000	-0.24	0.701	0.21	0.741
3.2.10	0.55	0.334	0.39	0.511	0.97	0.005**	0.82	0.089
3.2.11	0.97	0.005**	0.56	0.322	0.67	0.215	0.97	0.005**
3.2.12	0.56	0.322	0.57	0.312	-0.08	0.897	0.36	0.553
3.2.13	0.82	0.089	0.82	0.089	0.82	0.089	1.00	0.000**
3.2.14	0.31	0.614	0.00	1.000	-0.21	0.741	-0.20	0.747
3.2.15	0.67	0.219	0.95	0.014*	0.56	0.322	0.67	0.219
3.2.16	0.97	0.005**	0.80	0.102	0.92	0.026*	0.65	0.236
3.2.17	0.97	0.005**	0.97	0.005**	0.97	0.005**	1.00	0.000**

Note: *p<0.05, **p<0.01

- The degree of importance of factor 3.2.3, 3.2.4, 3.2.6, 3.2.7, 3.2.9, 3.2.12, 3.2.13, and 3.2.14 were viewed differently by the respondents from different firms according to their OLI+S indices.
- The important factor 3.2.6, 3.2.7, 3.2.8 and 3.2.9 reflect the availability and cost of local subcontractors, local professionals, local worker and other local resources. The degrees of influence of these factors to the firms' international operation vary among different groups of firms. This may be explained as follows:
    - the firm establishing business coverage in a large number of countries and the firm concentrating only few countries generally adopt different strategies regarding the availability and cost of local resources, and these strategies relate to their overall arrangement and allocation of their own resources in international market;
    - similarly, a firm with more complicated overseas management structure as indicated by the I indexes would utilize the local resources differently according to its firm-specific locational advantages;

- a more diversified firm in terms of its specialty (S indexes) and a firm with less S index would evidently employ the local resources differently, and this may be determined by its specialty.

- Factor 3.2.12, 3.2.13, and 3.2.14 were regarded as very important locational factors but were viewed differently by different firms. Actually these three host country specific locational factors reflect the local financial, taxation and currency polices, which are the most important issues of non-technical factors involved in international construction. The fact that different firms viewed these factors differently indicates that the different strategies are pursued by Chinese CMNCs regarding project funding and project earning. In actual fact, Chinese CMNCs with different level of L and I indexes in international market may chase on different types of projects in terms of the project funding (refer to section 6.2.2) and their strategies in different locations may vary. As analyzed in Chapter 5, a firm with high I-OMS may not result in a high O-IRTR because of the different objectives of firm's venturing into international market. This is consistent with the actual fact currently existing in Chinese CMNCs that, how to handle the forex earned from overseas projects is largely depending on the company's own strategies. For example, some Chinese firms may retain their earning in the host country or re-invest into other financial instruments, or they may transfer the earnings to a third location (such as Hong Kong). The earning may not be fully returned back to China due to various reasons. At the meantime, some Chinese CMNCs transfer their earnings from international projects as soon as they can, to facilitate their needs at home, for example, to reinvest or to offset their financial pressure in domestic operation. This consequently results in different views of the firms on the financial and forex policies in the host

country. The host country market, in which the foreign currency is relatively more fluctuated and more flexible controls are imposed, may provide a better opportunity to conduct foreign currency trading in short term. However, the same situation may cause large loss for other firms in the same market.

- Factor 3.2.12 was viewed differently by the firms. The firms with different OLI+S indices, especially the ownership and specialty indices, may be involved with different type of machinery, equipment and materials. Some highly specialized construction firm may need to employ more specialized and costly machinery; while the general construction firms may not need to do so.

6.5.3 Comparison of locational factors in different regions

Locational factors are generally specific to certain market. Table 6.25 shows a summary and comparison of the locational factors in different regions. The results are analyzed as follows based on the statistics and the actual international experience of Chinese CMNCs.

Asia (excluding Middle East)

Asian market is the most important market for Chinese CMNCs, where over half of their international revenue was generated. Table 6.25 shows that firm specific Factor 3.1.2 and 3.1.6 are the most important issues considered by Chinese firms when they worked in Asian market. Actually intensive competition among Chinese firms has become an increasingly critical issue despite much effort had been undertaken by Chinese Government. For the technical or investment-intensive projects, competition

with other international contractors such as Japanese, American and European contractors becomes important concern. If the other international contractors are able to lower their costs in production, Chinese CMNCs may not have sufficient advantages to compete with them. This is why "lower cost of other international in the host country" was regarded as very important factor by Chinese firms. Factor 3.1.3, 3.1.4, and 3.1.5 were viewed as moderate important locational factors in Asian market. This further suggests that the competition with other international contractors and local contractors is an important factor for Chinese CMNCs.

None of the host country specific locational factors were viewed as "most important", but nine of the factors were regarded as "more important". These include market factor (3.2.1), government-related factors (3.2.2, 3.2.3), factors related with the availability and cost of local resources (3.2.7, 3.2.8, and 3.2.9) and financial, and taxation and currency factors (3.2.12, 3.2.13, 3.2.14). It is interesting to find that social factors (3.2.4, 3.2.5, 3.2.15, 3.2.16 and 3.2.17) were not viewed as important as the others. This may be possibly due to the relatively high adaptability of Chinese project management team and high flexibility of management system in Chinese CMNCs. Another possible reason of this situation may be due to the relatively closed working environment in most Chinese construction firms when taking international works.

Table 6.25 Comparison of locational factors in different regions

No.	Asia (n=30)					Middle East (n=23)					Africa (n=24)					Europe (n=11)					N.America (n=7)					S.America (n=11)					Others (n=4)				
	Mean	SD	t test		Median	Mean	SD	t test		Median	Mean	SD	t test		Median	Mean	SD	t test		Median	Mean	SD	t test		Median	Mean	SD	t test		Median	Mean	SD	t test		Median
			t	Sig.				t	Sig.				t	Sig.				t	Sig.				t	Sig.				t	Sig.				t	Sig.	
Firm specific factors																																			
3.1.1	2.60	1.04	-2.11	0.98	2	2.39	0.99	-2.95	1.00	2	2.58	1.10	-1.86	0.96	2	2.64	1.03	-1.17	0.87	2	3.00	1.00	0.00	0.50	3	2.82	1.08	-0.56	0.71	3	3.25	0.50	1.00	0.20	3
3.1.2	4.33	0.84	8.65	0.00**	5	4.52	0.73	9.99	0.00**	5	4.38	0.77	8.75	0.00**	5	4.55	0.52	9.81	0.00**	5	4.57	0.53	7.78	0.00**	5	4.36	0.67	6.71	0.00**	4	3.75	1.26	1.19	0.16	4
3.1.3	3.97	1.07	4.97	0.00**	4	3.96	1.07	4.31	0.00**	4	3.83	1.09	3.74	0.00**	4	3.55	1.21	1.49	0.08	4	3.43	0.79	1.44	0.10	4	3.91	1.14	2.65	0.01*	4	4.25	0.96	2.61	0.04*	5
3.1.4	3.73	0.87	4.63	0.00**	4	3.74	0.81	4.38	0.00**	4	3.88	0.85	5.04	0.00**	4	3.45	0.82	1.84	0.05*	3	3.71	0.95	1.99	0.05*	3	3.55	0.93	1.94	0.04*	3	3.75	0.50	3.00	0.03*	4
3.1.5	3.83	0.95	4.81	0.00**	4	3.87	0.92	4.53	0.00**	4	3.83	1.05	3.89	0.00**	4	4.00	1.00	3.32	0.00**	4	4.57	0.79	5.28	0.00**	5	3.91	1.04	2.89	0.01**	4	4.25	0.50	5.00	0.01**	4
3.1.6	4.20	0.96	6.84	0.00**	5	4.17	0.94	6.01	0.00**	4	4.04	1.00	5.11	0.00**	4	4.00	1.10	3.03	0.01**	4	3.71	1.11	1.70	0.07	4	3.91	1.14	2.65	0.01*	4	4.25	0.96	2.61	0.04*	5
3.1.7	3.07	0.98	0.37	0.36	3	3.04	0.88	0.24	0.41	3	2.88	0.95	-0.65	0.74	3	3.18	0.60	1.00	0.17	3	3.29	0.76	1.00	0.18	3	3.09	0.70	0.43	0.34	3	4.00	0.82	2.45	0.05*	4
3.1.8	1.97	0.89	-6.36	1.00	2	2.00	0.85	-5.62	1.00	2	1.88	0.74	-7.44	1.00	2	2.09	1.04	-2.89	0.99	2	1.86	0.90	-3.36	0.99	2	1.82	0.87	-4.49	1.00	2	2.50	1.00	-1.00	0.80	2
3.1.9	3.27	0.98	1.49	0.07	3	3.30	1.06	1.37	0.09	3	3.46	0.98	2.30	0.02*	3	3.27	1.01	0.90	0.20	3	3.00	0.82	0.00	0.50	3	3.36	0.92	1.30	0.11	3	3.00	1.41	0.00	0.50	3
Host country specific factors																																			
3.2.1	3.80	1.06	4.12	0.00**	4	3.74	1.10	3.23	0.00**	4	3.71	1.08	3.21	0.00**	4	4.09	0.83	4.35	0.00**	4	4.29	0.76	4.50	0.00**	4	3.91	0.94	3.19	0.00**	4	4.00	1.15	1.73	0.09	4
3.2.2	4.33	0.71	10.27	0.00**	4	4.39	0.72	9.24	0.00**	5	4.29	0.75	8.43	0.00**	4	4.45	0.52	9.24	0.00**	4	4.57	0.53	7.78	0.00**	5	4.18	0.75	5.22	0.00**	4	4.25	0.50	5.00	0.01**	4
3.2.3	3.52	0.91	3.06	0.00**	4	3.59	0.91	3.05	0.00**	4	3.57	0.99	2.73	0.01**	4	3.20	0.79	0.80	0.22	3	3.50	0.55	2.24	0.04*	4	3.50	1.08	1.46	0.09	4	3.75	0.96	1.57	0.11	4
3.2.4	3.50	0.97	2.81	0.00**	4	3.61	0.94	3.10	0.00**	4	3.54	1.02	2.60	0.01**	4	3.55	0.93	1.94	0.04*	3	3.57	1.13	1.33	0.12	3	3.45	1.04	1.46	0.09	3	3.50	1.29	0.77	0.25	4
3.2.5	2.57	1.07	-2.21	0.98	2	2.70	1.11	-1.32	0.90	2	2.50	1.10	-2.22	0.98	2	2.27	1.10	-2.19	0.97	2	2.57	1.27	-0.89	0.80	2	2.27	1.10	-2.19	0.97	2	3.00	0.82	0.00	0.50	3
3.2.6	3.17	1.29	0.71	0.24	3	3.09	1.24	0.34	0.37	3	3.17	1.31	0.62	0.27	3	2.82	1.25	-0.48	0.68	2	3.29	0.95	0.79	0.23	4	2.73	1.19	-0.76	0.77	3	3.25	1.26	0.40	0.36	3
3.2.7	3.48	1.09	2.39	0.01*	4	3.50	1.01	2.32	0.02*	4	3.52	1.12	2.23	0.02*	3	2.80	0.92	-0.69	0.75	3	3.33	1.21	0.67	0.27	4	3.60	1.07	1.77	0.06	4	3.75	0.50	3.00	0.03*	4
3.2.8	4.41	0.57	13.40	0.00**	4	4.48	0.51	13.88	0.00**	4	4.38	0.58	11.70	0.00**	4	4.27	0.47	9.04	0.00**	4	4.43	0.53	7.07	0.00**	4	4.45	0.52	9.24	0.00**	4	4.33	0.58	4.00	0.03*	4
3.2.9	3.66	1.14	3.09	0.00**	4	3.68	1.21	2.64	0.01**	4	3.61	1.03	2.83	0.00**	4	3.60	1.43	1.33	0.11	4	4.33	0.82	4.00	0.01**	5	3.60	1.26	1.50	0.08	4	4.00	0.82	2.45	0.05*	4
3.2.10	2.13	0.97	-4.88	1.00	2	2.13	1.01	-4.11	1.00	2	2.04	1.00	-4.70	1.00	2	2.45	0.93	-1.94	0.96	2	2.00	0.58	-4.58	1.00	2	2.27	1.10	-2.19	0.97	2	2.25	0.50	-3.00	0.97	2
3.2.11	3.23	0.90	1.42	0.08	3	3.17	0.83	1.00	0.16	3	3.08	0.88	0.46	0.32	3	3.36	1.12	1.08	0.15	3	3.14	0.69	0.55	0.30	3	3.36	1.03	1.17	0.13	3	3.25	1.26	0.40	0.36	3
3.2.12	3.70	1.18	3.25	0.00**	4	3.96	1.07	4.31	0.00**	4	3.58	1.18	2.43	0.01*	4	4.09	0.83	4.35	0.00**	4	3.57	0.98	1.55	0.09	4	4.09	1.04	3.46	0.00**	4	3.00	1.15	0.00	0.50	3
3.2.13	3.80	0.89	4.94	0.00**	4	3.96	0.88	5.23	0.00**	4	3.71	0.91	3.82	0.00**	4	4.00	0.89	3.71	0.00**	4	4.29	0.76	4.50	0.00**	4	4.09	0.70	5.16	0.00**	4	3.75	0.96	1.57	0.11	4
3.2.14	3.77	1.07	3.91	0.00**	4	3.96	1.02	4.49	0.00**	4	3.75	1.07	3.42	0.00**	4	4.00	0.89	3.71	0.00**	4	3.71	0.95	1.99	0.05*	3	3.91	1.22	2.47	0.02*	4	3.25	1.50	0.33	0.38	3
3.2.15	2.03	0.85	-6.23	1.00	2	2.13	0.76	-5.51	1.00	2	2.00	0.78	-6.28	1.00	2	2.18	0.75	-3.61	1.00	2	2.00	0.82	-3.24	0.99	2	2.27	0.65	-3.73	1.00	2	2.25	1.50	-1.00	0.80	2
3.2.16	1.97	0.76	-7.40	1.00	2	1.96	0.77	-6.52	1.00	2	1.88	0.68	-8.11	1.00	2	1.82	0.60	-6.50	1.00	2	1.71	0.76	-4.50	1.00	2	1.73	0.79	-5.37	1.00	2	2.25	0.50	-3.00	0.97	2
3.2.17	2.27	0.83	-4.85	1.00	2	2.35	0.71	-4.38	1.00	2	2.17	0.70	-5.82	1.00	2	2.18	0.75	-3.61	1.00	2	2.14	0.69	-3.29	0.99	2	2.36	0.50	-4.18	1.00	2	2.25	1.26	-1.19	0.84	2

Note: *p<0.05, **p<0.01

Middle East

Most of the factors in Middle East are viewed similarly with those in other Asian countries. In Middle East, host country locational factor: "local government attitudes, intervention and policies towards international contractors, including regulatory barriers of entry in the host countries" was viewed as the most important factor. This may be possibly due to the relatively high government intervention for large infrastructure and industrial construction projects in Middle Eastern countries. A large number of projects in the region are of the resource exploring projects and this type of project is normally involved with more government interventions. When bidding for these projects, Chinese CMNCs may not compete with other international contractors from developed countries at the same price level due to the technical and political reasons. Factor 3.1.6: "lower cost of other international contractors in the host countries" therefore may be considered as an important factor by Chinese CMNCs in Middle East.

Africa

Africa is another traditional market for Chinese CMNCs in international market. In Africa, most of Chinese CMNCs work in the developing or less developed countries. The structure and characteristics of the construction markets in these countries are similar with those in Southern Asia and some South Eastern Asia. Hence, most of the locational factors were viewed similarly regarding Africa market and Asian market. However, the following points may be noted.

- Factor 3.2.7: "Availability and costs of local professionals in the host countries" in African countries was not viewed as important as that in Asian countries. In

fact, most of African countries are regarded by Chinese firms as the place lacking of local professional staffs. Therefore, most Chinese firms arrange the professional staffing from China at the starting point of project. Consequently, factor 3.2.7 in Africa is not as important as in Asian countries. In contrast, localizing professional and supporting staffs is a recent strategy adopted by Chinese CMNCs in some Asian countries, in order to reduce the increasing cost of expatriated employment.

- Factor 3.1.9: "Priority in the business strategy of the firm's headquarter relating to the host country market" was viewed as a significantly important factor regarding African market. This may reflect the importance of strategical decision of Chinese firms: the priorities of mobilizing and allocating financial and technical resources among different regions are decided by the headquarters, and normally African markets are at the position with lower priorities than Asian market. Therefore, factor 3.1.9 in African market becomes more important.
- Factor 3.2.4: "Political and social stability in the host countries" was viewed as more important in African market than in Asian market.

Europe

There is a low market share for Chinese CMNCs in European construction market, and relatively less Chinese firms have entered into this market. The relatively more important factors in European market include (i) firm-specific factors: 3.1.2, 3.1.4, 3.1.5, and 3.1.6, and (ii) host country specific factors: 3.2.1, 3.2.2, 3.2.8, 3.2.12, 3.2.13 and 3.2.14.

Among the firm-specific locational factors, competition factors (3.1.2, 3.1.4) and cost factors (3.2.5, 3.2.6) are the important ones for Chinese firms in European market. But they varied their views on factor 3.1.3 "large number of other international competitors in host countries" regarding European market, Asian and African markets. Actually Chinese CMNCs have less opportunity to compete with other international competitors from developed countries in European markets. They generally did not compete with other international contractors at the same technical or financial level.

The important host country specific locational factors include market-related factor (3.2.1), resource-related factor (3.2.8) and financial-related factors (3.2.12, 3.2.13, 3.2.14). Because of the advanced market system and transparent government behaviors in European countries, factor 3.2.3 and 3.2.4 were not regarded as very important concerns. Among the resource related factors (3.2.6, 3.2.7, 3.2.8, 3.2.9), only factor 3.2.8 was regarded as a significantly important issue in European market. This is evident because of the different price level of local employment in Europe and in China. The financial related factors were regarded similarly important in all regions.

North America

Few Chinese CMNCs work in North American market. Most of locational factors regarding N. American market were viewed similarly with those regarding European market. However, in N. America, Chinese firms have to divert their business to the specialized works, supply of low cost machinery and equipment, installation and maintenance works. They normally can not contract many infrastructural or general

building works. In addition, they frequently face the competition from other Chinese firms rather than from local or other international firms. Factor 3.1.3 and 3.1.6 in N. America were not viewed as important as in Asian or African market. The analysis of resource-related factors (3.2.7, 3.2.8 and 3.2.9) is similar with that for European market. Factor 3.2.12: "Local import and export control and tariff levels for construction machinery, equipment and materials in the host countries" was not viewed as important as others in N. America. This is possibly because of the relatively flexible import/export system in N. America, and less construction resources are needed to import into the region. As a result, this factor was regarded with less importance

South America

Chinese CMNCs began venturing into South America market from the mid 1990s (refer to Chapter 5), and they had increasingly paid more attention on the regional market due to the intensive competition in other regions.

The very important firm-specific locational factors in S. America include 3.1.2, 3.1.3, 3.1.4, 3.1.5 and 3.1.6. Factor 3.1.2: "large number of competitors from China in the host countries" in S. America was not regarded as important as in other regions. Venturing into S. American construction market has been pursued by Chinese CMNCs for a relatively short-time period, and therefore the competition among the Chinese CMNCs were not as intensive as in other regions. The host country specific locational factors which were viewed as very important include the market factor (3.2.1), government factor (3.2.2), resource factor (3.2.8), and financial and currency factors (3.2.12, 3.2.13 and 3.2.14). Resource related factor 3.2.7 and 3.2.9 in S. America were not regarded as

significant as in Asian and African market. All the three financial related factors were viewed as very important in S. America.

6.6 Internalization factors of Chinese CMNCs in international market

Internalization factors relate to how the CMNCs utilize their ownership advantages in responding to the locational factors they encounter. This may include various issues encompassed in the two transaction chains as proposed in this study (refer to Chapter 4). How the clients demand the construction services is directly reflected in various procurement methods; while how the CMNCs provide their services in international market, i.e. their business forms and modes of entry into market, is demonstrated by their various internationalization approached in international market. In this section, various procurement methods adopted in international construction works and various business forms pursued by Chinese CMNCs in international market are firstly investigated. Different objectives or internalization incentives of the Chinese CMNCs when they choose the business forms and modes of entry in international market are then examined, in terms of the degree of importance of internalization factors.

6.6.1 Procurement methods

The procurement methods used in international construction market were analyzed in Chapter 4 in terms of the transaction chains in international construction. Table 6.26 reports the situation of how these procurement methods were used by Chinese CMNCs in international market. It shows that traditional contracting is the very commonly used procurement method. In fact, selection of procurement method is largely related to project funding. As discussed in Section 6.2, a large portion of international projects

undertaken by Chinese CMNCs are initiated by international financial institutions. These financial institutions, including World Bank, Asian Development Banks and others, generally stipulate the projects to be tendered following a set of well-defined contract forms, and the project procurement procedures are also set out by the international institutions. The traditional contracting is the major approach for most projects in order to maintain fairness and transparency. Design & Build or Turnkey projects are also commonly used for the Chinese CMNCs. These procurement methods are more applicable for the projects funded by private sector clients and some government agents. BOOT and BOT projects and construction management contracts may also be encountered by Chinese firms in international market, but not very commonly. Chinese CMNCs also invest, build, own and operate some projects, but this case is not common. Chinese CMNCs adopt this approach when they intend to diversify their business and invest their earnings in host countries.

Table 6.26 Procurement methods used by Chinese CMNCs

Q. No.	Procurement methods	Mean	SD	Chi-square	
				Chi square	Sig.
4.1.1	BOOT & BOT	3.19	0.95	15.29	0.00
4.1.2	Design & Build / Turnkey	3.55	0.93	14.65	0.01
4.1.3	Traditional contracting	4.77	0.43	-	0.00
4.1.4	Construction management (Management service package only)	2.35	0.80	24.32	0.00
4.1.5	Management contracting (As a management contractor)	1.61	0.72	32.39	0.00
4.1.6	Investment/development, build, own and operate	2.23	0.43	-	0.00

6.6.2 Business forms and market entry modes

Business forms and market entry modes play very important roles when MNCs internalize their ownership advantages given certain locational factors in international construction market. A detailed analysis of business forms refers to Chapter 4, where the internalization and externalization of business are integrated into the analysis of two transaction chains in international construction market.

Table 6.27 presents the different business forms used by Chinese CMNCs in international market. The most commonly used approach with equity involvement is contractual joint venture. In fact, project-based contractual joint venture is one of the most common business forms in international construction market. Asset floating is used sometimes (the definition and explanation of asset floating refer to section 4.2.2). This approach is used effectively for Chinese CMNCs when the firms are not able to or do not intend to invest much capitals on many specialized construction machinery in different markets. Asset floating also helps the companies in lowering their tender prices in bidding new projects.

Sub-contracting and working with local agencies are two most commonly used approaches in terms of internationalization without equity involvement. Licensing the firm's brand name to and contracting with others without or with very little liability are sometimes used by Chinese CMNCs. This method is helpful when companies intend to establish long-term relationship in a foreign market. It is also helpful for them in bidding new projects. Strategic alliance and partnering are seldom used by Chinese

firms in international market; this situation possibly links to the actual fact that the cooperation and trustworthiness between Chinese firms need to be improved.

Table 6.27 Internationalization approaches used by Chinese CMNCs in international market

Q. No.	Business forms / modes of entry	Mean	SD	Chi-square	
				Chi square	Sig.
With equity involvement:					
4.2.1	Foreign Direct Investment (wholly owned subsidiaries)	1.87	0.81	24.32	0.00
4.2.2	Equity Joint Venture (partially owned subsidiaries)	2.29	0.69	30.45	0.00
4.2.3	Asset Floating (investment in assets including machinery, is not fixed in particular location, but allocated on a project basis)	2.97	0.84	20.77	0.00
4.2.4	Contractual Joint Venture (project-based joint venture)	4.84	0.37	-	0.00
Without equity involvement:					
4.2.5	Sub-contracting (to other contractors)	4.19	0.98	24.65	0.00
4.2.6	Licensing Name / Franchising (e.g. licensing the firm's brand name to and contract with others with no or very little liability)	2.61	0.76	26.58	0.00
4.2.7	Strategic Alliance / Partnering	2.35	0.75	26.26	0.00
4.2.8	Through local agencies	4.77	0.43	-	0.00

6.6.3 Firm-specific internalization factors

Different internalization factors may influence how the firms choose appropriate internationalization methods in terms of the business forms or market entry modes. In this section, nine major firm-specific internalization factors were analyzed, and their degree of importance for Chinese CMNCs in international market were examined. The fieldwork results are presented in Table 6.28.

Table 6.28 Firm specific internalization factors

Q. No.	Factors	Mean	SD	Chi-square		t test	
				Chi square	Sig.	t	Sig. (1-tailed)
4.3.1	To avoid or reduce information search and business negotiation costs	3.81	0.98	14.97	0.00	4.58	0.000**
4.3.2	To utilize international networking of the firm	3.61	1.05	10.13	0.04	3.24	0.001**
4.3.3	To avoid the cost of moral hazard and adverse selection or under-performance of sub-contractors	3.29	1.13	9.16	0.06	1.43	0.082
4.3.4	To protect the reputation of the firm	3.87	0.88	17.55	0.00	5.48	0.000**
4.3.5	To protect technological know-how of the firm	4.00	0.93	18.84	0.00	5.98	0.000**
4.3.6	To ensure the quality of construction and services provided	4.35	0.84	34.32	0.00	9.00	0.000**
4.3.7	To avoid the costs of breach of contracts and ensuing litigation	3.23	0.88	30.45	0.00	1.42	0.083
4.3.8	To facilitate the increasing need for professionals and personnel	2.74	0.93	14.65	0.01	-1.55	0.934
4.3.9	To facilitate the need for alternative investments for the profits earned	3.35	1.05	21.42	0.00	1.88	0.035*
4.3.10	To better utilize and control resources (construction materials, equipments, technology, human resources, etc.)	4.39	0.72	32.39	0.00	10.80	0.000**

Note: *p<0.05, **p<0.01

The statistical results of one-way Chi-square tests show that the responses obtained were unlikely to be the result of chance factors. Results in Table 6.28 show that the following factors are regarded as significant internalization factors for Chinese CMNCs in international market:

- To avoid or reduce information search and business negotiation costs;
- To utilize international networking of the firm;
- To protect the reputation of the firm;
- To protect technological know-how of the firm;
- To ensure the quality of construction and services provided;
- To facilitate the need for alternative investments for the profits earned;
- To better utilize and control resources (construction materials, equipments, technology, human resources, etc.).

Table 6.29 shows the correlation analysis of firm specific internalization factors; however, it does not provide practical implications. The variation analysis of firm

specific internalization factors of firms with different OLI+S indexes is shown in Table 6.30. The results show that:

Table 6.29 Correlation analysis of firm specific internalization factors

Q. No.	4.3.1	4.3.2	4.3.3	4.3.4	4.3.5	4.3.6	4.3.7	4.3.8	4.3.9	4.3.10
4.3.1	-	0.820	0.493	0.874	0.696	0.047*	0.452	0.618	0.474	0.670
4.3.2		-	0.148	0.626	0.856	0.336	0.193	0.455	0.905	0.749
4.3.3			-	0.493	0.083	0.473	0.726	0.006**	0.434	0.915
4.3.4				-	0.188	0.284	0.158	0.120	0.139	0.011*
4.3.5					-	0.249	0.515	0.211	1.000	0.420
4.3.6						-	0.400	0.674	0.855	0.016*
4.3.7							-	0.695	0.629	0.842
4.3.8								-	0.879	0.435
4.3.9									-	0.131
4.3.10										-

Note: The table presents the p-values of the corresponding Pearson's correlation coefficients of the pair factors.
*p<0.05, **p<0.01

Table 6.30 Variation analysis of firm specific internalization factors

Q. No	High O vs. Low O		High L vs. Low L		High I vs. Low I		High S vs. Low S	
	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)
4.3.1	1.00	0.000**	0.08	0.897	0.53	0.361	0.95	0.014*
4.3.2	0.67	0.219	0.10	0.873	0.13	0.833	0.65	0.236
4.3.3	0.21	0.741	0.50	0.391	0.57	0.312	0.05	0.935
4.3.4	0.88	0.047*	0.82	0.089	0.82	0.089	0.90	0.037*
4.3.5	0.67	0.219	0.55	0.334	0.50	0.391	0.50	0.391
4.3.6	0.89	0.041*	0.92	0.026*	0.87	0.058	0.89	0.041*
4.3.7	0.76	0.133	0.76	0.133	0.92	0.028*	0.67	0.219
4.3.8	0.47	0.420	0.56	0.322	0.79	0.112	0.45	0.450
4.3.9	0.53	0.362	0.67	0.215	0.35	0.559	0.97	0.005**
4.3.10	0.89	0.040*	0.89	0.040*	0.89	0.044*	0.46	0.437

Note: *p<0.05, **p<0.01

The two most important firm specific internalization factors: factor 4.3.6 and 4.3.10 were viewed similarly by the firms with different O, L and I indexes. Different Chinese firms varied their views on the degree of importance of factor 4.3.1, 4.3.2, 4.3.5 and 4.3.9. In actual fact, factors “the costs of information search and business negotiation”, “the need of international networking of a firm” and “the firm’s technological know-how” influence firm’s operation in very different manner when the firm possesses different O, L, I, and S indices. Factor 4.3.4 was also regarded as an important factor by the Chinese firms with different O indices. This may reflect that the reputation of firms is deemed increasingly important for the Chinese firms working in international market.

Reputation of firm is especially influential for the firms undertaking design, supervision and consultant works.

6.6.4 Country-specific internalization factors

The country specific internalization factors may link to the host country government policy, client requirement, and other particular regulations in host country. Seven major country specific internalization factors were examined and the results are presented in Table 6.31.

Table 6.31 Country specific internalization factors

Q. No.	Factors	Mean	SD	Chi-square		t test	
				Chi square	Sig.	t	Sig. (1-tailed)
4.4.1	To meet the host government's policy requirements relating to construction business operations	4.06	0.89	20.45	0.00	6.64	0.000**
4.4.2	To better facilitate strategic alliances, partnering and networking with others for the business	3.39	0.95	15.94	0.00	2.26	0.016*
4.4.3	To avoid client's uncertainty over the nature and value of services being sold and to better facilitate the client's needs	3.03	1.08	8.84	0.07	0.17	0.434
4.4.4	To overcome price discrimination on projects in host country	3.55	1.03	10.45	0.03	2.97	0.003**
4.4.5	To consolidate the market position and to facilitate the future growth and potential of the market	3.42	1.03	12.06	0.02	2.28	0.015*
4.4.6	To avoid or reduce the host government's intervention, (quotas, tariffs, price controls, tax difference, etc.)	3.94	0.89	17.87	0.00	5.84	0.000**
4.4.7	To exploit the host government's interventions (quotas, tariffs, price controls, tax difference, etc.)	2.74	1.21	8.19	0.08	-1.19	0.878

Note: *p<0.05, **p<0.01

As shown in Table 6.31, the following five factors were found to be statistically significant for Chinese CMNCs in international market:

- To meet the host government's policy requirements relating to construction business operations;
- To better facilitate strategic alliances, partnering and networking with others for the business;

- To overcome price discrimination on projects in host country;
- To consolidate the market position and to facilitate the future growth and potential of the market;
- To avoid or reduce the host government's intervention, (quotas, tariffs, price controls, tax difference, etc.).

The other factors were regarded as less important. The correlation analysis as shown in Table 6.32 indicates the relationship between factors 4.4.1 and 4.4.2, 4.4.1 and 4.4.4. In actual fact, to form partnership or joint venture with local firms, and to impose price discrimination on some projects are two important strategies used by host governments regarding international construction works in many developing country market. Therefore, these factors are considered together when Chinese CMNCs make their internalization decisions. Variation analysis of the country specific internalization factors is shown in Table 6.33. The results show that:

Table 6.32 Correlation analysis of country specific internalization factors

Q. No.	4.4.1	4.4.2	4.4.3	4.4.4	4.4.5	4.4.6	4.4.7
4.4.1	-	0.046*	0.135	0.008**	0.975	0.246	0.050
4.4.2		-	0.329	0.534	0.851	0.798	0.654
4.4.3			-	0.296	0.116	0.570	0.102
4.4.4				-	0.408	0.161	0.930
4.4.5					-	0.225	0.268
4.4.6						-	0.109
4.4.7							-

Note: The table presents the p-values of the corresponding Pearson's correlation coefficients of the pair factors.

*p<0.05, **p<0.01

Table 6.33 Variation analysis of country specific internalization factors

Q. No.	High O vs. Low O		High L vs. Low L		High I vs. Low I		High S vs. Low S	
	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)
4.4.1	0.82	0.089	0.97	0.005**	0.87	0.054	0.87	0.054
4.4.2	0.82	0.089	0.97	0.005**	0.89	0.042*	0.97	0.005**
4.4.3	0.41	0.498	0.67	0.219	0.79	0.112	0.79	0.112
4.4.4	0.41	0.493	0.21	0.741	0.14	0.828	0.53	0.361
4.4.5	0.82	0.089	0.95	0.014*	0.92	0.026*	0.89	0.042*
4.4.6	0.71	0.179	0.24	0.701	0.36	0.553	0.56	0.322
4.4.7	0.37	0.541	0.63	0.253	0.88	0.047*	0.63	0.253

Note: *p<0.05, **p<0.01

- Factor 4.4.1: “to meet the host government's policy requirements relating to construction business operations” was viewed similarly by the firms with different L indexes. Factor 4.4.2 and 4.4.5 were also viewed similarly as important factors. The firms with different L indices varied their views on the factors: 4.4.3, 4.4.4, 4.4.6 and 4.4.7 when they make decisions on business modes and internationalization approaches. In actual fact, factor 4.4.4, 4.4.6 and 4.4.7 closely relate to government policies in host countries, and different countries may impose different policies and regulations regarding the entering of CMNCs from other countries. Therefore, Chinese firms with different L indices may have different views on these factors. Firms with different S indices also viewed these four factors differently; this may imply that different types of specialized works may receive different concerns in host countries. Infrastructural projects and technology-intensive industrial projects may obtain flexible or favorable treatment reflected in host country policies, while general construction may not because this kind of works are generally protected for local contractors in developing countries.
- It should be noted that factor 4.4.6 and 4.4.7 reflect the two aspects of the same issue. The host government may intervene into the projects undertaken by international contractors through the vehicles such as quotas, tariffs, commodity price control, tax discrimination and others. These vehicles are normally the

barriers for CMNCs' internationalization; but in some cases, they may become advantageous conditions for CMNCs. Therefore, to avoid or reduce the host country government interventions and to exploit such interventions should be considered simultaneously by the CMNCs when they select their internationalization approaches. The fieldwork in this study revealed that the Chinese CMNCs viewed factor "to avoid or reduce the host government intervention" more important than 'to exploit the host government's interventions" when the decisions on internalization were made, meanwhile both factors are important for them.

Case Study 3:

Business forms of Chinese CMNC in international market[7]

Following the study on various business forms used by Chinese CMNCs in international construction market, this case study intends to further analyze how different home country-specific ownership advantages, host country-specific locational factors and various internalization factors impact the decisions of business forms adopted by Chinese CMNCs in international market. The investigation was conducted on a Chinese CMNCs who had over 20 years of international construction experience. Various business forms adopted by the Chinese company in 12 countries are presented in Table CS3.1.

[7] Information used in the case study was sourced from fieldwork.

Table CS3.1 Business forms of Chinese CMNC in international market

No.	Country	Number of projects	Business form
1	Pakistan	3	All wholly direct investment
2	Nepal	3	Joint venture with German firms (1), and direct investment (2)
3	Cambodia	1	Wholly direct investment
4	Philippine	2	All joint venture with local firms
5	Thailand	2	All joint venture with local firms
6	Malaysia	2	All joint venture with local firms
7	Laos	1	Wholly direct investment
8	Hong Kong	4	All wholly direct investment, but all sub-contracted to local firms
9	Sudan	1	Wholly direct investment
10	Cameron	1	Wholly direct investment
11	Ghana	1	Joint venture with German and French firms
12	Peru	1	Joint venture with local firms

As shown in the table, wholly direct investment was used in most less developed countries, and this form consists of 75% (9 of 12) of the projects undertaken by the company. This is possibly because the local contractors in these countries are relatively weak in terms of overall working capability, and they may not be able to compete with the Chinese firm. As a result, the joint venture which aims to adopt advantages from each other may not be formed up. In the newly developed countries such as Philippines, Thailand and Malaysia, the joint venture with local firms are commonly adopted. This is probably because the local contractors may have advantage in some low technical-content areas such as earth works, backfilling, and transportation due to their advantages on low cost in these areas, hence joint venture may well function on the advantages explored from each other. It is a special case in Hong Kong, where very strict restrictions are imposed on non-resident workforces. This is partially for the protection of local employment, and partially for the objectives of utilizing the relatively cheap engineering technical and professional resources from the mainland CMNCs. There are very little options for Chinese CMNCs in Hong Kong but to sub-

contract the works to local contractors. The joint ventures between Chinese firms and western firms are not very common as far as company in this study revealed. This is possibly because of the cultural difference between the two. In the cases of joint venture between Chinese firms and western firms, generally the western partners take the works of supplying permanent equipments while Chinese firms take the construction works and installation.

To further analyze the joint venture of Chinese firms with their foreign partners, we look into the following two projects.

Contractual joint venture between Chinese firm and local firms

In Thailand, Chinese company A entered into a consortium with local company B and C, in order to obtain two infrastructure projects. Company B is a first-class local contractor; according to local regulation, only the local registered first-class contractors are qualified to undertake large scale projects. Hence, Company B acted as leading partner in the consortium, and it took the works of tendering, construction, preparation of bank guarantees, arrangement of working capital, and also took some other risks for the first project. In return, Company B may receive all the economic and financial benefits from the project. Company A undertook the construction for the other project which had relatively higher technical requirement, preparation of bank guarantees, arrangement of working capital, and managing of other risks for the second project, while Company A may obtain all returns from the second project. Company C acted as project agent taking care of the public relationship with local authorities, and earned agent fees. According to the consortium agreement, Company A invested 98%, Company B and C each invested 1%. Company A and company B paid to each other 1% of the

construction progress payment for the respective project they undertook as management fees. All project risks were borne by the consortium. This consortium agreement was in contractual form with legal effect. In addition, all parties should pay their own taxes to local authorizes under their own names.

Non-contractual joint venture between Chinese firm and local firms

In Malaysia, Chinese company D entered into a consortium with local firm E regarding two local projects in Pulau Pinang. Company D, as a large international contractor, acted as the main contractor, and be responsible to win the biddings. Company E, a local publicly listed firm, based on its good local relationship, was responsible for all public affairs for the projects. If the consortium wins the bid, Company D takes the construction of dam and other relevant facilities, while company E, as a sub-contractor to company D, takes the works of water treatment plant and the transportation works for the earthworks for dam construction. There is no financial and ownership relationship in the consortium between the two parties. However, they would not sign any legal document or contract, except the sub-contracting contact between them. It is well perceived that this kind of non-contractual joint venture is entirely based on the reputation and business credit of the two companies.

In summary, there are various business forms in international construction regarding cooperation between different parties, but everything between them should be built on their various OLI advantages, especially the three key elements: technology, fund, and opportunity.

Chapter Seven

ANALYZING CAUSALITY RELATIONSHIP OF OLI ADVANTAGES OF CMNCS USING ROUGH SET ANALYSIS[8]

7.1 Introduction

Based on the identification and analysis of OLI advantages in previous chapters, this chapter further explores the causality relationship of OLI advantages of Chinese CMNCs in international market. Due to the reason mentioned below, a methodology which is based on new advancements in rough set theory is applied. It uncovers the significant attributes that influence the firm's performance, and establish the causal relationship between these factors and the performance indicators. In addition, it also provides straightforward decision rules which offer valuable suggestions for management to improve the firm's operations by concentrating on a few key factors with different priorities. It is believed that this present study is the first ever study that applied the rough set analysis in the domain of construction management and economics to analyzing construction MNCs.

As far as research methodology is concerned, business and economics research have so far relied almost exclusively on the conventional statistical toolbox. This reaches its limit very readily in applications where the ratio of sample size to variables is too low to be satisfied, even where the number of potential variables exceeds the number of observations. For example, studies on MNCs of a particular country often yielded such a situation, where the sample size may not be large enough in the context of many

[8] The content in this chapter has been submitted for publication in Low and Jiang (2005).

influencing factors. In such a scenario, many previous studies were generally brought to a pre-mature end at the identification, examination and evaluation stage of the various factors or strategies, rather than to further examine the causality patterns of these factors or strategies due to methodological constraints. The relatively new but more advanced rough set analysis provides a solution out of this situation. It identifies the significant attributes that influence the firm's performance, and establish the causal relationship between these factors and the performance indicators. In addition, the straightforward predictive rules may offer valuable suggestions for management to improve the firm's operations with different priorities on different advantages. However, the application of rough set analysis in construction management and economics remains very scanty so far (if none at all), despite the increasing attention paid to this methodology in a variety of research in business, economics and finance.

7.2 Rough sets analysis

An important research question in the empirical study concerns the causality patterns of the OLI advantages of Chinese MNCs. This seeks to determine the relationships between the various OLI factors and the performance indicators of the ownership, locational and internalization advantages. In another words, the question is to determine the factors and their degrees of influence in the OLI analysis. In this way, the performance of some Chinese construction MNCs can be distinguished from others. For example, in the case of ownership advantages, the standard statistical methods may reveal the important or statistically significant ownership factors, as in previous chapter. However, it remains unclear how these significant factors influence the performance of the firm from the ownership perspective. A conventional probabilistic method that can

be used to answer this question is the linear regression analysis or one of its variants, such as the probit and the logit models. Such statistical models measure the correlation between a dependent variable and a number of independent or explanatory variables. However, in the case of a small number of observations, the validity of these results is low; hence the standard approach is inadequate in such cases (Peter and Baaijens, 1999). Nevertheless, in view of past completed studies with a similar nature (such as in Seymour, 1987; Mansfield, 1988; Abdul-Aziz, 1995; Egmond, et. al., 2003; Cuervo, 2002; Cuervo and Low, 2003; Ling, 2003), a relatively low ratio of observations to variables, namely a small number of observations (e.g. less than 50 or 40) and a relatively large number of factors (e.g. more than 30 or 40), is an inherent characteristic in such studies. This is probably the major reason why most of the earlier studies mentioned above, were brought to a pre-mature end. This would be at the exploration, examination and evaluation stages relating to the various factors or business strategies adopted by the firms. No attempt was made to further understand the causality patterns of these factors. A method which is based on new advancements in rough set theory, provides an alternative methodology to overcome this shortcoming.

The rough set analysis was described comprehensively by Pawlak (1992). A brief background introduction may be found in EBRSC (1993). In this chapter, only a concise description of the methodology, without elaborating its mathematical background, is offered here. The rough set theory was originally introduced by Pawlak (1982). It has attracted the attention of many researchers and practitioners from a wide spectrum of disciplines worldwide during the last decade. They have, in turn, contributed considerably to the further development and applications of the theory, such as studies completed by Slowinski and Zopoundis (1994, 1995), Greco, et al. (1998),

Peter and Baaijens (1999), Dimitras, et al. (1999) and Slowinski, et al. (1997, 1999). The rough sets theory may be used to describe dependencies between attributes, to evaluate the significance of attributes, and to deal with inconsistent data. As an approach to handling imperfect data with uncertainty and vagueness which is often true with the attitudinal data from fieldworks, rough set analysis complements other theories that deal with data uncertainty, such as the probability theory, evidence theory, fuzzy set theory, etc. The rough set philosophy is founded on the assumption that with every object of the universe of discourse, some information such as data, knowledge and other characteristics will be consequentially associated. Objects characterized by the same information are indiscernible in view of the available information about them. The indiscernibility relation generated in this way forms the mathematical basis for the rough set theory (Dimitras, et al., 1999).

The rough set analysis is suitable for analyzing qualitative information, especially categorical data. The information is considered as a finite set of *objects* (i.e., individuals, firms, cities, countries, etc.) which can be described on the basis of a set of *attributes*, represented in distinct class sizes (i.e., categorical data). These attributes constitute the information available on the objects. On the basis of a distinct set of attributes, the objects can then be divided into groups or *classes*. Given this information in categorical form, an observer cannot make a distinction between objects of the same group. The groups of objects that result from the classification on the basis of all attributes are called elementary *sets*. If the information on the objects increases, the number of elementary sets will never decrease. A set which is not a union of one or more elementary sets, is called a *rough set*. A set is so-called "rough" if, given the information (i.e. the attributes) on the objects, an observer is not able to indicate and

classify with certainty all elements of the set concerned. The observer is, however, able to identify all objects that are certainly elements of the set. The observer is also able to mark the objects that possibly belong to the set. The set of objects that belongs with certainty to the rough set, is called the *lower approximation* of the rough set, while the set of objects that are possibly or certainly elements of the rough set, is called the *upper approximation* (Pawlak, 1982, 1992; Peter and Baaijens, 1999).

A rough set analysis firstly selects the data on the attributes of predefined objects. Next, the information chosen is transformed into a coded *information table*. For each attribute, the data are divided into categorical classes. Subsequently, a kind of combination analysis is applied to derive consistent *decision rules*. Then the so-called *reducts* of attributes are determined. A *reduct*, as the result of the *reduction* process, is a combined set of features which is in agreement with the hypothesis that the object is of a given nature. They lead to 'if-then' statements known as *decision algorithms*: if attribute a and b and c… is present, then the object concerned has a given distinct character. Generally, there may be various sets of such features that support the hypothesis. Each of these reducts is a basis for a *minimal decision algorithm* on the assignment of objects to sets. As a result, several reducts were found that could serve as a basis for decision algorithms. These decision algorithms remain comprehensible because they did not comprise many (i.e., more than ten) decision rules (Peter and Baaijens, 1999). The main specific problems addressed by the rough sets analysis are (EBRSC, 1993):

- representation of uncertain or imprecise knowledge;
- empirical learning and knowledge acquisition from experience;
- knowledge analysis and analysis of conflicts;

- evaluation of the quality of the available information with respect to its consistency and the presence or absence of repetitive data patterns;
- identification and evaluation of data dependencies;
- approximate pattern classification;
- reasoning with uncertainty;
- information-preserving data reduction.

Compared with rough sets analysis, in many cases, the conventional statistical methods may not only require a rigid sample size to variables ratio, but also provide insufficient predictive capability when it comes to problems involving interactions among many interdependent variables with unknown probability distribution. In addition, the issues of multicollinearity, distributional assumptions of the variables used, poolability, and (log-) linearity, among others, that are the main assumptions in conventional statistical methods, influence very much the outcome of the research analysis. On the contrary, the rough sets analysis makes only one assumption, which is that the objectives can form classes (Obersteiner and Wilk, 1999). Therefore, in contrast with the conventional statistical methods used in economics and business studies, including the factoral analysis, discriminant analysis, univariate statistical method, and the linear probability model, the rough sets analysis has the following advantages (Dimitras et al., 1999; Greco et al., 1998; Pawlak, 1992):

- It is based on the original data only and does not need any external information;
- It is a tool suitable for analyzing not only quantitative attributes but also qualitative ones;
- It discovers important facts hidden in the data and expresses them in the natural language of decision rules;

- The set of derived decision rules gives a generalized description of the knowledge contained in the database, eliminating any redundancy typical of the original data;
- The decision rules obtained are based on facts, because each decision rule is supported by a set of real examples;
- The results of rough sets are easy to understand, while the results from other methods (credit scoring, utility function and outranking relation) usually require an interpretation of the technical parameters, with which the user may not be familiar.

Due to its mathematical rigor and abilities in solving practical problems, the rough set theory and its applications have attracted much attention from more and more disciplines. But because the theory of rough set is quite mathematically involving, it has not been used more generally and applied widely until several computer softwares were developed in recent years. For the reason of conciseness, this brief introduction of rough set analysis has left out the mathematical derivatives. Instead, the description of the concepts was simplified, followed by an application for the OLI analysis of Chinese construction MNCs.

A number of practical applications of rough sets analysis in the past decade have directed its application primarily on artificial intelligent (AI) and other scientific and computing fields in its earlier stage that was related to the social sciences. These included applications in economic studies, e.g. Obersteiner and Wilk (1999); in business performance and failure prediction, e.g. Slowinski and Zopoundis (1994; 1995), Greco et al. (1998), Dimitras, et al. (1999), Slowinski, et al. (1997; 1999); and in

financial investment, e.g. Golan (1995), Golan and Edwards (1993), Ruggiero (1994), Ruggiero (1994a), Ziarko, et al. (1993). However, it seems there is so far no application of rough set analysis in the area of construction management and economics, especially for studies of construction MNCs.

7.3 Application of rough sets analysis

The application of rough sets analysis for the study of Chinese construction MNCs in relation to the OLI factors is described below.

7.3.1 The methodology

In this chapter, the rough set analysis is applied to the OLI analysis of the performance of Chinese construction MNCs in the international market. The objectives are to identify the qualitative causality patterns of the various OLI factors of Chinese construction MNCs with respect to the indicators of the ownership, locational and internalization advantages of the firms. Three performance indicators namely O-IRTR, L-IBD and I-OMS were defined and described in Chapter 4, as well as in Low, et al. (2003); Low and Jiang (2003; 2004a; 2004c).

The causal relationship between the attributes and the decision classes can therefore be established using the following analytical procedures:

Step 1: The relevant data is selected from the fieldworks and the previous data analysis, and the information table is constructed by coding the data with predefined codes of the objects and attributes;

Step 2: Using the information table as input, the reducts and the core of the set of all attributes are calculated and identified;

Step 3: The minimal decision algorithms as well as other algorithms are adopted to discover the decision rules; and

Step 4: The attributes induced from reducts and the decision rules discovered are analyzed.

7.3.2 The data

The whole sets of OLI factors and O-IRTR, L-IBD and I-OMS provided a good approximation of the decision classes as well as the quality of classification on how well construction MNCs have leveraged from the advantages derived from their ownership, locational and internalization factors in the international construction market.

Following the analysis in Chapter 6, the analysis of ownership, locational and internalization factors is separated into three sets of factor groups. Each group comprises various condition attributes (i.e. the O, L and I factors) and one decision attribute (i. e. the O-IRTR, L-IBD or I-OMS). The codification of OLI factors in the OLI analysis for the various condition attributes is shown in Table 7.1. The decision classes are codified by the binary assignment to a decision class, i.e., a well performing firm or a relatively not well performing firm in terms of its O-IRTR / L-IBD / I-OMS results is coded by 1 or 0 respectively. A relatively well performing firm in terms of its O-IRTR / L-IBD / I-OMS results may be indicated by its higher O-IRTR / L-IBD / I-OMS than the average of all the objects. Therefore, the coded information table is prepared as inputs for the rough set analysis that consisted of 31 firms (objects); they

are described in the information table by 18 coded attributes (for both ownership and internalization factor groups) and 20 attributes (for locational factor group), and 2 coded decision classes of all the three sets of groups, using data from the analysis presented in the previous chapters.

Table 7.1 Codification of OLI attributes of Chinese construction MNCs

Variables		Codification							Variables		Codification				
Ownership advantages															
Compare with other international contractors	Compare with local contractors	1	2	3	4	5	6	7	Locational factors	Internalization factors	1	2	3	4	5
Firm specific		Very Significant Disadvantage	Significant Disadvantage	Disadvantage	No Influence	Advantage	Significant Advantage	Very Significant Advantage	Firm specific		Least Important	Less Important	Important	More Important	Most Important
2.2.a.1	2.2.b.1								3.1.1	4.3.1					
2.2.a.2	2.2.b.2								3.1.2	4.3.2					
2.2.a.3	2.2.b.3								3.1.3	4.3.3					
2.2.a.4	2.2.b.4								3.1.4	4.3.4					
2.2.a.5	2.2.b.5								3.1.5	4.3.5					
2.2.a.6	2.2.b.6								3.1.6	4.3.6					
2.2.a.7	2.2.b.7								3.1.7	4.3.7					
2.2.a.8	2.2.b.8								3.1.8	4.3.8					
2.2.a.9	2.2.b.9								3.1.9	4.3.9					
2.2.a.10	2.2.b.10									4.3.10					
2.2.a.11	2.2.b.11								Country specific						
2.2.a.12	2.2.b.12								3.2.1	4.4.1					
2.2.a.13	2.2.b.13								3.2.2	4.4.2					
2.2.a.14	2.2.b.14								3.2.3	4.4.3					
Country specific									3.2.4	4.4.4					
2.3.a.1	2.3.b.1								3.2.5	4.4.5					
2.3.a.2	2.3.b.2								3.2.6	4.4.6					
2.3.a.3	2.3.b.3								3.2.7	4.4.7					
2.3.a.4	2.3.b.4								3.2.8						
2.3.a.5	2.3.b.5								3.2.9						
2.3.a.6	2.3.b.6								3.2.10						
2.3.a.7	2.3.b.7								3.2.11						
2.3.a.8	2.3.b.8								3.2.12						
2.3.a.9	2.3.b.9								3.2.13						
									3.2.14						
									3.2.15						
									3.2.16						
									3.2.17						

Note: For the coded number of the attributes, please refer to Chapter 6.

7.3.3 The results

The information table is taken as inputs for the rough set analysis using the Rough Set Data Explorer 2.0 (ROSE 2.0) software program. This analysis produced the following results.

- Quality of approximation

  The three sets of O-IRTR, L-IBD and I-OMS results provided the quality of classification on how well the construction MNCs performed in terms of their ownership, locational and internalization advantages with the quality of approximation as follows:

$\gamma_{\text{O-IRTR}}(\{Y^1, Y^2\})=1;$
$\gamma_{\text{L-IBD}}(\{Y^1, Y^2\})=1;$
$\gamma_{\text{I-OMS}}(\{Y^1, Y^2\})=1.$

Where γ is the quality of approximation of classification y by the set of attributes P, or in short, the quality of approximation;
$y = \{Y^1, Y^2\}$ is the classification;
Y^1 *and* Y^2 are the decision classes.

The quality of approximation (γ) is calculated using the following formula:

$$\gamma_P(y) = \frac{\sum_{i=1}^{n} card(\overline{P}Y_i)}{card(U)}$$

Where $P \subseteq Q$, Q is a finite set of attributes;
$Y \subseteq U$, U is a finite set of objects;
$\overline{P}Y_i$ is the P – upper approximation of Y_i;
$i = 1,\ldots\ldots, n,$ are the classes of classification of y;
card (x) is the cardinality of a set x.

- The *Cores of Attributes* for all the three sets are empty. This indicates that no single attribute is absolutely necessary for perfect approximation of the decision classes. A non-empty core would indicate that there are attributes in the system which are indispensable from the discriminating point of view, because removal of any of the attributes contained in the core leads immediately to the decrease of the quality of approximation. On the other hand, a non-empty core helps in

determining the most important attributes as far as the approximation of classes is concerned (Dimitras, et. al., 1999).

- The *Discernibility Matrix Method* is used for Reduction (search for reducts). For the set analysis of ownership factors, 760 reducts were obtained for the coded information table. These contain 3 - 6 attributes, which is considerably smaller than the total number of attributes. This result strongly supports the process of reduction as each of the reducts contains fewer attributes but ensures the quality of approximation. Similarly, 1388 reducts and 857 reducts were found for the set analysis of locational factors and of the internalization factors respectively. The attributes with the top 10 higher frequency of occurrence in reducts for each sets of factor groups are presented in Table 7.2. The attributes as shown in Table 7.2 represent the most significant factors influencing the firm's performance in terms of the ownership, locational and internalization advantages. Some of the reducts are shown in Table 7.3 as an illustration.
- The basic and extended *Minimal Covering Method* (MCM) is adopted for the rule induction, and the *Entropy Measure* is used for evaluating conditions in order to ensure that the conditions with the best evaluation are added to each of the currently generated rules. Consequently, the decision rules discovered by the rough set analysis from the coded information table are presented in Table 7.4, where the rules for each set of attributes are less than ten. This suggests the advantages of the mathematical processes in rough set analysis as mentioned earlier where comprehensive and easily understandable rules can be derived without invoking too many complicated formulae. All the rules have a 100% level of discrimination and many of them have the relative strength of over 20%. In actual fact, the rules with less than 100% level of discrimination had already

been eliminated by the MCM process, and the number of rules would increase significantly if the level of discrimination is lowered. To evaluate more complicated causality patterns between the various attributes (factors) and the performance indicators, the level of discrimination can be lowered and more decision rules could be discovered for further analysis. This is, however, not elaborated further in this chapter.

7.4 Analysis of attributes induced from reducts

The attributes with the top 10 higher frequency of occurrence in the reducts as shown in Table 7.2 represent the most significant attributes among the various OLI factors which influenced the firm's performance in terms of its ownership, locational and internalization advantages. In particular, the most influential *ownership factors* include:

- Comparing with other international contractors: Accessibility to technical resources; Firm's reputation; Size of the firm; Experience and knowledge about international construction market; Home government assistance and incentives on overseas contracting; and Governmental and historical relationship with developing countries;
- Comparing with local contractors: Experience and knowledge about international construction market; Accessibility to technical resources; Working quality and Total Quality Management capability; and Availability of professionals from China.

Table 7.2 The attributes with the top 10 higher frequency of occurrence in reducts

No.	Set of ownership attributes			Set of locational attributes			Set of internalization attributes		
	Attribute	Frequency	% Frequency	Attribute	Frequency	% Frequency	Attribute	Frequency	% Frequency
1	2.2.a.8	248	32.6%	3.2.8	440	31.7%	4.4.2	254	29.6%
2	2.2.b.13	233	30.7%	3.1.6	420	30.3%	4.4.3	252	29.4%
3	2.3.a.3	232	30.5%	3.1.3	415	29.9%	4.4.5	244	28.5%
4	2.3.a.2	213	28.0%	3.2.12	410	29.5%	4.3.7	238	27.8%
5	2.2.b.8	207	27.2%	3.2.11	365	26.3%	4.3.10	230	26.8%
6	2.2.b.6	194	25.5%	3.1.2	356	25.6%	4.4.6	225	26.3%
7	2.2.a.5	191	25.1%	3.1.5	346	24.9%	4.3.5	223	26.0%
8	2.3.b.7	190	25.0%	3.1.7	337	24.3%	4.3.9	221	25.8%
9	2.2.a.4	184	24.2%	3.2.4	334	24.1%	4.4.1	212	24.7%
10	2.2.a.6	183	24.1%	3.2.13	330	23.8%	4.4.4	200	23.3%

Similarly, the top 10 most important *locational factors* were as follows:

- Large number of competitors from China in the host countries;
- Large number of other international competitors in the host countries;
- Lower cost of local contractors in the host countries;
- Lower cost of other international contractors in the host countries;
- Relationship amongst international and local contractors in the host countries;
- Political and social stability in the host countries;
- Availability and costs of local workers in the host countries;
- Local income and corporate taxation levels in the host countries;
- Local import and export control and tariff levels for construction machinery, equipment and materials in the host countries; and
- Accessibility to local financing resources in the host countries.

The top 10 most dominant *internalization factors* were as follows:

- To protect technological know-how of the firm;
- To avoid the costs of breach of contracts and ensuing litigation;
- To facilitate the need for alternative investments for the profits earned;
- To better utilize and control resources (construction materials, equipments, technology, human resources, etc.);

- To meet the host government's policy requirements relating to construction business operations;
- To better facilitate strategic alliances, partnering and networking with others for the business;
- To avoid client's uncertainty over the nature and value of services being sold and to better facilitate the client's needs;
- To overcome price discrimination on projects in the host country;
- To consolidate the market position and to facilitate the future growth and potential of the market; and
- To avoid or reduce the host government's intervention (quotas, tariffs, price controls, tax difference, etc.).

The analysis of each reducts, which yielded a large number of permutation and combination of the above-mentioned attributes, were not fully discussed here. Nevertheless, some examples were illustrated in Table 7.3.

Table 7.3 Illustration of reducts

Set of ownership attributes:		Set of locational attributes:		Set of internalization attributes:	
No.	Reducts	No.	Reducts	No.	Reducts
1	{22a5,22a8,22b6,23b9}	1	{312,328,329,3211,3212}	1	{435,437,445,446}
2	{22a5,22a8,22b6,23b7}	2	{312,319,329,3211,3212}	2	{435,437,444,445}
3	{22a5,22a8,22b6,23b2}	3	{312,317,329,3211,3212}	3	{435,437,443,445}
4	{22a5,22a8,22b6,23a9}	4	{315,322,3212,3213,3214}	4	{435,437,442,445}
5	{22a5,22a8,22b6,23a3}	5	{313,315,3212,3213,3214}	5	{435,437,441,445}
⋮		⋮		⋮	
756	{22a2,22a6,22a8,23a2}	1384	{312,313,316,321,3211}	853	{432,436,439,442,443}
757	{22a2,22a6,22a8,23a3}	1385	{312,313,316,322,3211}	854	{433,436,438,441,444}
758	{22a2,22a6,22a8,23a9}	1386	{312,313,316,324,3211}	855	{431,433,434,436,438}
759	{22a2,22a6,22a8,23b2}	1387	{312,313,316,326,3211}	856	{431,433,434,438,441}
760	{22a2,22a6,22a8,23b7}	1388	{312,313,316,3211,3212}	857	{431,433,434,438,445}

7.5 Analysis of decision rules

The decision rules derived from the rough set analysis as shown in Table 7.4 can be interpreted in a relatively straightforward manner. The rules were grouped according to the OLI analytical framework, and a total of nine rules were derived for the set of ownership attributes, eight rules for the set of locational attributes and nine rules for the set of internalization attributes. The examples presented below were randomly selected for illustrations. Not all decision rules will be explained below due to space constraint in this study.

Table 7.4 The minimal sets of decision rules

Rule No.	Elementary conditions	Decision			
		Class	Strength	Relative strength	Level of discrimination
Set of ownership attributes:					
Rule O1	(2.2.b.4 = 6) & (2.2.b.8 in [5, 7)) & (2.3.a.9 = 6)	O=1	6	42.86%	100%
Rule O2	(2.2.a.5 in [5, 7)) & (2.3.a.9 = 5)	O=1	4	28.57%	100%
Rule O3	(2.2.a.5 = 5) & (2.2.a.14 = 4)	O=1	2	14.29%	100%
Rule O4	(2.2.a.2 = 2) & (2.2.a.8 = 6)	O=1	1	7.14%	100%
Rule O5	(2.2.a.2 = 5) & (2.3.a.9 = 7)	O=0	3	17.65%	100%
Rule O6	(2.2.a.2 = 2) & (2.3.a.9 = 6)	O=0	3	17.65%	100%
Rule O7	(2.2.a.2 = 5) & (2.3.a.3 in [6, 7])	O=0	4	23.53%	100%
Rule O8	(2.2.a.5 = 4) & (2.2.b.13 = 7)	O=0	2	11.76%	100%
Rule O9	(2.2.b.8 = 3)	O=0	1	5.88%	100%
Set of locational attributes:					
Rule L1	(3.1.2 >= 5) & (3.1.9 >= 4)	L=1	9	45.00%	100%
Rule L2	(3.1.5 >= 5)	L=1	8	40.00%	100%
Rule L3	(3.1.2 < 4) & (3.2.7 >= 4)	L=1	4	20.00%	100%
Rule L4	(3.2.4 >= 5)	L=1	5	25.00%	100%
Rule L5	(3.1.3 >= 5) & (3.2.7 >= 5)	L=1	2	10.00%	100%
Rule L6	(3.1.2 >= 4) & (3.1.5 < 5) & (3.1.9 < 4) & (3.2.11 < 4)	L=0	4	36.36%	100%
Rule L7	(3.2.7 < 4) & (3.2.11 >= 4)	L=0	5	45.45%	100%
Rule L8	(3.1.3 >= 5) & (3.1.5 < 5) & (3.2.14 >= 5)	L=0	3	27.27%	100%
Set of internalization attributes:					
Rule I1	(4.3.2 < 5) & (4.3.4 >= 5)	I=1	6	26.09%	100%
Rule I2	(4.3.1 >= 3) & (4.3.7 >= 3) & (4.4.2 >= 4)	I=1	12	52.17%	100%
Rule I3	(4.4.7 >= 4)	I=1	7	30.43%	100%
Rule I4	(4.4.4 < 3)	I=1	6	26.09%	100%
Rule I5	(4.4.3 >= 5)	I=1	3	13.04%	100%
Rule I6	(4.3.1 < 5) & (4.3.3 in [3, 5)) & (4.3.4 < 5) & (4.4.7 < 4)	I=0	3	37.50%	100%
Rule I7	(4.3.1 < 3) & (4.3.8 >= 3)	I=0	3	37.50%	100%
Rule I8	(4.3.9 < 3) & (4.4.2 < 3)	I=0	1	12.50%	100%
Rule I9	(4.3.1 >= 4) & (4.3.4 < 3)	I=0	1	12.50%	100%

The decision rules appear to look rather complex but in actual fact, can be interpreted quite readily without the need to know much about the mathematical background in the rough set method. For example,

- Rule O1: "*(2.2.b.4 = 6) & (2.2.b.8 in [5, 7)) & (2.3.a.9 = 6) => O=1*" indicates that a firm is likely to perform well in terms of its ownership advantages, namely with a relatively higher O-IRTR, when it has a significant advantage on its reputation and its accessibility to technical resources when compared with local contractors. In addition, it is also significantly advantaged on the country-specific factor: "availability of low-cost machinery and material from China" when compared with other international contractors.
- Rule O2 implies that, when the size of a firm is perceived as its advantage and the country-specific factor: "availability of low-cost machinery and material from China" is well utilized as an advantage by the firm, although not as significant or very significant advantages, the firm would tend to perform well in terms of its ownership factor.
- Rule O3 stipulates that if a firm is advantaged on its size when compared with other international contractors and it is not disadvantaged on the lower costs in production compared with other international competitors, then the firm is likely to perform well on its ownership advantages.
- Rule O6 states that if a firm is disadvantaged significantly in its business development capacity, it may not be able to utilize its ownership advantages well although it enjoys significantly the country-specific factor: "availability of low-cost machinery and material from China" as an advantage.
- Rule O9 reveals that the factor "accessibility to technical resources" is important when a firm intends to exercise its ownership advantages well in the international market; it may not succeed in this regard if the factor becomes its disadvantage.

The rules derived for the sets of locational and internalization attributes can be interpreted similarly with reference to the codification table. For example,

- Rule L1 indicates that a firm may be expected to achieve better results in terms of its locational advantages, namely with a relatively higher L-IBD, if the factor "large number of competitors from China in the host countries" becomes its most important consideration and the factor "priority in the business strategy of the firm's headquarter relating to the host country market" was taken as its more important consideration when the locational factors of the host countries were examined.
- Rule L3 indicates that even if the factor "large number of competitors from China in the host countries" is not considered an important issue for a firm, it may still be better to utilize its locational advantages with a higher L-IBD if the factor "availability and costs of local professionals in the host countries" is a top concern of the firm.
- Rule I2 indicates that if the factor "to avoid or reduce information search and business negotiation costs" and "to avoid the costs of breach of contracts and ensuing litigation" were considered as important or more important factors when the firm decides on its international business forms and modes of entry in the international market, and the factor "to better facilitate strategic alliances, partnering and networking with others for the business" was also considered as a more important issue, then the firm tends to perform well in terms of its internalization advantages with a higher level of I-OMS results.

All the other rules may be interpreted directly with reference to the codification table. It should be mentioned that the rule induction in rough set analysis is deterministic and

incorporate a compulsory logic from the underlying data sets. Hence, the rules discovered, being inductively based, may possibly include some spurious correlation between the attributes and should therefore be interpreted with caution (Egmond, et. al., 2003). Nevertheless, these predictive rules were able to discover the important facts and relationships hidden in the data and expressed them in the natural language that can be understood more readily.

7.6 Concluding Remarks

This chapter proposes the rough set analysis as an operational decision tool for the evaluation of the OLI factors and the prediction of the performance of the OLI advantages of a firm. This study demonstrated the power and usefulness of the rough set analysis, which has gained significant achievements in other business and economic studies in the past decade. The rough set analysis is especially useful to determine the causal relationship between variables in cases where the ratio of the sample size to the number of variables is too low to appropriately justify the use of any statistical methodologies. The predictive rules discovered by rough set analysis, as expressed in plain English language for easy understanding, provided the causality patterns between the various factors and the performance that resulted from the OLI advantages. These relationships are meaningful because (i) given the level of the performance of a firm in terms of its ownership, locational and internalization advantages, the various degree of influence of the significant factors can then be identified; (ii) given a number of O, L and I factors a firm may encounter in the international market, the strategies on how to better leverage its performance in its ownership, locational and internalization advantages by concentrating on a few key factors with different priorities may be

identified for implementation. These generalized rules would be particularly helpful for a firm when it intends to develop its internationalization strategies in the international market. In this study, Chinese CMNCs were adopted as the pioneer samples in the rough set analysis; therefore the rules reported earlier may only be applicable for the analysis of Chinese construction MNCs. However, in actual fact, the methodology of rough set analysis as presented in this chapter may be applied to any other set of learning samples, and their predictive rules derived accordingly.

Part III

Chinese Large Construction Firms in Domestic Market

Chapter Eight

CHINESE CONSTRUCTION INDUSTRY IN DOMESTIC ECONOMY[9]

8.1 Introduction

The objective in this thesis is to study the large Chinese construction MNCs in both international and domestic markets. To analyze the competitive advantages and the role of large Chinese CMNCs in domestic economy, it is necessary to find out the general status of construction industry in China's domestic economy. In this Chapter, firstly the development of construction industry in China is briefly reviewed; followed by analysis of the role of construction industry in China's domestic economy. Then the structure of Chinese construction industry, and construction enterprises are studied. Consequently, the general status of large construction MNCs in China's domestic construction market are identified.

8.2 The development of Chinese construction industry

The construction industry, as a pillar economic sector in China, has experienced a rapid development during the past decades. In the recent two decades, the construction industry in China has undergone much economic and enterprises reform. Consequently, construction industry has become the fourth largest output sector in terms of its total production in GDP. In general, the development of Chinese construction industry may be phased into four periods as briefly reviewed as follows.

[9] Part of the contents in this chapter has been published in Low and Jiang (2003).

Phase I: the creation time (1949 – 1957)

The construction industry in China was started up from a number of small scale construction factories. During 1950s, a number of state owned construction enterprises were established following some government Acts. The industrialization of construction sector in China began from 1956. Soon after, the government stipulated several Acts to regulate the construction sector, and this included the scope of infrastructure, the organization, the compiling and approval procedures of the design and construction works, the construction and supervision works. During this period, the construction ministry at central government level and the construction bureaus at provinces and municipal levels were set up following a "tree shape" administration system. Meanwhile, the design institutions at similar organizational structure were also established. The starting up of China's construction industry was from central planning economic system and absorbed vast low productive resources including low skill workers and non-industrial production systems, and this posed many problems when the economic demand on construction works grew rapidly later on. The share of construction sector in the total GDP in China was 1.1% at the beginning of 1950s, while it reached to 3.6% in 1952 and 5% in 1957 respectively (NSB, 1999).

Phase II: the frustrated time (1958-1976)

When the construction industry was going on a fast developing track, the "great leap" from 1958 and the "cultural revolution" in 1960s and 1970s destroyed the growth of the sector. The labor force in construction industry was significantly expanded in 1958 and was suddenly compressed in 1960s. Most of the design institutions and research units were abrogated and the management of construction enterprises was led to paralysis. The non-economic methods instead of economic management brought disorder in

construction works, as reflected in the low productivity, high accidental rate, poor construction quality. It should be admitted that many of the infrastructures in China which played very important roles in the economic development of China prior to mid-1980s were constructed during this period. These include many inter-provinces and inter-city highways, power plants, hydro-electrical plants, water control works and petroleum factories. Some of these heavy industrial infrastructure are still in operation now with significant contribution to the local economy. For example, the present key urban water supply system from Miyun reservoir for Beijing was built up by tens of millions of hands of labor force during this period, and it is still functioning well. But the low construction quality of these works also brought lots of damages to the society such as several bursting of dams in north-west areas of China during the 1990s.

Phase III: rehabilitation (1977-1983)

From the late of 1970s, the "reform and open" policy in China directed the rehabilitation of the whole economy. The total production output of construction industry in 1983 is RMB 105.3 billion or 1.4 times of that in 1976. The share of construction sector in the whole economy was increased from 8.1% in 1975 to 9.5% in 1983 (NSB, 1999). The reform of wage system in construction enterprises increased the productivities. The productivity of state owned construction enterprises in terms of the production output per employee was doubled to RMB 5148 in 1983 from 1976.

Phase IV: the development time (after 1984)

The competitive mechanism and bidding system in construction industry were introduced from 1983. Gradually, open bidding system was expanded to the entire sector. The projects contracted through open bid covered 20.5% of all projects values in

1984, while it was 40.1% in 1998. The management system was changing from planning system to market system. Many other forms of construction enterprises were set up and began increasing their shares in the whole market. The organizational structure of construction enterprises, the construction management on project basis and the quality control were improved significantly. From the mid-1990s, the legal system with respect to construction works has been gradually built up and enhanced. The Construction Law and bidding acts and several other legal mechanisms were put into force in recent years, and therefore the whole industry is in a better regulated position. Due to the heavy investment in infrastructure and real estate market in recent years, the position of construction sector is now playing a very significant role in domestic economy. Due to the large number of employees in the construction enterprises, the further reform to cater to the marketing system in construction has now met some difficulties and therefore the construction sector is probably one of the least open sectors in China's economy.

8.3 Construction industry in China: macro-economic perspectives

In this section, the role of construction industry in China's domestic economy is analyzed in terms of its production output in domestic economy, the intermediate inputs ratios and industrial output impact. Various economic data are used to analyze quantitatively.

8.3.1 Gross production output and value added of construction industry

The total production output of construction industry is significantly influenced by the macro economic policies, as well as the entire economy demand of the whole society and government investment in China. The gross output value of construction industry in

China increased steady from the 1980s with the exception of decreasing at about 1.6% during the economic adjustment period from 1987 to 1990. Thereafter, the domestic economic growth stimulated the construction sector and the total output increased around 20% per year (Figure 8.1). This increasing trend is continuing after the turn of the century. The value added figures of construction industry were also demonstrated as an increasing trend along with a steady contribution to the overall domestic economic growth. The percentage of added value of construction industry to GDP is increasing from 4.6% in 1990 to 6.6% in 2000. The lower speed of increas in terms of gross output of construction in comparison with the steady increase of percentage to GDP reveals that the other industrial sectors are also increasing dramatically in China, while the relative contribution of construction sector to the overall economy output is becoming less (Table 8.1).

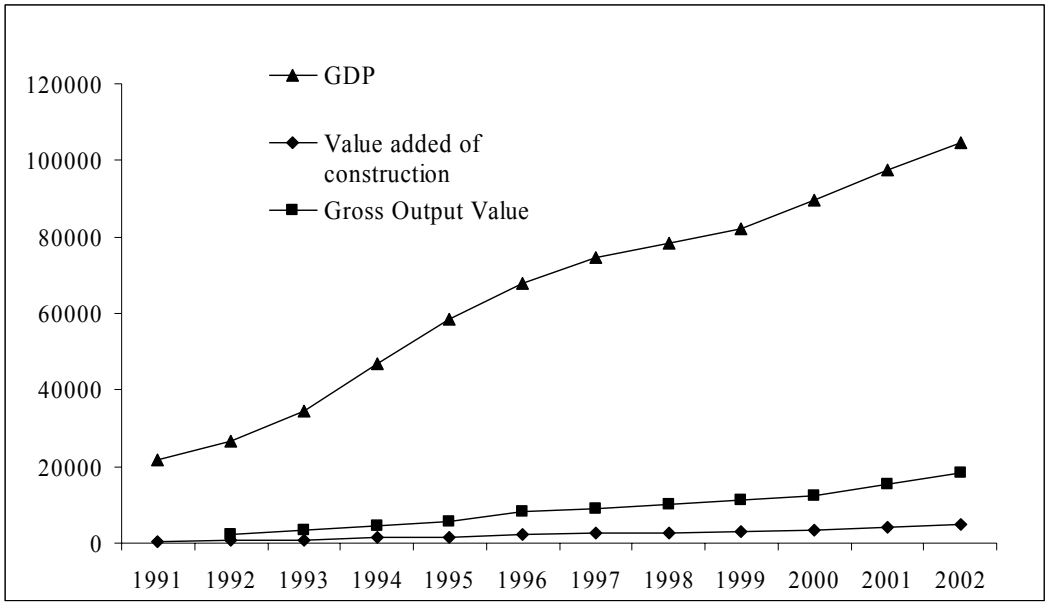


Figure 8.1 Economic growth and construction industry in China

Source: China Statistic Yearbook (2003)
Note: in RMB 10 million.

Table 8.1 Construction industry indexes from I-O Table of China

Year	Gross output value (RMB 100 million)	Average increase per year	Value added in GDP (RMB 100 million)	% in GDP	Inverse Matrix Coefficient	Intermediate inputs ratio
1990	1345.01	-	388.21	4.6	1.129	71.1%
1992	2174.44	30.8%	614.57	5.3	1.145	71.7%
1995	5793.75	36.9%	1668.64	6.5	1.302	71.2%
1997	9126.48	25.8%	2540.54	6.5	1.252	72.2%
2000	12497.60	10.8%	3341.09	6.6	1.241	73.3%
2002	18527.18	18.5%	4698.3	6.7	1.317	74.6%

Source: China Statistic Yearbook (2003)

8.3.2 Intermediate Inputs Ratio (IIR) of construction industry

Intermediate inputs indicate the value of goods and services including the deployed resources (material, fuels and others) and services that are used in the construction process of other goods and services and are not sold in final product markets. The Intermediate Input Ratio (IIR) refers to the ratio of the value of intermediate inputs for an economic sector to the total inputs which equals to the total outputs in the sector. It can be calculated as follows:

$$IIR = (\text{gross output} - \text{value added}) / \text{gross output}$$

This index may reflect the efficiency of the industry. The increase of IIR may imply the increase of utilization of input components in the sector, or the decrease of the efficiency of production in the sector. The IIRs of China's construction industry are shown in Table 8.1, and one may find that the IIR of construction industry is increasing gradually from 71.1% to 74.6% during the past decade. In fact, the technical level of construction sector in China has not been significantly improved during the period, and the sector remains as an highly labor-intensive industry. Therefore, the rise of IIR of construction industry may imply that the efficiency in construction industry has not

been improved considerably, and the profitability in the sector is also low. This is consistent with the actual fact that the very high competition in the domestic construction market eroded the profit shares for many construction companies. On the other hand, the increase of IIR may also imply that the growth of construction output in China heavily depends on the input of fixed asset investment, rather than the improvement of technical and management level.

8.3.3 Industrial output impact - Inverse Matrix Coefficient (IMC)

In macroeconomics, several indicators may be used to analyze the contribution and impact of an economic sector to the overall economy and other sectors. The Input-Output Table of a nation provides necessary data to calculate such indicators. Among the various indexes such as Type I and Type II output multipliers (for direct and indirect impact), and Production Inducement Coefficient (for final demand items), Inverse Matrix Coefficients (IMC) is chosen in this study to reflect the impact of construction industry in the overall economy. When one unit of construction demand arises for the industry, the Inverse Matrix Coefficients not only indicate the amount of materials directly needed for the construction activity, but also the indirect amount of demand including the compound material amounts needed by multiple industries or the material needed to produce the raw material for the construction. The calculation procedure of IMC is not presented here for the reason of conciseness, but the results are shown in Table 8.1.

The results indicate that the IMC of construction industry in China are all above 1 with an increasing trend gradually. This may indicate that the impact of construction activity

to other economic sectors in China is stably higher than the average impact of all economic sectors. The IMC has increased 17% from 1990 to 2002, and it is higher than the average impact of all economic sectors by 31.7% in 2002. Hence, it may be argued that for the overall domestic economic growth in China, to further increase the input on construction industry and therefore to simulate the growth of construction may significantly drive the growth of other economic sectors and the overall macro economy.

8.4 The structure of construction industry in China

8.4.1 Key characteristics of construction industry in China

In China, enterprises in the construction industry are organized into three categories: State Owned Enterprises (SOEs); Urban and Rural Collectives (URCs); and Rural Construction Teams (RCTs). In 1999, there were more than 84,250 construction enterprises in China employing over 23.65 million workers. These were made up of about 9,394 SOEs with 6.9 million employees, 25,442 URCs with 9.35 million employees and 49,414 RCTs with nearly 7.4 million employees (National Bureau of Statistics of China, 2000). The rapid growth in construction during the past 24 years has expanded the construction labor force, which increased from 9.8 million in 1980 to over 23.65 million in 1999. In recent years, there is an increasing trend for the emergence of private construction companies, due to the privatization of some URCs and RCTs. However, the number of private construction companies is still small relative to the entire construction industry.

Generally, the following characteristics of China's construction industry and enterprises may be identified:

- Large domestic market and huge construction work forces

  As shown in Figure 8.2, the construction industry is closely related to national fixed capital investment, which has been increasing rapidly along with China's economic growth. China's fixed capital investment in 1985 was RMB 254.3 billion, 65.1% of which were in construction and installation projects. In 1999, the total fixed capital investment had reached RMB 2,975.46 billion, with 63.17% or RMB 1,879.6 billion in construction and installation projects. In the foreseeable future, this trend will continue to remain high. On the other hand, China's construction work force continues to remain as the largest labor force in the working population. As mentioned above, almost 23.65 million people are working in the industry in 1999. This comprises of 6.9 million in SOEs, 9.35 million in URCs and 7.4 million in RCTs (National Bureau of Statistics of China, 2000). Although China's construction industry contributes to employment opportunities to a large extent, it is still a very labor intensive industry that is not likely to change drastically in the near future. Figure 8.3 shows that in 1999, the number of construction enterprises and employment increased to 1.5 and 2.5 times that of 1980 respectively. Meanwhile, the total production was raised almost 36 times during the same period as shown in Figure 8.4. The productivity in terms of production per employee increased 15 times as shown in Figure 8.4. These trends suggest that improving the labor productivity of construction can remain a tough task to tackle in China.

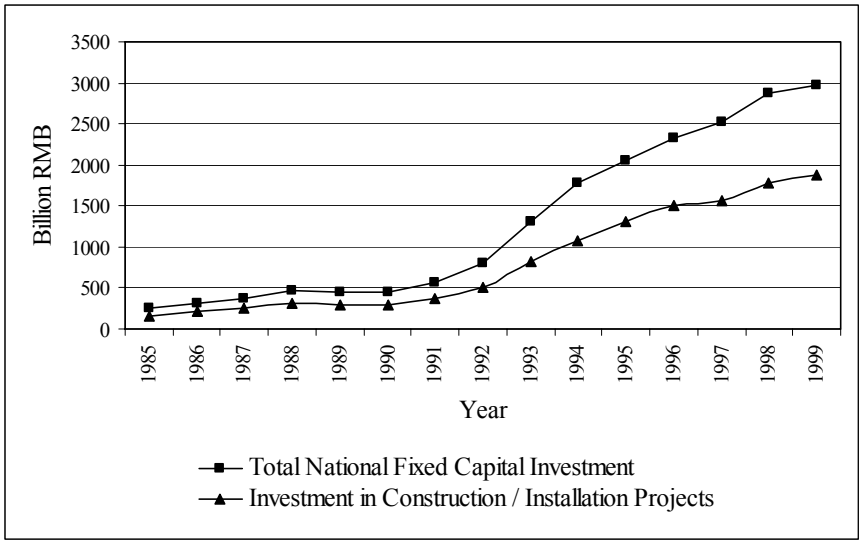


Figure 8.2 National fixed capital and investments in construction/installations
Source: China Statistical Yearbook, 2000

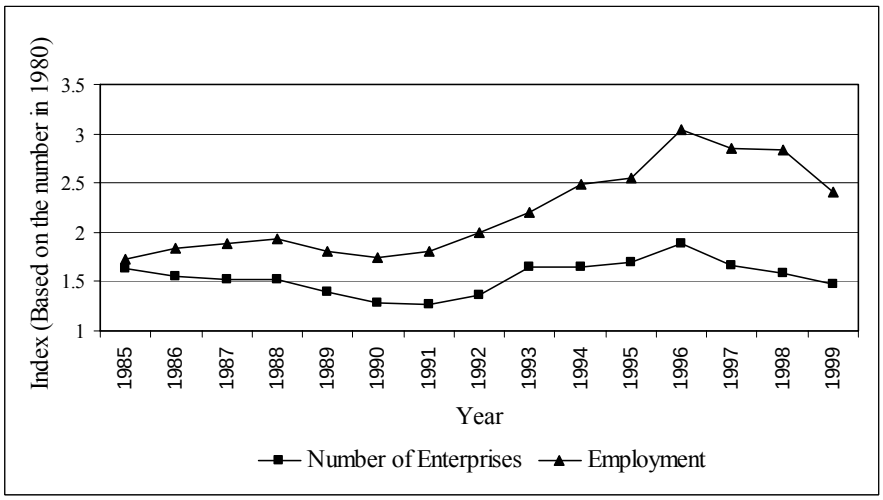


Figure 8.3 Changes in China's construction enterprises and employment
Note: 1980 Index=1.
Source: Compiled from China Statistical Yearbook, 2000

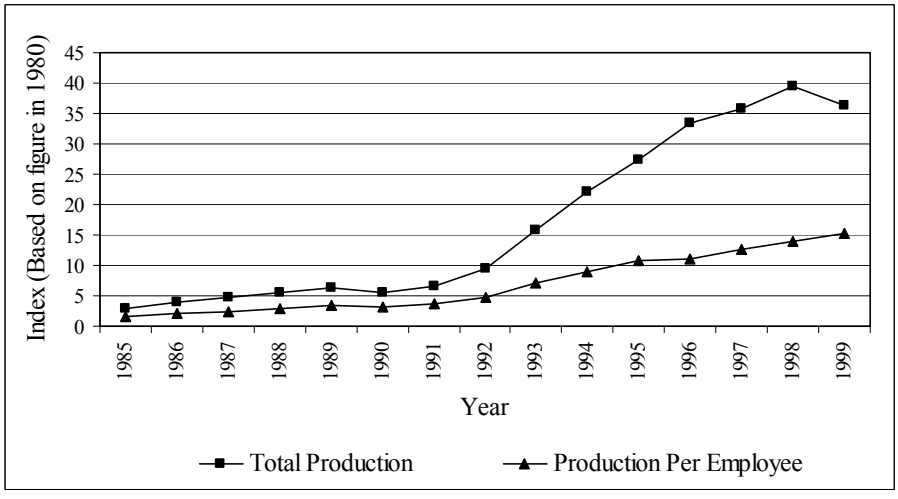


Figure 8.4 Changes in total production and production per employee
Note: 1980 Index=1.
Source: Compiled from China Statistical Yearbook, 2000

- Labor intensive and less open industry

  China's labor-intensive construction industry, to some extent, does not presently rely on technological innovation. It is not as open an industry compared with other industries. This situation occurs because of its potential impact on employment, as well as the possible influence of reforms on State Owned and Urban Collective enterprises. Hence, foreign construction companies have limited access to the industry. Consequently, it is only 5 years after China's entry to the World Trade Organization (WTO) that foreign companies will be allowed to set up wholly owned enterprises in China. However, although the construction industry is not as open as other industry, reforms are underway in many aspects.

  Joint ventures and sub-contracting are currently common within the various enterprises. There are very few private contractors in China. Although SOEs handled most of the construction in the past, their relative share is now decreasing. SOEs that comprise both the local units authorized by municipal governments and central ministry-affiliated enterprises have undertaken most of the construction of the infrastructure projects. For some years, notable progress has been achieved in reforming these enterprises in terms of commercial behavior, operational autonomy and competitive bidding. However, SOEs still face many unresolved problems, i.e., poor management, use of old technology and an excessive labor force. The Urban Collectives and Rural Teams, on the other hand, have been developing fast. The URCs and RCTs in 1999 accounted for over 71 percent of the construction labor force and produced about 62 percent of total construction output (National Bureau of Statistics of China, 2000).

The rapid growth of the URCs and RCTs in China's construction industry helped contribute to the country's economic reforms towards a market-oriented system. While many SOEs are still in the process of reforms, the URCs and RCTs, who were set up in a market environment, have readily captured some market shares because of their low production costs, flexible labor force, profit-driven objective and ease of movement from one city to another. However, the quality of the URCs and RCTs is relatively poorer because of their lower level of professional and technological management. In addition, the involvement of more RCTs in China's construction market, especially in the larger cities, has resulted in some social problems because of poor management and the large number of workers which the RCTs brought along with them.

- Specialized enterprises

  Traditionally, the entire construction industry in China is dispersed in many economic fields, each of which is administrated by relevant government sectors. Generally, the enterprises may be categorized into construction of building and the construction of civil engineering projects. The former includes the construction of houses, office buildings, hospitals, and other buildings. The latter includes the construction of roads, highways, bridges, hydropower stations, thermo-power stations, nuclear power stations, irrigation works and other infrastructures. Different types of projects are administrated by different government departments. Hence, each of the construction enterprises traditionally possesses specialty in a certain field. But along with the market-driven economy that is growing rapidly in China, construction enterprises have also reformed and diversified to include as many types of projects as possible.

- Delineation between design and construction

  China has a very well established system of design institutes. In 1999, there were nearly 12,572 design institutes that employed 786,370 employees, of whom 612,027 were engineers or designers and the rest were supporting staff (National Bureau of Statistics of China, 2000). About 44 percent of employment in this field is administered by line ministries, with the rest managed by provincial and municipal governments. The need to develop an adequate construction supervision capacity was felt once contracts started to be awarded based on competitive bidding other than on an assignment basis as practised earlier. Traditionally, there is no independent supervisory organization in China's construction industry. From the 1990s, some supervisory-based companies were set up gradually. Many of these companies were off-shoots of state-owned design institutes, especially the larger ones. There are presently 277 A-class supervisory-based companies in China which were registered and approved by the Ministry of Construction of China (Information Center of Ministry of Construction, China 2002). In 2001, the registered supervision engineers in the Ministry of Construction of China numbered 11,330 (Ministry of Construction, China, 2001). Engineering consulting is a new but fast growing field in China. While design institutes still undertake some consulting work, they are not named as consultants in the market place as such.

- Separation of R&D

  Chinese construction enterprises usually do not have R&D departments. A few construction R&D institutes are administrated by the line ministries, while the remaining are managed by provincial or municipal governments. Construction R&D works received relatively low emphasis in China compared with those in

Japan, UK and US. In 2000, R&D expenditure in the construction industry was only RMB 530 million nation-wide, accounting for only 0.6% of the whole country's R&D expenditure. Apart from construction research institutes, most of the design institutes have their own research sections providing some supporting works, which construction enterprises do not have.

8.4.2 Economic return of construction enterprises

The rapid growth of construction output drives the improvement of economic performance of construction enterprises. Table 8.2 shows four economic indexes of construction industry in China, i.e. the labor productivity in terms of the value added amount per capita, ratio of profit to gross output value, profitability in terms of profit per capita and ratio of debt to asset of all construction enterprises. As shown in the table, the labor productivity has increased about 3 times from RMB 6219 per capita in 1993 to RMB 19316 per capita in 2002 with an average increase of 14% per year. The ratio of profit to gross output value decreased from 1.9% in 1993 to 1.2% in 1997 and 1998, and increased thereafter to 2.0% in 2002. This is consistent with the actual fact that a large number of construction projects were undertaken during the mid of 1990s, but severe competition among construction enterprises squeezed out much of the profits. The situation has been improved after the turn of the century due to better regulations enforced in recent years and the more matured market system. The increasing trend of profitability in terms of profit per capita shows a different scenario with that of the ratio of profit to gross output value. This may imply that while the profit generated from the construction production experienced fluctuation during the period, the profit per capita has significantly increased. This is consistent with the trend of labor productivity.

Table 8.2 Scale, economic and technical indexes of construction industry

Year	Scale index		Economic index				Technical index			
	Number of enterprises	Number of employees (10 thousand)	Labor productivity (RMB per capita)	Ratio of Profit to Gross Output Value	Profitability (RMB per capita)	Ratio of debt to asset	Number of Machinery and Equipment Owned (10 000 set)	Value of Machines per Laborer (RMB per capita)	Power of Machines per Laborer (kw per capita)	Ratio of excellent projects
1993	20998	1344	6219	1.9%	477	73.6%	260.8	4105	4.3	38.8%
1994	23315	1446	9144	1.6%	502	78.0%	295.3	3446	4	31.1%
1995	24133	1498	11140	1.3%	495	72.7%	348.3	4264	4.7	32.3%
1996	41364	2122	11337	1.3%	515	74.6%	565	4154	4.6	29.7%
1997	44017	2102	12089	1.2%	523	74.7%	560.5	4729	4.1	29.7%
1998	45634	2030	13350	1.2%	578	74.1%	538.4	5127	4.3	30.3%
1999	47234	2091	14451	1.4%	740	72.9%	611	5756	4.5	31.9%
2000	47518	2097	15929	1.5%	916	71.0%	626	6304	4.6	29.0%
2001	45893	2111	17621	1.9%	1394	66.8%	702.2	7136	4.9	33.0%
2002	47820	2245	19316	2.0%	1649	63.7%	754	9675	4.9	N/A

Source: Calculated based on the data from China Statistic Yearbook (2003)
Note: see Endnote 8.

A problem revealed from Table 8.2 is the high ratio of debt to asset in the construction enterprises. From 1993 to 2000, the debt to asset ratio remained over 70% while it dropped down to 63.7% in 2002. This may imply many Chinese construction enterprises generally have low solvency to debt and therefore have to take considerable financial risks. This is also evident in the actual fact that many construction enterprises are operating under large amount of bank debt and new projects revenues are normally used to refinance the existing projects. The default payment for completed works was one of the causes of the high debt borne by the construction enterprises, and it intensified the problem of solvency of construction firms. In 1996, the total of default payment in construction industry is RMB 136 billion, which is 16.4% of the total construction production in the year. In 1999, the default payment increased to RMB 222.14 billion or 19.9% of the total construction production. Meanwhile, in 1996, the total debt in construction industry is RMB 689.58 billion or 83.3% of total construction production. This figure increased to RMB 1036.78 billion in 1999 or 88.2% of total production (EC, 2002).

8.4.3 Technical level and construction quality

Table 8.2 also shows the technical level and construction quality of China construction industry from 1993 to 2002. Generally, the technical level of construction enterprises has improved and the technological contents in construction works has also increased. This is the result of higher requirement of productivity, higher competition in the industry, and higher requirement from the end users of the construction works during the period. The number of machinery and equipment owned by the construction enterprises increased from 2.6 million units in 1993 to 7.5 million units in 2002 and the value of these machines per laborer also doubled during the same period. This implies that the technical level of construction enterprises has improved both in terms of quantity and quality. However, as revealed by the index of power of machines per laborer, this improvement has not caught up with the increased requirement of productivity in the industry. The index of power of machines per laborer has only slightly increased from 4.3 in 1993 to 4.9 in 2002. This reflects the low efficiency in the industry, and the improvement of technical level in construction enterprises is far less than necessary. The construction quality, in terms of ratio of excellent projects, has not been improved significantly during the period. The ratio of excellent projects remained around 30%. This indicates that the working quality of construction enterprises needs to be improved.

8.4.4 Concentration ratio of construction market

Concentration ratio is an important indicator for the structure of construction industry. In normal market situation, over-competition may create problems for the overall

structure of the industry. Over-competition is normally found in the sectors with low concentration ratio such as the construction industry. Therefore, the analysis on concentration ratio may help to find the problems in the industrial structure, and therefore the structure can be properly adjusted, competition can be regulated on a healthy track, and the efficiency of the whole industry can be improved.

Generally speaking, concentration ratio is a measure of the extent of competition or monopoly power in a market. It is usually measured as the percentage of revenues that belong to the n largest domestic firms in the sector. Hereby, n may be 4, 8, or 10. The larger the concentration ratio, then the more market power the largest firms are likely to possess and, therefore, the less competition in the market. The smaller the concentration ratio, the greater is the amount of competition. Concentration ratio normally has a positive relationship with the profitability of firms. Therefore, the higher concentration ratio may bring a higher average profitability in a sector, and the low concentration ratio may lead to low profitability.

Table 8.3 Concentration ratio of China construction industry

Type of enterprises	Construction enterprises			Corresponding production output		
	Number	%	Accumulated %	Total (RMB 100m)	%	Accumulated %
Class I	1971	2.05%	2.05%	3919.61	31.45%	31.45%
Class II	6445	6.72%	8.77%	2333.82	18.73%	50.18%
Class III	17277	18.01%	26.78%	1992.85	15.99%	66.17%
Class IV	18324	19.10%	45.87%	880.2	7.06%	73.23%
Others	51939	54.13%	100.00%	3336.09	26.77%	100.00%
Total	95956	100.00%			100.00%	

Source: EC (2002)

Table 8.3 shows the relative concentration ratios of China's construction industry. In terms of number of construction enterprises, 1971 Class I construction enterprises as 2.05% of the total number of construction enterprises took the share of 31.45% of total

construction output. Meanwhile, 18324 Class IV construction enterprises (small scale of construction firms) as 54.13% of the total number of construction enterprises took the share of 7.06% of total construction output. In other industrialized countries, generally a small number of very large construction firms and a large number of small scale construction firms take the majority of the market shares. In contrast, a large number of the medium scale construction firms still play a significant role in taking the construction market shares. A comparison with the construction firms in Japan and US may further uncover the issue. As shown in Table 8.4, the concentration ratio of China's construction industry is obviously lower than that of Japan and US. C_4 in China is only 1.08% in 1997, while it is 7.35% in Japan in 1996 and 4.2% in US in 1997. C_{100} in China in 1997 (12.9%) is much lower than that of Japan in 1996 (36.93%), and lower than that of US in the same year (15.21%). This evidently suggests that the low concentration ratio in China's construction industry has impeded the growth of economy of scale in construction enterprises, and caused over-competition in the market, and led to low efficiency and low profitability in the industry.

Table 8.4 Comparison of concentration ratio of construction industry: China, Japan and US

C_n (%)	China		Japan		US
	1993	1997	1994	1996	1997
C_4	1.34	1.08	8.03	7.35	4.2
C_{10}	2.75	2.39	13.6	14.08	6.39
C_{50}	8.79	8.26	28.28	29.98	12.33
C_{100}	14.44	12.9	35.17	36.93	15.21

Source: EC (2002)

8.4.5 Total factor productivity of construction enterprises: a synthetical analysis

As mentioned in previous sections, the major economic indexes of China's construction industry show that the labor productivity of construction industry has increased over the past decade. As known generally, the productivity of an economic sector is determined by various variables, and labor productivity may not be the best indicator. The capital productivity and technical productivity among other variables are all very influential for the overall productivity of the industry. By taking several quantifiable partial factor productivity indicators together, Total Factor Productivity was derived to better reflect the overall productivity of an industry. A detailed explanation of TFP and the mathematical procedure will not be elaborated here for the reason of conciseness, and a brief analysis of the results is presented below.

According to TFP model, the input factors for production include tangible and intangible elements. Tangible factors include the resources of labor, plants, equipments and materials, and intangible factors include the technical level, economy of scale, managerial expertise, efficiency of utilization tangible resources, and others. After deducting the contributed productivity of quantifiable tangible resources from the total production output, the TFP represents the contribution to production from the remaining unquantifiable factors. As a result, TFP provides a synthetical index indicating the productivity sourcing from all other unquantifiable elements in production. Following the empirical procedure outlined in Stigler (1947), Kendrick (1956), Solow (1957), Denison (1962), Abrarnovitz (1956), Griliches and Jorgenson (1966), Jorgenson and Griliches (1967), Chau and Walker (1988) and Gao (2003), the data of major economic statistical indexes of China construction industry were collected for period of 1991-

2002 as shown in Table 8.5. Calculation was done according to the procedure outlined in Chau and Walker (1988) and Gao (2003), and the TFP and VATFP models can be expressed as follows:

TFP model:

$$\ln\frac{T_t}{T_{t-1}} = \frac{S_{m,t}+S_{m,t-1}}{2}\ln\frac{P_{m,t}}{P_{m,t-1}} + \frac{S_{l,t}+S_{l,t-1}}{2}\ln\frac{P_{l,t}}{P_{l,t-1}}$$
$$+\frac{S_{c,t}+S_{c,t-1}}{2}\ln\frac{P_{c,t}}{P_{c,t-1}} + \frac{S_{e,t}+S_{e,t-1}}{2}\ln\frac{P_{e,t}}{P_{e,t-1}}$$
$$-\ln\frac{1-q_t}{1-q_{t-1}} - \ln\frac{P_{o,t}}{P_{o,t-1}}$$

Where t is time period; T is Total production productivity; $S_{i,t}$ is the weight of input element i in the total production output during period t; $P_{i,t}$ is the price of input element i during period t; m, l, c, e, and o represent direct material, labor, capital, other inputs and total output respectively; q is the weight of profit in total output.

Value-Added TFP model:

$$\ln\frac{T'_t}{T'_{t-1}} = \frac{S'_{m,t}+S'_{m,t-1}}{2}\ln\frac{P_{m,t}}{P_{m,t-1}} + \frac{S'_{l,t}+S'_{l,t-1}}{2}\ln\frac{P_{l,t}}{P_{l,t-1}}$$
$$+\frac{S'_{c,t}+S'_{c,t-1}}{2}\ln\frac{P_{c,t}}{P_{c,t-1}} + \frac{S'_{e,t}+S'_{e,t-1}}{2}\ln\frac{P_{e,t}}{P_{e,t-1}}$$
$$-\ln\frac{1-q'_t}{1-q'_{t-1}} - \ln\frac{P_{va,t}}{P_{va,t-1}}$$

Where t is time period; T' is value added total production productivity; $S'_{i,t}$ is the weight of input element i in the value added amount during period t; $P_{i,t}$ is the price of input element i during period t; m, l, c, e, and va represent direct material, labor, capital,

other inputs and value added amount respectively; q' is the weight of profit in value added amount.

Table 8.5 Economic data of China construction industry

Year	Gross Output Value RMB 100 m	Value added of construction RMB 100 m	Wages and welfare payable RMB 100 m	Fixed assets RMB 100 m	Average wages RMB/capita	Cost of construction RMB/m2	Depreciation of Fixed Assets RMB 100 m	Total Profits RMB 100 m
1991	1564.3	464.7	280.2	746.0	2649	437	38.7	28.5
1992	2174.4	614.6	369.4	861.4	3066	557	47.7	46.0
1993	3253.5	835.6	452.6	1069.0	3779	677	53.3	64.7
1994	4653.3	1322.1	658.8	1354.8	4894	797	82.6	72.5
1995	5793.8	1668.6	860.5	1850.8	5785	911	105.5	74.2
1996	8282.3	2405.6	1276.0	2685.9	6249	1111	145.6	109.4
1997	9126.5	2540.5	1284.0	3083.8	6655	1175	165.1	109.9
1998	10062.0	2783.8	1435.0	3380.9	7456	1218	179.6	117.3
1999	11152.9	3022.3	1521.0	3752.7	7982	1152	203.7	154.8
2000	12497.6	3341.1	1690.6	4204.7	8735	1139	211.5	192.1
2001	15361.6	4023.6	1984.9	4951.3	9484	1128	260.3	294.4
2002	18527.2	4698.3	2274.7	6183.8	10279	1184	301.1	370.4

Source: China Statistic Yearbook (1996-2003)

Table 8.6 TFP and Value-added TFP of China's construction industry

Year	TFP	Value-added TFP
1991	100.0	100.0
1992	87.9	94.6
1993	99.5	106.3
1994	93.7	98.0
1995	87.0	89.5
1996	74.5	76.3
1997	70.8	77.5
1998	67.5	78.8
1999	70.7	87.8
2000	72.2	94.6
2001	75.8	97.5
2002	83.1	104.3

Taking the base year of 1991 (TFP and value-added TFP equal to100), the TFP and value-added TFP of China construction industry from 1991-2002 were calculated using the above models and the results are reported in Table 8.6 and Figure 8.5. As shown in Figure 8.5, the overall trend of the total factor productivity of China's construction industry is declining during the study period. The TFP is higher in 1993, and this is consistent with the actual fact that during 1993 the construction of infrastructure and real estate market in China was booming and investment was increased dramatically. As

a result, the overall productivity in construction industry was stimulated significantly. From the mid of 1990s, the TFP of construction industry has been increasing gradually. This implies that the productivity and efficiency in construction industry has been improved, although not at the degree as reflected by the labor productivity. By 2002, the TFP of construction industry was still less that that of the peak period, but a moderate increasing trend can be observed. From the figure one may also notice the differences between the TFP and value-added TFP. Value-added TFP is always higher than TFP. As we known, the value-added is the total output deducted the intermediate input during the production. Hence, the figure suggests that the construction inputs, such as the new construction material, construction technical improvement, and efficiency of construction process, have considerable influence on the total productivity of the industry. The separated movement of TFP and value-added TFP in Figure 8.5 starts from 1996 onwards. This implies that the efficiency in construction process, the utilization of new construction material and technique and the improvement of construction technical level become more important to improve the productivity in construction industry.

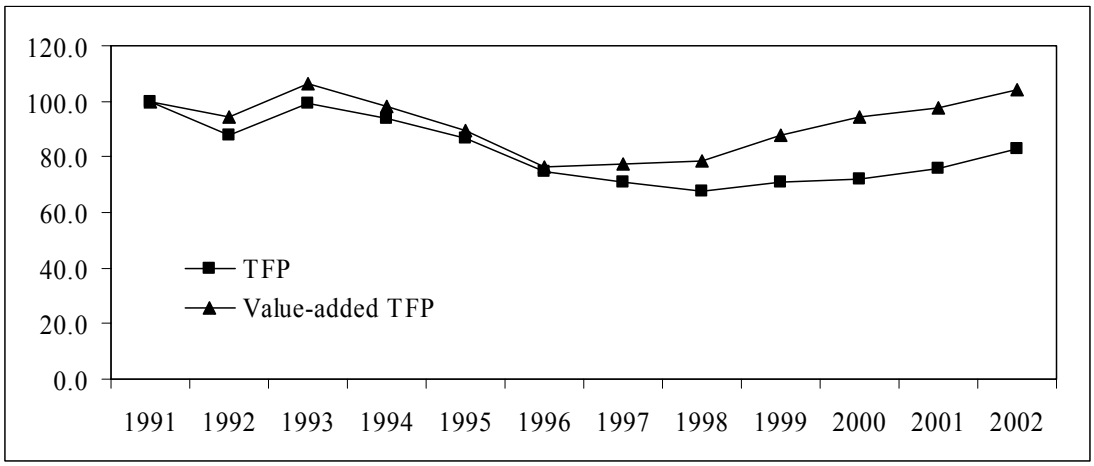


Figure 8.5 TFP and Value-added TFP of China's construction industry

8.4.6 Foreign and other construction enterprises in domestic market

In China's construction industry, there is less proportion of foreign investment involved than that in other economic sectors. This is due to the governmental protection of domestic construction industry, which caters a large number of local labor employments. The foreign construction firms are restricted to contract works in domestic market and can only undertake some types of projects in China. With the entry of WTO, China will further open its construction market to international players after 2005. Although the overall position of foreign construction firms in China is not very significant, but their influences to Chinese construction enterprises are of important. The joint venture between Chinese and foreign firms, the employment of foreign design and consultant firms, and the technological and managerial knowledge transfers between them increasingly influence the Chinese construction enterprises.

Table 8.7 Foreign construction firms in China: 2001

Description	Total	Firms funded from Hong Kong, Macau or Taiwan	Solely owned by Hong Kong, Macau or Taiwan	Foreign funded firms	Solely foreign owned
Number of firms	45,893	622	74	274	16
Number of employees	21,106,600	76,800	5,400	42,900	2,400
Gross output value (RMB 100 million)	15,361.56	102.55	4.35	73.06	2.79
Total profit (RMB 100 million)	294.39	3.76	0.35	2.34	0.11
Profit ratio (%)	1.90%	3.70%	8.00%	3.20%	4.10%
Labor productivity (RMB per capita)	67,275	101,699	67,502	115,996	88,191
Value of Machines per laborer (RMB per capita)	7,136	10,257	12,620	13,758	8,167
Ratio of excellent projects	33.30%	23.40%	60.00%	37.90%	40.30%

Source: China Statistic Yearbook (2002)

A detail of foreign construction firms in China is shown in Table 8.7. In 2001, the foreign firms, including firms funded from Hong Kong, Macau or Taiwan, solely owned by Hong Kong, Macau or Taiwan, foreign funded firms and solely foreign owned firms, took very minor proportion of the whole construction market share in terms of the number of firms (1.9%) and employees (0.57%), and the production output

(1.2%). The majority of the non-indigenous construction firms in mainland are from Hong Kong, Macau and Taiwan. Although the foreign firms took a less share of market, they achieved higher profitability on construction works than the local enterprises. The labor productivity of foreign firms is also very high comparing with the local firms. The labor productivity of firms of joint venture between Chinese and foreign partners are almost double of that of the local firms. The technical level of foreign firms, as reflected by the value of machinery per labor, is also much higher than that of local firms.

Chapter Nine

COMPETITIVE ADVANTAGES OF CHINESE CMNCS IN DOMESTIC MARKET

9.1 Introduction

This chapter focuses on the analysis of competitive advantages of Chinese large construction firms in domestic construction market. The analysis adopts the similar empirical procedure as set out in section 6.1 with the data from fieldworks regarding domestic market. The profile of samples refers to the descriptive analysis in section 6.2. This Chapter is also structured according to the OLI framework with various statistical techniques.

The large Chinese CMNCs contract differently in terms of the types of project and services in domestic construction market compared with those in international market. The 31 sample firms provide a general picture in this aspect as shown in Table 9.1.

As shown in Table 9.1, the projects undertaken by the Chinese CMNCs in domestic market are mainly the projects funded by central government, local governments including provincial, municipal and other local agents, which account for about two thirds of the total projects. The following categories are the projects funded by foreign private sectors and by international financing institutions. In terms of services, Chinese CMNCs mainly provide the services of construction works and design works. The other major works include supply and installation of construction machinery and equipment, labor services and project feasibility studies. Consultancy works, project financing and operation and maintenance works take fewer portions. In actual fact, the consultancy

works in domestic market are separately contracted with the supervision firms or design institutes, and the operation and maintenance works are also directly controlled by the clients with less involvement with construction firms except that during defects liability period.

Table 9.1 Types of project and service provided by Chinese CMNCs in domestic market

Q.No.	Types of project undertaken in terms of project funding	Frequency	%
1.1.1	Projects funded by local governments including provincial and municipal and other local agencies	31	33.0%
1.1.2	Projects funded by foreign private sectors	13	13.8%
1.1.3	Projects funded by central government	31	33.0%
1.1.4	Projects initiated by international financing institutions (World Bank, Asian Development Bank, etc)	12	12.8%
1.1.5	Projects funded by Non-Government Organizations (NGO)	4	4.3%
1.1.6	Others (e.g. funded by the firm)	3	3.2%
	Total	94	100.0%
Q.No.	Types of services provided	Frequency	%
1.2.1	Project feasibility studies	12	9.8%
1.2.2	Design works	20	16.4%
1.2.3	Construction works	31	25.4%
1.2.4	Consultancy works	9	7.4%
1.2.5	Project financing	6	4.9%
1.2.6	Labor service	13	10.7%
1.2.7	Supply of construction material	5	4.1%
1.2.8	Supply and installation of construction machinery and equipment	14	11.5%
1.2.9	Operation and maintenance	9	7.4%
1.2.10	Others	3	2.5%
	Total	122	100.0%

9.2 Incentives of regionalization in domestic market

"Regionalization" in this Chapter refers to Chinese CMNCs expanding their contracting works in different regions in China. The normal organizational structure of CMNCs follows a top-down "tree style", i.e. with the headquarter in a major city (Beijing, Shanghai, etc.) and several subsidiaries or branches in different provinces. The key incentives of regionalization in domestic market were found in the fieldwork, as presented in Table 9.2.

Table 9.2 Key incentives of Chinese CMNCs undertaking domestic works

Q. No.	Incentives	Mean	SD	t test	
				t	Sig.
2.1.1	To improve profits	4.58	0.62	14.18	0.000**
2.1.2	To diversify business risks	2.45	0.89	-3.44	0.999
2.1.3	To maintain a better cash and/or capital flow for the firm as a whole	3.84	1.00	4.65	0.000**
2.1.4	To increase the shares in domestic market	3.45	0.81	3.10	0.002**
2.1.5	To alleviate the pressure from competition in the market and explore new market	2.97	0.87	-0.21	0.581
2.1.6	To be invited by joint venture partners or other partners to venture into new market	2.84	1.24	-0.72	0.763
2.1.7	To be invited by the local government	2.23	0.72	-6.01	1.000
2.1.8	To utilize surplus capacity, i.e. employment, machinery, capital, etc.	2.61	0.95	-2.26	0.984
2.1.9	To maintain existing business involvement and to continue to develop in various regions in China	3.52	0.89	3.23	0.001**

Note: **p<0.01(1-tailed)

As expected, the most important incentives to regionalize is to improve profits, and the other three incentives, i.e. to maintain a better cash flow for the firm as a whole, to increase the shares in domestic market and to maintain existing business involvement and to continue to develop in various regions, are also regarded importantly. All these four factors are significant statistically at level of 0.01. The results also suggest that the risk management is not generally paid attention in the firms.

Table 9.3 Variation of regionalization incentives according to OLI+S indexes

No.	High O vs. Low O		High L vs. Low L		High I vs. Low I		High S vs. Low S	
	Spearman's rho	Sig.	Spearman's rho	Sig.	Spearman's rho	Sig.	Spearman's rho	Sig.
2.1.1	0.918	0.028*	0.918	0.028*	0.918	0.028*	1.000	0.000**
2.1.2	0.711	0.179	0.872	0.054	0.821	0.089	0.973	0.005**
2.1.3	0.811	0.096	0.564	0.322	0.368	0.542	0.344	0.571
2.1.4	0.821	0.089	0.816	0.092	0.872	0.054	0.900	0.037*
2.1.5	0.684	0.203	0.895	0.040*	0.973	0.005**	0.811	0.096
2.1.6	0.667	0.219	0.667	0.219	-0.616	0.269	0.574	0.312
2.1.7	0.895	0.040*	0.973	0.005**	1.000	0.000**	0.895	0.040*
2.1.8	0.763	0.133	0.872	0.054	0.921	0.026*	0.500	0.391
2.1.9	0.800	0.104	0.718	0.172	0.718	0.172	0.667	0.219

Note: *p<0.05(2-tailed), **p<0.01(2-tailed)

Different views regarding the incentives were received from the different firms according to their OLI+S indexes. The calculated Spearman's ranking-order correlation coefficients are presented in Table 9.3. Among the important factors, "to improve

profits" was regarding similarly regardless of the firms' OLI+S indexes, while the factors 2.1.3, 2.1.4 and 1.1.9 were ranked differently by the firms with high or low indexes. This may possibly imply that the firms with different degrees of specialization and ownership structure have different incentives (2.1.4 and 2.1.9) in regionalizing their business in the domestic market. In other words, the ownership structure and the specialty of the firms may influence the objectives of their regionalization in market.

9.3 Ownership factors of Chinese CMNCs in domestic market

The ownership advantages of Chinese CMNCs in domestic market are designed to have two parts: the firm specific ownership factors and the national specific ownership factors. Each part includes the analysis of Chinese CMNCs vs. foreign contractors and Chinese CMNCs vs. local contractors. The factors used in the study were derived from literature as well as the practice in Chinese domestic construction market.

9.3.1 Firm specific ownership factors: Chinese CMNCs vs. foreign contractors

Fourteen firm specific ownership factors were examined and evaluated by the respondents. Each of the factors may be regarded as advantages or disadvantages following a Likert scale of 1 to 7 from very significant disadvantages to very significant advantages. The results are presented in Table 9.4.

All of the one-way Chi-square tests suggest significant results at level of 5% or 10%. This implies that the possibility of the responses resulting from chance factors is less. The t-statistics show that the Chinese CMNCs have significant advantages on the following areas compared with foreign contractors in domestic market:

Table 9.4 Firm specific ownership factors: Chinese CMNCs vs. foreign contractors

Q. No.	Factors	Mean	SD	Chi-square		t test		
				Chi square	Sig.	t	Sig. (1-tailed: lower)	Sig. (1-tailed: upper)
2.2.a.1	Technological and R&D capacity	2.61	1.05	27.94	0.000	-7.32	0.000**	1.000
2.2.a.2	Business development capacity	5.65	1.38	23.87	0.001	6.64	1.000	0.000**
2.2.a.3	Product diversification	3.84	1.27	21.16	0.002	-0.71	0.242	0.758
2.2.a.4	Firm's reputation	4.52	1.46	13.94	0.030	1.97	0.971	0.029*
2.2.a.5	Size of the firm	5.26	1.09	34.26	0.000	6.40	1.000	0.000**
2.2.a.6	Experience and knowledge about the local construction market	5.90	1.42	-	0.000	7.45	1.000	0.000**
2.2.a.7	Accessibility to financial resources	3.90	1.58	18.00	0.006	-0.34	0.368	0.632
2.2.a.8	Accessibility to technical resources	4.65	1.43	12.13	0.059	2.52	0.991	0.009**
2.2.a.9	Accessibility to construction machinery and materials	4.42	1.31	16.65	0.011	1.78	0.957	0.043*
2.2.a.10	Management expertise	3.55	1.46	12.13	0.059	-1.73	0.047*	0.953
2.2.a.11	Marketing and project securing capability	4.71	1.49	35.61	0.000	2.66	0.994	0.006**
2.2.a.12	Networking flexibility of headquarter and domestic branches	5.19	1.72	15.74	0.015	3.86	1.000	0.000**
2.2.a.13	Working quality and Total Quality Management capability	3.90	1.72	11.68	0.070	-0.31	0.378	0.622
2.2.a.14	Lower costs in production compared with other competitors	5.74	1.26	36.52	0.000	7.67	1.000	0.000**

Note: *p<0.05(1-tailed), **p<0.01(1-tailed)

- Business development capacity
- Size of the firm
- Experience and knowledge about the local construction market
- Accessibility to technical resources
- Marketing and project securing capability
- Networking flexibility of headquarter and domestic branches
- Lower costs in production compared with other competitors

As the hosts in domestic market, Chinese CMNCs may have these advantages in domestic market despite their technical level may be lower than their foreign counterparts. Their disadvantages are technological and research & development capacity, and the management expertise compared with foreign contractors. Variation analysis of firm specific ownership factors is presented in Table 9.5. Results indicate that:

- For different ownership indexes of the firms, they viewed the factors of 2.2.a.5, 2.2.a.6, 2.2.a.9 and 2.2.a.14 as advantages similarly, while they viewed other factors differently. Especially, they viewed the factors of 2.2.a.1 (technological and R&D capacity), 2.2.a.3 (product diversification) and 2.2.a.10 (management expertise) very differently, and this may imply that the companies having different ownership shares in domestic market (as indicated by O index) may vary their views on the importance of technological capacity and their strategies of production diversification.
- The firms with different specialty indexes shared similar views on 2.2.a.1, 2.2.a.7 and 2.2.a.9. The most consentaneous factor they viewed is the disadvantage of technological and R&D capacity compared with foreign contractors. This is consistent with the argument mentioned in Chapter 8, that most of the Chinese construction firms do not pay much attention on R&D.
- Firms with different L indexes viewed 2.2.a.1 and 2.2.a.5 similarly, and those with different I indexes viewed 2.2.a.1 and 2.2.a.12 similarly. They viewed other factors differently.

A relationship analysis of the factors is conducted using Pearson's correlation coefficients and the p-values are presented in Table 9.6. It is found in this analysis that factors 2.2.a.2, 2.2.a.4 and 2.2.a.6 are significantly correlated together. This implies that the experience and knowledge about the local construction market significantly influences the firm's business development capacity, as well as the firm's reputation. In addition, the product diversification is related with the firm's accessibility to financial resources.

Table 9.5 Variation analysis of firm specific ownership factors: CMNCs vs. foreign contractors

No.	High O vs. Low O		High L vs. Low L		High I vs. Low I		High S vs. Low S	
	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)
2.2.a.1	0.451	0.309	0.886	0.008**	0.963	0.000**	0.903	0.005**
2.2.a.2	0.724	0.066	0.240	0.604	-0.216	0.642	0.348	0.444
2.2.a.3	0.440	0.323	0.381	0.399	0.248	0.592	0.000	1.000
2.2.a.4	0.698	0.081	0.645	0.118	0.253	0.584	0.538	0.213
2.2.a.5	0.963	0.001**	0.917	0.004**	0.699	0.081	0.734	0.061
2.2.a.6	0.766	0.045*	0.657	0.109	0.584	0.169	0.421	0.346
2.2.a.7	0.736	0.059	0.491	0.263	0.510	0.242	0.796	0.032*
2.2.a.8	0.746	0.054	0.146	0.755	0.362	0.425	0.308	0.502
2.2.a.9	0.827	0.022*	0.565	0.186	0.302	0.510	0.822	0.023*
2.2.a.10	0.396	0.379	0.587	0.166	0.657	0.109	0.617	0.140
2.2.a.11	0.596	0.158	0.734	0.061	0.602	0.153	0.602	0.153
2.2.a.12	0.667	0.102	0.481	0.274	0.913	0.004**	0.000	1.000
2.2.a.13	0.638	0.123	0.539	0.212	0.663	0.104	0.583	0.170
2.2.a.14	0.972	0.000**	0.743	0.056	0.732	0.061	0.716	0.071

Note: *p<0.05, **p<0.01

Table 9.6 Correlation analysis of firm specific ownership factors: CMNCs vs. foreign contractors

Q. No.	2.2.a.1	2.2.a.2	2.2.a.3	2.2.a.4	2.2.a.5	2.2.a.6	2.2.a.7	2.2.a.8	2.2.a.9	2.2.a.10	2.2.a.11	2.2.a.12	2.2.a.13	2.2.a.14
2.2.a.1	-	0.93	0.59	0.66	0.34	0.54	0.13	0.66	0.60	0.07	0.28	0.74	0.24	0.70
2.2.a.2		-	0.49	0.52	0.19	0.01*	0.74	0.31	0.51	0.66	0.21	0.49	0.60	0.17
2.2.a.3			-	0.46	0.09	0.80	0.05*	0.90	0.27	0.98	0.36	0.36	0.84	0.52
2.2.a.4				-	0.49	0.00**	0.46	0.69	0.08	0.26	0.72	0.67	0.30	0.64
2.2.a.5					-	0.19	0.70	0.83	0.96	0.41	0.64	0.60	0.72	0.52
2.2.a.6						-	0.51	0.21	0.76	0.46	0.35	0.92	0.39	0.44
2.2.a.7							-	0.17	0.59	0.26	0.55	0.87	0.88	0.58
2.2.a.8								-	0.22	0.93	0.20	0.78	0.34	0.05
2.2.a.9									-	0.79	0.77	0.97	0.33	0.49
2.2.a.10										-	0.05	0.98	0.91	0.97
2.2.a.11											-	0.08	0.18	0.73
2.2.a.12												-	0.24	0.14
2.2.a.13													-	0.45
2.2.a.14														-

Note: The table presents the p-values of the corresponding Pearson's correlation coefficients of the pair factors.
*p<0.05, **p<0.01

9.3.2 Firm specific ownership factors: Chinese CMNCs vs. local contractors

The firm specific ownership factors regarding the Chinese CMNCs vs. local contractors are analyzed following the similar procedure, and the advantages and disadvantages are identified as in Table 9.7.

Table 9.7 Firm specific ownership factors: Chinese CMNCs vs. foreign contractors

No.	Factors	Mean	SD	Chi-square		T test		
				Chi square	Sig.	t	Sig. (1-tailed: lower)	Sig. (1-tailed: lower)
2.2.b.1	Technological and R&D capacity	4.32	1.28	25.23	0.000	1.41	0.915	0.085
2.2.b.2	Business development capacity	5.55	1.21	23.42	0.001	7.14	1.000	0.000**
2.2.b.3	Product diversification	4.06	1.09	18.90	0.004	0.33	0.628	0.372
2.2.b.4	Firm's reputation	5.94	1.36	22.97	0.001	7.90	1.000	0.000**
2.2.b.5	Size of the firm	5.61	1.41	20.71	0.002	6.38	1.000	0.000**
2.2.b.6	Experience and knowledge about the local construction market	4.19	1.68	27.94	0.000	0.64	0.737	0.263
2.2.b.7	Accessibility to financial resources	6.35	0.98	-	0.000	13.31	1.000	0.000**
2.2.b.8	Accessibility to technical resources	6.16	1.07	24.32	0.000	11.27	1.000	0.000**
2.2.b.9	Accessibility to construction machinery and materials	4.65	1.28	10.32	0.112	2.81	0.996	0.004**
2.2.b.10	Management expertise	5.29	1.10	-	0.000	6.52	1.000	0.000**
2.2.b.11	Marketing and project securing capability	4.23	1.23	-	0.000	1.02	0.842	0.158
2.2.b.12	Networking flexibility of headquarter and domestic branches	5.29	1.22	16.65	0.011	5.91	1.000	0.000**
2.2.b.13	Working quality and Total Quality Management capability	5.55	1.06	36.52	0.000	8.14	1.000	0.000**
2.2.b.14	Lower costs in production compared with other competitors	4.81	1.08	21.16	0.002	4.17	1.000	0.000**

Note: *p<0.05(1-tailed), **p<0.01(1-tailed)

The one-way Chi-square tests suggest all significant results at level of 5% or 10% except for 2.2.b.9. This may imply that the possibility of the responses resulting from chance factors is less. The t-statistics show that the Chinese CMNCs have the following significant advantages compared with local contractors in domestic market:

- Business development capacity
- Firm's reputation
- Size of the firm
- Accessibility to financial resources
- Accessibility to technical resources
- Accessibility to construction machinery and materials
- Management expertise
- Networking flexibility of headquarter and domestic branches
- Working quality and Total Quality Management capability

- Lower costs in production compared with other competitors

As perceived, the large construction firms generally considered they had overwhelming advantages over the local domestic contractors. Compared with other local contractors, the CMNCs have very significant advantages on the firm's reputation, size effect of the firm and the accessibility to financial resources and technical resources. They do not have disadvantage when competing with the local contractors. Variation analysis of firm specific ownership factors is presented in Table 9.8. Results are discussed as follows:

- Firms with different ownership indexes viewed the factors of 2.2.b.2, 2.2.b.4, 2.2.b.8, 2.2.b.9, 2.2.b.13 and 2.2.b.14 as advantages similarly, while they viewed other factors differently. It is useful to note that firms with different ownership indexes varied their views on size effect of firms and the importance of accessibility to financial resources. This can be explained as that the higher O indexes may possibly imply the firms have higher financial capacity or their own access to financial sources, and therefore they may consider the accessibility differently. The factors “experience and knowledge about local construction market” and “marketing and project securing capability” are viewed most differently, although these two factors are deemed as neither advantages nor disadvantages. This implies the importance of marketing strategy has not become an agreement among the construction firms, i.e. some firms have realized the importance of marketing in construction market, and others have not.
- The firms with different specialty indexes shared similar views on 2.2.b.2, 2.2.b.3, 2.2.b.4, 2.2.b.8, 2.2.b.9, 2.2.b.13, and 2.2.b.14. The size effect of firms

and the local market knowledge and experiences are viewed very differently. This may be because of the different requirement on local market information due to the specialty of the works. General building works may require more local knowledge while very specialized works such as power station and petroleum works may need focus more on the regional or national level of business environment.

- Firms with different L indexes viewed 2.2.b.5, 2.2.b.7, 2.2.b.8, 2.2.b.12 and 2.2.b.14 similarly, and those with different I indexes viewed 2.2.b.8, 2.2.b.11 and 2.2.b.14 similarly. They viewed other factors differently.

Table 9.8 Variation analysis of firm specific ownership factors: CMNCs vs. local contractors

No.	High O vs. Low O		High L vs. Low L		High I vs. Low I		High S vs. Low S	
	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)
2.2.b.1	0.421	0.347	0.577	0.175	0.667	0.102	0.577	0.175
2.2.b.2	0.833	0.020*	0.732	0.062	0.465	0.293	0.762	0.046*
2.2.b.3	0.972	0.000**	0.629	0.130	0.638	0.123	0.913	0.004**
2.2.b.4	0.991	0.000**	0.516	0.236	0.369	0.415	0.777	0.040*
2.2.b.5	0.687	0.088	0.907	0.005**	0.730	0.062	0.400	0.374
2.2.b.6	0.287	0.533	0.321	0.483	0.387	0.391	0.412	0.359
2.2.b.7	0.586	0.167	0.755	0.050*	0.586	0.167	0.634	0.126
2.2.b.8	0.971	0.000**	0.961	0.001**	0.874	0.010*	0.912	0.004**
2.2.b.9	0.827	0.022*	0.545	0.206	0.667	0.101	0.760	0.047*
2.2.b.10	0.723	0.067	0.462	0.297	0.577	0.175	0.490	0.264
2.2.b.11	0.569	0.183	0.542	0.209	0.774	0.041*	0.701	0.079
2.2.b.12	0.750	0.052	0.814	0.026*	0.422	0.346	0.759	0.048*
2.2.b.13	0.830	0.021*	0.485	0.269	0.637	0.124	0.854	0.014*
2.2.b.14	0.793	0.034*	0.906	0.005**	0.778	0.039*	0.831	0.021*

Note: *p<0.05, **p<0.01

Several close relationships among the firm specific factors of Chinese CMNCs when compared with local contractors may be found in Table 9.9. Practically, the significant relationship between 2.2.b.10 and 2.2.b.13 may imply the important impact of management expertise on working quality and the total quality management capacity of the firms. On the other hand, the firm' reputation closely linked with the size of the firm in domestic construction market. This is consistent with the general view that the big

firms always have good reputation, although this argument may not be always correct in actual fact.

Table 9.9 Correlation analysis of firm specific ownership factors: CMNCs vs. local contractors

Q. No.	2.2.b.1	2.2.b.2	2.2.b.3	2.2.b.4	2.2.b.5	2.2.b.6	2.2.b.7	2.2.b.8	2.2.b.9	2.2.b.10	2.2.b.11	2.2.b.12	2.2.b.13	2.2.b.14
2.2.b.1	-	0.27	0.58	0.16	0.19	0.36	0.29	0.40	0.63	0.89	0.22	0.64	0.55	0.03*
2.2.b.2		-	0.35	0.51	0.49	0.17	0.37	0.25	0.42	0.60	0.32	0.04*	0.55	0.04*
2.2.b.3			-	0.11	0.03*	0.46	0.12	0.92	0.87	0.21	0.01*	0.12	0.28	0.83
2.2.b.4				-	0.00**	0.84	0.00**	0.10	0.29	0.13	0.26	0.35	0.00**	0.31
2.2.b.5					-	0.56	0.28	0.90	0.71	0.14	0.86	0.80	0.00**	0.22
2.2.b.6						-	0.27	0.08	0.73	0.20	0.58	0.91	0.94	0.19
2.2.b.7							-	0.08	0.56	0.19	0.33	0.39	0.02*	0.75
2.2.b.8								-	0.31	0.41	0.02*	0.83	0.72	0.35
2.2.b.9									-	0.51	0.61	0.93	0.69	0.69
2.2.b.10										-	0.43	0.16	0.00**	0.18
2.2.b.11											-	0.03*	0.40	0.53
2.2.b.12												-	0.67	0.29
2.2.b.13													-	0.96
2.2.b.14														-

Note: The table presents the p-values of the corresponding Pearson's correlation coefficients of the pair factors
*p<0.05, **p<0.01

9.3.3 Country specific ownership factors: Chinese CMNCs vs. foreign contractors

The country specific ownership factors regarding the Chinese CMNCs vs. foreign contractors are identified, and the Chinese CMNCs' advantages and disadvantages are presented in Table 9.10.

The one-way Chi-square tests suggest all results are significant at level of 5% or 10%. This may imply that the possibility of the responses resulting from chance factors is less. The t-statistics show that the Chinese CMNCs have the following significant country specific advantages compared with foreign contractors in domestic market:

- Size and growth of the domestic construction market in China
- Central government's close relationship with the provincial and local governments
- Support from the financial sector and banking system at central government level

- Availability of professionals from other regions in China

Table 9.10 Country specific ownership factors: Chinese CMNCs vs. foreign contractors

No.	Factors	Mean	SD	Chi-square		T test		
				Sig.	Chi square	t	Sig. (1-tailed: Lower)	Sig. (1-tailed: Upper)
2.3.a.1	Size and growth of the domestic construction market in China	5.61	1.05	26.581	0.00	8.52	1.000	0.000**
2.3.a.2	Central government assistance and incentives on contracting in different regions in China	4.26	1.63	11.677	0.07	0.88	0.807	0.193
2.3.a.3	Central government's close relationship with the provincial and local governments	5.16	1.37	15.290	0.02	4.72	1.000	0.000**
2.3.a.4	Support from the financial sector and banking system at central government level	5.39	1.71	18.000	0.01	4.53	1.000	0.000**
2.3.a.5	Availability of professionals from other regions in China	4.55	1.26	25.226	0.00	2.42	0.989	0.011*
2.3.a.6	Availability of low-cost workers from other regions in China	3.94	1.15	25.226	0.00	(0.31)	0.379	0.621
2.3.a.7	Availability of low-cost machinery and materials from other regions in China	4.26	1.39	13.032	0.04	1.03	0.845	0.155

Note: *p<0.05(1-tailed), **p<0.01(1-tailed)

The fast economic growth in China provides boom in construction market, and the large size and growth of domestic construction market may offer good advantages for Chinese CMNCs at home. As is well known, the relationship with governments plays a significant role when doing business in China. The support from the financial sector and banking system at central government level may be one of the privileges possessed by the large construction firms when compared with foreign contractors. The large firms may easily mobilize human resources such as the professionals from other regions where they have business operations. From the fieldwork, the respondents do not think they have country specific disadvantage when competing with the foreign contractors in domestic market.

Table 9.11 Variation analysis of country specific ownership factors: CMNCs vs. foreign contractors

Q. No	High O vs. Low O		High L vs. Low L		High I vs. Low I		High S vs. Low S	
	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)
2.3.a.1	0.641	0.121	0.728	0.064	0.882	0.009**	0.871	0.011*
2.3.a.2	0.453	0.307	0.591	0.163	0.476	0.280	0.208	0.655
2.3.a.3	0.467	0.291	0.299	0.515	-0.095	0.839	0.705	0.077
2.3.a.4	0.841	0.018*	0.761	0.047*	0.217	0.641	0.718	0.069
2.3.a.5	0.679	0.093	0.292	0.524	0.651	0.113	0.769	0.043*
2.3.a.6	0.870	0.011*	0.505	0.248	0.314	0.493	0.785	0.036*
2.3.a.7	0.444	0.318	0.305	0.506	0.582	0.171	0.557	0.194

Note: *p<0.05, **p<0.01

Variation analysis of country specific ownership factors is presented in Table 9.11. Results are discussed as follows:

- Firms with different ownership indexes viewed the factor of 2.3.a.4 as advantages similarly, and this indicates the importance of financial support for the large firms from central government level. They viewed other factors differently. It is interesting to find that the firms viewed factor "central government assistance and incentives on contracting in different regions in China" very differently, although this factor is neither an advantage nor a disadvantage. This may possibly indicate that the assistance from the central government for different firms may differ.
- The firms with different specialty indexes shared similar views on 2.3.a.1, 2.3.a.5 and 2.3.a.6. This indicates that the mobilization of human resources including professionals or common workers across different regions in China is not a problem for both the specialized and non-specialized firms. This conforms to the actual fact that the human resources flowing across the construction markets in different regions in China make up a large portion of the non-resident people.

From the correlation analysis (Table 9.12) of the country specific ownership factors of Chinese CMNCs comparing with foreign contractors, the only close relationship is

found between the factors of 2.3.a.2 and 2.3.a.4. This may possibly indicate that the major assistance from central government to CMNCs is the support from the financial sector and banking system at central government level.

Table 9.12 Correlation analysis of country specific ownership factors: CMNCs vs. foreign contractors

Q. No.	2.3.a.1	2.3.a.2	2.3.a.3	2.3.a.4	2.3.a.5	2.3.a.6	2.3.a.7
2.3.a.1	-	0.844	0.258	0.645	0.938	0.580	0.913
2.3.a.2		-	0.270	0.048*	0.580	0.271	0.871
2.3.a.3			-	0.100	0.336	0.793	0.469
2.3.a.4				-	0.962	0.401	0.827
2.3.a.5					-	0.382	0.110
2.3.a.6						-	0.696
2.3.a.7							-

Note: The table presents the p-values of the corresponding Pearson's correlation coefficients of the pair factors

9.3.4 National specific ownership factors: Chinese CMNCs vs. local contractors

Table 9.13 shows the national specific ownership factors regarding Chinese CMNCs comparing with the foreign contractors. The one-way Chi-square tests suggest all results are significant at level of 5%. The t-statistics show that the Chinese CMNCs have the following significant national specific advantages compared with local contractors in domestic market:

- Central government assistance and incentives on contracting in different regions in China
- Central government's close relationship with the provincial and local governments
- Support from the financial sector and banking system at central government level
- Availability of professionals from other regions in China
- Availability of low-cost workers from other regions in China
- Availability of low-cost machinery and materials from other regions in China

Table 9.13 National specific ownership factors: Chinese CMNCs vs. local contractors

Q. No.	Factors	Mean	SD	Chi-square		T test		
				Sig.	Chi square	t	Sig. (1-tailed: Lower)	Sig. (1-tailed: Upper)
2.3.b.1	Size and growth of the domestic construction market in China	4.10	0.65	-	0.00	0.83	0.793	0.207
2.3.b.2	Central government assistance and incentives on contracting in different regions in China	4.77	1.12	32.90	0.00	3.86	1.000	0.000**
2.3.b.3	Central government's close relationship with the provincial and local governments	4.71	0.94	-	0.00	4.21	1.000	0.000**
2.3.b.4	Support from the financial sector and banking system at central government level	6.35	0.75	-	0.00	17.37	1.000	0.000**
2.3.b.5	Availability of professionals from other regions in China	5.52	1.12	31.10	0.00	7.53	1.000	0.000**
2.3.b.6	Availability of low-cost workers from other regions in China	5.52	1.06	26.13	0.00	7.96	1.000	0.000**
2.3.b.7	Availability of low-cost machinery and materials from other regions in China	5.23	1.12	26.58	0.00	6.11	1.000	0.000**

Note: **p<0.01(1-tailed)

In fact, all factors except 2.3.b.1 are considered as advantages by CMNCs when they compete with local contractors. This is evident that both of the CMNCs and the local contractors may share the economic impact of the fast growing national economy and the booming construction market, therefore this factor is not a distinguished advantage for the CMNCs.

Table 9.14 Variation analysis of national specific ownership factors: CMNCs vs. local contractors

No	High O vs. Low O		High L vs. Low L		High I vs. Low I		High S vs. Low S	
	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)
2.3.b.1	0.900	0.006**	0.630	0.129	0.836	0.019*	0.930	0.002**
2.3.b.2	0.755	0.050*	0.491	0.264	0.577	0.175	0.702	0.078
2.3.b.3	0.923	0.003**	0.913	0.004**	0.753	0.051	0.913	0.004**
2.3.b.4	0.745	0.054	0.836	0.019*	0.885	0.008**	1.000	0.000**
2.3.b.5	0.886	0.008**	0.676	0.096	0.850	0.015*	0.860	0.013*
2.3.b.6	0.906	0.005**	0.716	0.071	0.692	0.085	0.602	0.153
2.3.b.7	0.762	0.046*	0.838	0.018*	0.887	0.008**	0.906	0.005**

Note: *p<0.05, **p<0.01

The variation analysis of national specific ownership advantages the CMNCs possess over their local counterparts is presented in Table 9.14. The results are discussed as follows:

- Firms with different ownership indexes viewed only the factor of 2.3.b.4 as advantages differently, while all other factors are viewed similarly. This may possibly indicate that the support from the financial sector and banking system at central government level for different firms may vary when the firms possess different ownership indexes.
- The firms with different specialty indexes shared similar views on 2.3.b.1, 2.3.b.3, 2.3.b.4, 2.3.b.5 and 2.3.b.7. This indicates similar situation as analyzed in previous section, that the mobilization of resources including the government assistance, capitals, the professionals, machinery and materials, across different regions in China is of an advantage for both the specialized and non-specialized firms.

In the correlation analysis (Table 9.15) of the national specific ownership factors of Chinese CMNCs comparing with local contractors, the close relationship between the factors of 2.3.b.1, 2.3.b.2 and 2.3.b.4 is of practical interest. This may indicate that the possible causal relationship between the booming construction market and the government policy direction. Furthermore, the government assistance and incentives in construction sector may be reflected in the financial support and helps from the banking system at central government level. This is consistent with the analysis in previous section.

Table 9.15 Correlation analysis of national specific ownership factors: CMNCs vs. local contractors

Q. No.	2.3.b.1	2.3.b.2	2.3.b.3	2.3.b.4	2.3.b.5	2.3.b.6	2.3.b.7
2.3.b.1	-	0.027*	0.254	0.021*	0.177	0.708	0.681
2.3.b.2		-	0.120	0.064	0.020*	0.508	0.821
2.3.b.3			-	0.961	0.063	0.056	0.306
2.3.b.4				-	0.724	0.025*	0.239
2.3.b.5					-	0.159	0.344
2.3.b.6						-	0.486
2.3.b.7							-

Note: The table presents the p-values of the corresponding Pearson's correlation coefficients of the pair factors.

9.4 Locational factors of Chinese CMNCs in domestic market

As viewed in the eclectic paradigm, locational factors are as important as the ownership and internalization factors in OLI framework. Similarly with the analysis in Chapter 6, the locational factors considered by Chinese CMNCs in domestic construction market are structured into two groups: the firm specific locational factors and the regional specific locational factors. The firm specific factors are directly related with the firm's operation in domestic market, while the regional specific locational factors are those originated from the regional environment where the firm works.

According to the status of economic development, China domestic market is generally divided into the following four major regions (Figure 9.1):

- Capital city region, including Beijing, Tianjin and Hebei;
- Eastern economic region, including Shanghai, Jiangsu, Zhejiang, Liaoning, Fujian, Shandong, Guangdong and Hainan;
- Middle economic region, including Shanxi, Jilin, Heilongjiang, Anhui, Jiangxi, Henan, Hubei, Hunan;
- Western economic region, including Chongqing, Sichuan, Guizhou, Yunnan, Tibet, Shanxi, Gansu, Qinghai, Ningxia, Xinjiang, Guangxi and Inner Mongolia.

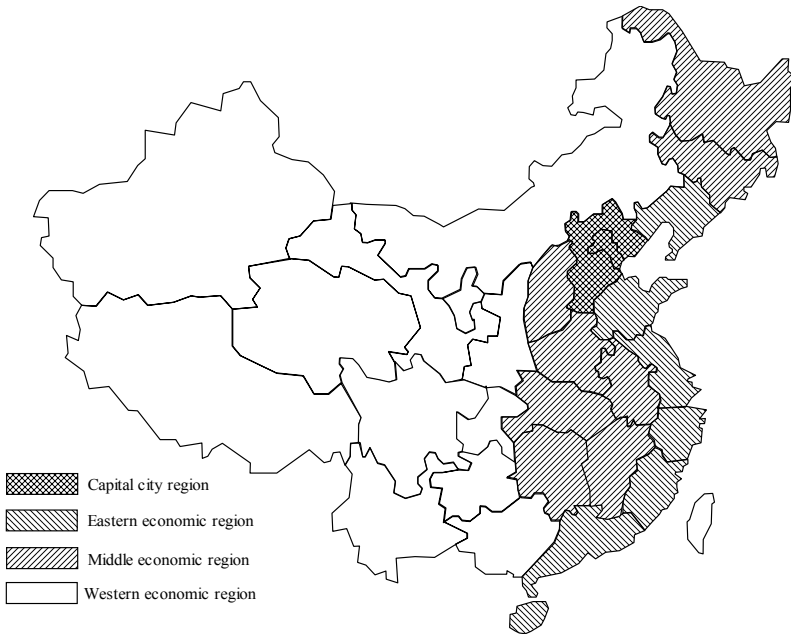


Figure 9.1 Four economic regions of China domestic market

Most of the CMNCs work national-wide in domestic market; however, they may strategically focus on certain areas. Figure 9.2 shows the locational distribution of the sample firms in terms of the major locations for their domestic works.

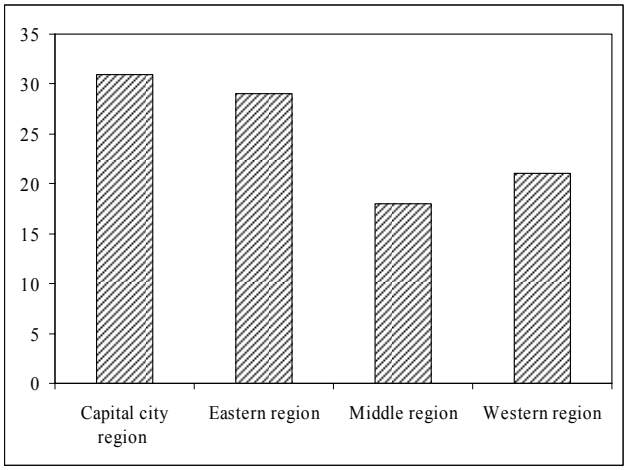


Figure 9.2 Locational distribution of Chinese CMNCs in domestic market

To choose different regions as major market, the CMNCs may strategically utilize their ownership advantages with the examination of different locational factors. The locational factors are examined as below, followed by a cross-region analysis of these factors.

9.4.1 Firm specific locational factors

Table 9.16 shows the firm specific locational factors regarding Chinese CMNCs in domestic construction market. The one-way Chi-square tests suggest all results are significant, which indicate less influence of chance factor in the data. The t-statistics show that the following locational factors are important considerations for the CMNCs working in domestic market:

- Large number of local competitors in the region
- Intensive competition in the regional market
- Lower cost of local contractors in the region

Table 9.16 Firm specific locational factors

Q. No.	Factors	Mean	SD	Chi-square		T test	
				Chi square	Sig.	t	Sig. (1-tailed)
3.1.1	Large number of local competitors	4.16	1.19	29.48	0.000	5.452	0.000**
3.1.2	Large number of competitors from firms at the central government level	2.77	0.99	17.87	0.001	-1.270	0.893
3.1.3	Large number of other international competitors	2.42	0.92	26.58	0.000	-3.503	0.999
3.1.4	Intensive competition in the regional market	3.81	1.11	14.00	0.007	4.052	0.000**
3.1.5	Lower cost of local contractors in the region	3.90	1.30	21.74	0.000	3.868	0.000**
3.1.6	Lower cost of other international contractors in the region	1.61	1.05	-	0.000	-7.324	1.000
3.1.7	Relationship amongst international and local contractors in the region	2.74	0.86	28.52	0.000	-1.680	0.948
3.1.8	Expatriate social and living conditions in the region	1.68	0.83	29.16	0.000	-8.849	1.000
3.1.9	Priority in the business strategy of your firm's headquarter relating to the regional market	3.23	1.12	16.58	0.002	1.126	0.135

Note: **p<0.01(1-tailed)

It seems that the competition in the regional market considerably influences the decision making when the CMNCs choose their business location. The possible lower cost of the local contractor may intensify the competition, therefore becoming another important factor.

Table 9.17 Variation analysis of firm specific locational factors

Q. No.	High O vs. Low O		High L vs. Low L		High I vs. Low I		High S vs. Low S	
	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)
3.1.1	0.921	0.026*	0.574	0.312	0.803	0.102	0.803	0.102
3.1.2	0.300	0.624	0.359	0.553	0.289	0.637	0.289	0.637
3.1.3	0.359	0.553	0.459	0.437	0.229	0.710	0.051	0.935
3.1.4	0.718	0.172	0.487	0.406	0.289	0.638	0.791	0.111
3.1.5	0.975	0.005**	0.649	0.236	0.474	0.420	0.324	0.594
3.1.6	0.803	0.102	0.872	0.054	0.763	0.133	0.574	0.312
3.1.7	0.895	0.040*	0.973	0.005**	0.973	0.005**	0.811	0.096
3.1.8	0.947	0.014*	0.975	0.005**	0.894	0.041*	0.975	0.005**
3.1.9	0.791	0.111	0.763	0.133	0.658	0.227	0.763	0.133

Note: *p<0.05, **p<0.01

The firms with different OLI+S indexes evaluate the locational factors differently. As shown in Table 9.17, the degree of importance of factor 3.1.1, 3.1.5, 3.1.7, and 3.1.8 were viewed similarly by the firms with different O indexes. This further confirms the importance of competition in terms of its impact in locational decision making. In addition, the t statistic result also indicates that the relationship amongst different origins of the contractors in the region was not considered as important factor. This may be possibly explained by the fact that CMNCs take the works mainly through main contracting with less involvement of sub-contracting, and therefore the collaboration between the Chinese CMNCs, other international contractors and the local contractors are at low degree. This conforms to the actual situation in practice, since the large construction firms own efficient resources to complete the works in various locations. This aspect links to the internalization analysis, which will be further discussed in the next section.

In the correlation analysis (Table 9.18) of firm specific locational factors, the close relationships were found between the factors of 3.1.1, 3.1.2, 3.1.4, 3.1.5 and 3.1.9. This may further reveal that the Chinese CMNCs mainly compete with their local counterparts if the local contractors are advantaged in lower cost of works. The competition between the contractors from central government level are also very

significant. Since the CMNCs operate national-wide, the hierarchical structure and the Chinese traditions of management determined the priority of business focus for different locations. Therefore, the business strategy of the firm's headquarters relating to regional market is of importance. This is consistent with the recent theoretical development of the eclectic paradigm, for which Dunning added another variable into the OLI paradigm - the strategic advantage.

Table 9.18 Correlation analysis of firm specific locational factors

Q. No.	3.1.1	3.1.2	3.1.3	3.1.4	3.1.5	3.1.6	3.1.7	3.1.8	3.1.9
3.1.1	-	0.010**	0.256	0.001**	0.001**	0.769	0.959	0.513	0.000**
3.1.2		-	0.242	0.356	0.015*	0.904	0.077	0.786	0.038*
3.1.3			-	0.433	0.034*	0.012*	0.594	0.852	0.078
3.1.4				-	0.345	0.148	0.918	0.014*	0.042*
3.1.5					-	0.712	0.352	0.411	0.000**
3.1.6						-	0.679	0.559	0.845
3.1.7							-	0.722	0.682
3.1.8								-	0.472
3.1.9									-

Note: The table presents the p-values of the corresponding Pearson's correlation coefficients of the pair factors.
*p<0.05, **p<0.01

9.4.2 Regional specific locational factors

Table 9.19 shows the regional specific locational factors regarding Chinese CMNCs in domestic construction. The one-way Chi-square tests suggest that factors 3.2.8 and 3.2.9 are less reliable compared with others. The t-statistics show that the following locational factors are important considerations for the CMNCs working in domestic market:

- Local construction market demand and potential in the region
- The speed and level of local economic development in the region
- Availability and costs of local professionals in the region
- Local government attitudes, intervention and policies towards international contractors, including regulatory barriers of entry in the region.

- Local governmental and regulatory protection for local contractors in the region
- Local commodity price levels in the region

The most important factors to be taken into account are the market demand and potentials, as well as the local economic development. Cost of resources is also important. It is also found that, although the economy in China as a whole is changing from central-planned system to that of market-driven, the government intervention and the regulatory barriers of entry in regional market are still influential in the construction market.

Table 9.19 Regional specific locational factors

No.	Factors	Mean	SD	Chi-square		T test	
				Chi square	Sig.	t	Sig. (1-tailed)
3.2.1	Local construction market demand and potential in the region	4.23	1.12	30.45	0.000	6.111	0.000**
3.2.2	Local government attitudes, intervention and policies towards international contractors, including regulatory barriers of entry in the region.	3.26	1.00	15.61	0.004	1.438	0.080
3.2.3	Local governmental and regulatory protection for local contractors in the region	3.23	0.80	25.29	0.000	1.563	0.064
3.2.4	Local social security and stability in the region	2.26	0.86	18.84	0.001	-4.831	1.000
3.2.5	The speed and level of local economic development in the region	4.13	1.09	23.35	0.000	5.780	0.000**
3.2.6	Availability and capacity of local subcontractors in the region	1.68	0.91	30.77	0.000	-8.103	1.000
3.2.7	Availability and costs of local professionals in the region	3.58	1.09	18.19	0.001	2.970	0.003**
3.2.8	Availability and costs of local workers in the region	2.68	1.19	4.65	0.326	-1.504	0.928
3.2.9	Availability and costs of local machinery and materials in the region	3.06	1.21	4.00	0.406	0.297	0.384
3.2.10	Local commodity price levels in the region	3.29	1.22	7.55	0.110	1.329	0.097
3.2.11	Accessibility to local financing resources in the region	2.61	0.99	18.19	0.001	-2.179	0.981
3.2.12	Local governmental bureaucratic system and possible corruption in the region	2.61	0.92	21.74	0.000	-2.344	0.987
3.2.13	Interference of local unofficial societies in the region	2.97	0.98	13.35	0.010	-0.183	0.572

Note: **p<0.01(1-tailed)

In terms of the variation analysis (Table 9.20), most of the firms with different OLI+S indexes varied their views on the locational factors. Nevertheless, congruent views were

found for factor of 3.2.1 from firms with different O indexes, and factor 3.2.10 from firms with different S indexes.

Table 9.20 Variation analysis of regional specific locational factors

Q. No.	High O vs. Low O		High L vs. Low L		High I vs. Low I		High S vs. Low S	
	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)
3.2.1	0.894	0.041*	0.975	0.005**	0.789	0.177	0.671	0.215
3.2.2	0.789	0.112	0.395	0.511	0.973	0.703	0.472	0.422
3.2.3	0.616	0.269	0.821	0.089	0.410	0.821	0.500	0.391
3.2.4	0.703	0.185	0.816	0.092	0.406	0.289	0.359	0.553
3.2.5	0.564	0.322	0.900	0.037*	0.577	1.000	0.667	0.219
3.2.6	0.821	0.089	0.921	0.026*	0.135	0.616	0.821	0.089
3.2.7	0.821	0.089	0.975	0.005**	-0.103	0.671	0.671	0.215
3.2.8	-0.368	0.542	0.559	0.327	0.803	0.026*	0.316	0.604
3.2.9	-0.211	0.734	0.026	0.966	-0.237	0.395	-0.825	0.086
3.2.10	0.872	0.054	1.000	0.000**	0.973	0.553	0.973	0.005**
3.2.11	0.700	0.188	0.821	0.089	0.671	0.975	0.821	0.089
3.2.12	0.763	0.133	0.900	0.037*	-0.081	1.000	0.872	0.054
3.2.13	0.791	0.111	0.667	0.219	0.821	0.892	0.703	0.185

Note: *p<0.05, **p<0.01

In the correlation analysis (Table 9.21) of regional specific locational factors, the significant correlations were found between the factors of 3.2.1, 3.2.5 and 3.2.10, 3.2.2 and 3.2.5. It is evident that market demand and market potential are closely related to the economic growth in the region, and it will consequently influence the resource price. It is interesting to find the significant relation between the speed and level of local economic development in the region and the government intervention in construction works as well as the regulatory barriers of entry into the market. This may possibly reflect the importance of construction works in the development of local economy, and therefore the local government intervention and local regulations are carefully taken into consideration when construction works are undertaken.

Table 9.21 Correlation analysis of regional specific locational factors

Q. No.	3.2.1	3.2.2	3.2.3	3.2.4	3.2.5	3.2.6	3.2.7	3.2.8	3.2.9	3.2.10	3.2.11	3.2.12	3.2.13
3.2.1	-	0.319	0.361	0.736	0.176	0.096	0.306	0.081	0.260	0.008**	0.354	0.960	0.539
3.2.2		-	0.791	0.824	0.001**	0.052	0.082	0.416	0.414	0.279	0.355	0.573	0.251
3.2.3			-	0.125	0.153	0.671	0.990	0.097	0.526	0.588	0.333	0.756	0.689
3.2.4				-	0.338	0.745	0.946	0.783	0.548	0.821	0.817	0.634	0.790
3.2.5					-	0.182	0.185	0.710	0.760	0.001**	0.355	0.936	0.851
3.2.6						-	0.105	0.841	0.110	0.409	0.569	0.690	0.643
3.2.7							-	0.393	0.402	0.048*	0.623	0.478	0.109
3.2.8								-	0.744	0.080	0.984	0.888	0.134
3.2.9									-	0.304	0.434	0.544	0.089
3.2.10										-	0.112	0.470	0.159
3.2.11											-	0.207	0.156
3.2.12												-	0.907
3.2.13													-

Note: The table presents the p-values of the corresponding Pearson's correlation coefficients of the pair factors.
*p<0.05, **p<0.01

9.4.3 Locational factors in different regions

A cross-region analysis regarding the locational factors is presented in Table 9.22. This analysis was structured through four groups of the firms according to different regions, and the means and standard deviation of the data as well as t-statistic tests were calculated.

Table 9.22 Locational factors in different regions in domestic market

Q. No.	Capital city region (n=31)				Eastern economic region (n=29)				Middle economic region (n=18)				Western economic region (21)			
	Mean	SD	t test		Mean	SD	t test		Mean	SD	t test		Mean	SD	t test	
			t	Sig.			t	Sig.			t	Sig.			t	Sig.
Firm specific locational factors																
3.1.1	4.16	1.19	5.45	0.00**	4.21	1.15	5.67	0.00**	3.56	1.25	1.89	0.04*	3.76	1.26	2.77	0.01**
3.1.2	2.77	0.99	-1.27	0.89	2.76	0.99	-1.32	0.90	2.39	0.98	-2.65	0.99	2.52	0.98	-2.22	0.98
3.1.3	2.42	0.92	-3.50	1.00	2.48	0.91	-3.06	1.00	2.17	0.86	-4.12	1.00	2.19	0.81	-4.56	1.00
3.1.4	3.81	1.11	4.05	0.00**	3.93	1.00	5.03	0.00**	3.61	1.24	2.09	0.03*	3.67	1.20	2.55	0.01**
3.1.5	3.90	1.30	3.87	0.00**	3.90	1.32	3.66	0.00**	4.89	0.32	24.78	0.00**	4.57	0.87	8.28	0.00**
3.1.6	1.61	1.05	-7.32	1.00	1.66	1.08	-6.72	1.00	1.67	1.03	-5.50	1.00	1.62	0.97	-6.50	1.00
3.1.7	2.74	0.86	-1.68	0.95	2.79	0.86	-1.29	0.90	2.61	0.78	-2.12	0.98	2.71	0.85	-1.55	0.93
3.1.8	1.68	0.83	-8.85	1.00	1.72	0.84	-8.17	1.00	1.56	0.78	-7.82	1.00	1.52	0.75	-9.02	1.00
3.1.9	3.23	1.12	1.13	0.13	3.17	1.10	0.84	0.20	3.89	0.83	4.53	0.00**	3.71	0.96	3.42	0.00**
Regional specific locational factors																
3.2.1	4.23	1.12	6.11	0.00**	4.28	1.07	6.45	0.00**	4.61	1.04	6.59	0.00**	4.52	1.03	6.78	0.00**
3.2.2	3.26	1.00	1.44	0.08	3.21	0.98	1.14	0.13	3.72	0.75	4.08	0.00**	3.62	0.80	3.53	0.00**
3.2.3	3.23	0.80	1.56	0.06	3.24	0.79	1.65	0.05	3.06	0.64	0.37	0.36	3.05	0.59	0.37	0.36
3.2.4	2.26	0.86	-4.83	1.00	2.21	0.82	-5.22	1.00	2.06	0.73	-5.52	1.00	2.19	0.81	-4.56	1.00
3.2.5	4.13	1.09	5.78	0.00**	4.10	1.11	5.34	0.00**	4.78	0.43	17.63	0.00**	4.52	0.81	8.58	0.00**
3.2.6	1.68	0.91	-8.10	1.00	1.72	0.92	-7.45	1.00	1.89	1.08	-4.37	1.00	1.86	1.01	-5.16	1.00
3.2.7	3.58	1.09	2.97	0.00**	3.62	1.08	3.09	0.00**	3.83	0.99	3.59	0.00**	3.76	1.00	3.51	0.00**
3.2.8	2.68	1.19	-1.50	0.93	2.59	1.15	-1.94	0.97	2.61	1.04	-1.59	0.94	2.71	1.06	-1.24	0.89
3.2.9	3.06	1.21	0.30	0.38	3.10	1.18	0.47	0.32	2.78	1.17	-0.81	0.79	2.95	1.20	-0.18	0.57
3.2.10	3.29	1.22	1.33	0.10	3.24	1.24	1.05	0.15	2.78	1.06	-0.89	0.81	3.10	1.26	0.35	0.37
3.2.11	2.61	0.99	-2.18	0.98	2.55	0.99	-2.45	0.99	2.72	0.96	-1.23	0.88	2.71	0.96	-1.37	0.91
3.2.12	2.61	0.92	-2.34	0.99	2.66	0.94	-1.98	0.97	2.61	1.04	-1.59	0.94	2.62	1.02	-1.71	0.95
3.2.13	2.97	0.98	-0.18	0.57	2.93	1.00	-0.37	0.64	2.83	0.92	-0.77	0.77	3.05	1.07	0.20	0.42

Note: *p<0.05, **p<0.01, 1-tailed.

Capital city region

The firms take factors 3.1.1, 3.1.4, 3.1.5, 3.2.1, 3.2.5, and 3.2.7 as their significantly important considerations when working in capital city region in domestic market. The t-statistic appears to indicate that the construction market in capital city region is quite

competitive. The significant competition comes from the local contractors resulting from their lower cost of works, while little or no competition exists from other international competitors. Besides the most important locational factor of market demand and potential in the region, the level of economic development in the region and the availability and costs of local professionals are also important. Other factors, such as the local government attitude and intervention, regulatory barrier of entry, protection of local contractors, and the local commodity price level are of importance but not as significant as those mentioned earlier.

Eastern economic region

Eastern economic region is the most rapidly developed area in China, led by Shanghai. From the cross-region analysis of the locational factors, most of the factors were viewed similarly with those in the capital city region. In actual fact, the capital city region and the eastern economic region demonstrate similarity in terms of the economic development, concentration ratio of construction enterprises, local market demand, and other business environments. Therefore, both of the firm specific and regional specific locational factors are considered similarly by the CMNCs in these two regions.

Middle economic region

Middle economic region is less developed compared with capital city region and eastern economic region. In this region, the most important locational factor was viewed as the lower cost of local contractors, followed by the factor of priority of business strategy of the firm. The competition in this region is also intensive between the CMNCs and the local contractors, although the degree of competition is less than that in capital city region and eastern region. The most important regional specific locational factors were

considered as the level of local economic development in the region, and market demand. These two factors may appear as more important consideration for the middle economic region than for the capital city or eastern economic region, because many urban and rural areas in this region are less developed and the investment in construction are largely directed by the government policy. Hence, the decision has to be made carefully in evaluating where to venture in this region. Possibly due to the same reason, the factor of local government attitude and intervention, regulatory barrier of entry in middle economic region become significant in addition to the market demand, economic development and costs and professionals.

Western economic region

The situation in western economic region is similar with that in middle economic region, except that the degree of importance of factor of competition with local counterparts is even higher. This may be possibly explained by the fact that the excessive labor force in western region gives the local contractors more advantages on reducing the cost of works. The priority of business strategy of the construction firms relating to the western region market is also regarded as important factor. In actual fact, the policy of "developing the West" in China has drawn much attention in recent years, and whether to venture into the western regions is still depending on the business strategy of the CMNCs. Some of the CMNCs were still focusing on the more developed regions such as the eastern regional market, and some have developed new strategy to go west. In terms of the regional specific locational factors, the local market demand and potentials, government attitude and intervention, regulatory barrier of entry, and the economic development status in the region are the important factors to be taken into account.

9.5 Internalization factors of Chinese CMNCs in domestic market

Internalization of Chinese CMNCs in domestic market is the process of utilizing the firms' ownership advantages by taking into consideration various locational factors. In this section, the important procurement methods of construction projects used by CMNCs in domestic construction market, and their business forms are discussed. The detailed explanation of the various procurement methods and the business forms may be referred to in Chapter 4.

9.5.1 Procurement methods

As shown in Table 9.23, the most frequently used procurement method is traditional contracting. The other two methods, i.e. BOOT & BOT, and turnkey or EPC. are also sometimes used or frequently used in contracting domestic works. It may be noted that CM (construction management) and MC (management contracting) are seldom used or even never used by some firms. This situation may be linked to the industrial structure in domestic construction market. There is very little chance for construction firms to contract works based on CM or MC procurement in domestic market, and most of the works are undertaken through traditional bidding process.

9.5.2 Business forms and market entry modes

As reported in Table 9.24, the most important form of business adopted by Chinese CMNCs in domestic market is the direct investment. In other words, the CMNCs wholly own their subsidiaries in various provinces or cities. Actually most of the CMNCs are state owned enterprises, and all of the ownership belongs to the central

government. The headquarters of CMNCs take the administration and management of some large scale projects. Table 9.24 also reveals that the other three forms of business with equity involvement, i.e. equity joint venture, asset floating and contractual joint venture are also sometimes used or frequently used. Asset floating actually is a vehicle to manage resources, and was originated from the previous planning economic system in China. Joint venture is developed in recent years, when the government encourages the various forms of cooperation between foreign and domestic business partners, national-wide firms and local companies.

Table 9.23 Procurement methods used by Chinese CMNCs in domestic market

Q. No.	Procurement methods	Mean	SD	Chi-square	
				Chi square	Sig.
4.1.1	BOOT & BOT	3.00	0.97	14.00	0.007
4.1.2	Design & Build / Turnkey /EPC	3.16	0.86	21.10	0.000
4.1.3	Traditional contracting	5.00	-	-	0.000
4.1.4	Construction management (Management service package only)	1.61	0.76	32.71	0.000
4.1.5	Management contracting (As a management contractor)	1.84	0.78	23.35	0.000
4.1.6	Investment/development, build, own and operate	2.35	0.49	-	0.000

In terms of the business form without equity involvement, there is no frequently used business form. This may imply that the business forms among the construction firms in domestic market are mainly through equity involvement, and those without equity involvement receive less chance to succeed. However, some firms did adopt the strategic alliance and partnering, licensing or franchising, and subcontracting. It may show that, in domestic market, the subcontracting of construction works is not a method used as common as in international market. This conforms to the actual situation in domestic construction industry, and this may be possibly determined by the traditions in

China construction industry, where subcontracting has never been well developed. This also links to the structure of domestic construction industry as analyzed in Chapter 8.

Table 9.24 Business forms and market entry modes used in domestic market

Q. No.	Business forms / modes of entry	Mean	SD	Chi-square	
				Chi square	Sig.
With equity involvement:					
4.2.1	Direct Investment (wholly owned subsidiaries)	4.74	0.58	-	0.00
4.2.2	Equity Joint Venture (partially owned subsidiaries)	3.61	0.84	20.77	0.00
4.2.3	Asset Floating (investment in assets including machinery, is not fixed in particular location, but allocated on a project basis)	3.52	0.96	12.71	0.01
4.2.4	Contractual Joint Venture (project-based joint venture)	3.35	1.08	8.19	0.08
Without equity involvement:					
4.2.5	Sub-contracting (to other contractors)	2.52	0.89	21.74	0.00
4.2.6	Licensing Name / Franchising (e.g. licensing the firm's brand name to and contract with others with no or very little liability)	2.71	0.78	23.68	0.0
4.2.7	Strategic Alliance / Partnering	3.58	1.18	7.23	0.12
4.2.8	Through local agencies	1.52	0.57	-	0.00

9.5.3 Firm specific internalization factors

Table 9.25 shows the firm specific internalization factors regarding Chinese CMNCs in domestic construction market. The one-way Chi-square tests suggest that all factors appear with less chances factors. The t-statistics show that the following factors are important for the CMNCs working in domestic market:

- To avoid or reduce information search and business negotiation costs
- To utilize the networking of the firm's headquarter and its branches
- To avoid the cost of moral hazard and adverse selection or under-performance of sub-contractors
- To ensure the quality of construction and services provided
- To facilitate the increasing need for professionals and personnel
- To better utilize and control resources (construction materials, equipments, technology, human resources, etc.)

The most important factors to be taken into account are 4.3.3 and 4.3.10. To better utilize and control resources including material, equipment and other resources, is of most importance. As mentioned earlier, most of the construction enterprises are undergoing structural reform from previous central planning system to the market system. As a result, the function of re-allocating resources through the planning system may be gradually replaced by the market system regulation. Other internalization factors such as 4.3.1, 4.3.2, 4.3.6, 4.3.7 and 4.3.8, were regarded at the similar degree of importance. It is noted that factor 4.3.5: to protect technological know-how of the firm, was ranked relatively low. As analyzed in Chapter 6, to protect technological know-how is generally perceived as an important internalization factor for many CMNCs. However, it is not the case for Chinese CMNCs in domestic construction market. This is probably due to the low technical level in construction industry and the low technological contents in construction projects in domestic market.

Table 9.25 Firm specific internalization factors

Q. No.	Factors	Mean	SD	Chi-square		t test	
				Chi square	Sig.	t	Sig. (1-tailed)
4.3.1	To avoid or reduce information search and business negotiation costs	3.45	0.96	15.94	0.003	2.62	0.007**
4.3.2	To utilize the networking of the firm's headquarter and its branches	3.42	1.03	12.06	0.017	2.28	0.015*
4.3.3	To avoid the cost of moral hazard and adverse selection or under-performance of sub-contractors	4.19	1.05	24.97	0.000	6.35	0.000**
4.3.4	To protect the reputation of the firm	2.45	0.85	30.13	0.000	-3.59	0.999
4.3.5	To protect technological know-how of the firm	1.71	1.07	35.61	0.000	-6.71	1.000
4.3.6	To ensure the quality of construction and services provided	3.71	0.69	30.45	0.000	5.71	0.000**
4.3.7	To avoid the costs of breach of contracts and ensuing litigation	3.23	1.06	14.65	0.005	1.19	0.121
4.3.8	To facilitate the increasing need for professionals and personnel	3.39	0.88	29.48	0.000	2.44	0.010*
4.3.9	To facilitate the need for alternative investments for the profits earned	2.32	1.08	12.71	0.013	-3.50	0.999
4.3.10	To better utilize and control resources (construction materials, equipments, technology, human resources, etc.)	4.42	0.67	34.97	0.000	11.76	0.000**

Note: *p<0.05, **p<0.01, 1-tailed.

In terms of the variation analysis (Table 9.26), firms with different O indexes varied their views on all factors except 4.3.6, 4.3.8, 4.3.9 and 4.3.10. The different ownership indexes may lead to different business strategies, and as a result the factors influencing their internalization may differ significantly. Likewise, firms with different specialty indexes may also deal the internalization factors differently. Factor 4.3.2, 4.3.3, 4.3.4 and 4.3.6 are regarded similarly important, while other factors are not.

Table 9.26 Variation analysis of firm specific internalization factors

Q. No	High O vs. Low O		High L vs. Low L		High I vs. Low I		High S vs. Low S	
	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)
4.3.1	0.718	0.172	0.671	0.215	0.577	0.308	0.671	0.215
4.3.2	0.872	0.054	0.667	0.219	0.763	0.133	0.949	0.014*
4.3.3	0.688	0.199	0.900	0.037*	1.000	0.000**	1.000	0.000**
4.3.4	0.763	0.133	0.526	0.362	0.344	0.571	0.918	0.028*
4.3.5	0.800	0.104	0.667	0.219	0.688	0.199	0.410	0.493
4.3.6	0.973	0.005**	0.973	0.005**	0.973	0.005**	0.895	0.040*
4.3.7	0.825	0.086	0.229	0.710	0.444	0.454	0.459	0.437
4.3.8	0.947	0.014*	0.872	0.054	0.632	0.252	0.872	0.054
4.3.9	0.894	0.041*	0.263	0.669	0.132	0.833	0.462	0.434
4.3.10	0.895	0.040*	0.895	0.040*	0.803	0.102	0.811	0.096

Note: *p<0.05, **p<0.01

The correlation analysis as shown in Table 9.27 shows that the only significant correlated regional specific internalization factors are between factor 4.3.1 and 4.3.7, 4.3.8 and 4.3.9. This may possibly indicate that the cost of business negotiation, and the cost of breach of contracts and ensuing litigation are linked together and may be influenced by each other.

Table 9.27 Correlation analysis of firm specific internalization factors

Q. No	4.3.1	4.3.2	4.3.3	4.3.4	4.3.5	4.3.6	4.3.7	4.3.8	4.3.9	4.3.10
4.3.1	-	0.101	0.165	0.342	0.595	0.430	0.000**	0.235	0.191	0.281
4.3.2		-	0.275	0.089	0.175	0.759	0.094	0.995	0.538	0.887
4.3.3			-	0.796	0.497	0.668	0.087	0.746	0.051	0.903
4.3.4				-	0.835	0.351	0.148	0.120	0.624	0.725
4.3.5					-	0.926	0.996	0.927	0.988	0.232
4.3.6						-	0.220	0.301	0.793	0.931
4.3.7							-	0.604	0.785	0.814
4.3.8								-	0.030*	0.359
4.3.9									-	0.120
4.3.10										-

Note: The table presents the p-values of the corresponding Pearson's correlation coefficients of the pair factors.
*p<0.05, **p<0.01

9.5.4 Regional specific internalization factors

Table 9.28 shows the regional specific internalization factors regarding Chinese CMNCs in domestic construction. The t-statistics show that the following two factors are of significantly important:

- To avoid client's uncertainty over the nature and value of services being sold and to better facilitate the client's needs
- To consolidate market position and to facilitate the future growth and potential of the market

In addition, factor 4.4.1: "To meet the local government's policy requirements relating to construction business operations" may also be deemed as an important factor (at significant level of 10%).

Table 9.28 Regional specific internalization factors

Q. No.	Factors	Mean	SD	Chi-square		t test	
				Chi square	Sig.	t	Sig. (1-tailed)
4.4.1	To meet the local government's policy requirements relating to construction business operations	3.26	0.96	14.968	0.00	1.49	0.073
4.4.2	To better facilitate strategic alliances, partnering and networking with others for the business	2.68	0.94	32.387	0.00	-1.90	0.967
4.4.3	To avoid client's uncertainty over the nature and value of services being sold and to better facilitate the client's needs	3.84	1.04	11.742	0.02	4.51	0.000**
4.4.4	To consolidate market position and to facilitate the future growth and potential of the market	4.26	0.93	26.581	0.00	7.53	0.000**

Note: *p<0.05, **p<0.01, 1-tailed.

In terms of the variation analysis (Table 9.29), the firms with different O indexes varied their views on the factor 4.4.3 and 4.4.4, and those with different S indexes regarded factor 4.4.4 similarly. The correlation analysis (Table 9.30) of regional specific internalization factors shows the statistically significantly correlations between 4.4.1

and 4.4.3, 4.4.4; 4.4.2 and 4.4.3, 4.4.4. However, it is difficult to find any practical meaning from these two analyses.

Table 9.29 Variation analysis of regional specific internalization factors

Q. No.	High O vs. Low O		High L vs. Low L		High I vs. Low I		High S vs. Low S	
	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)	Spearman's rho	Sig. (2-tailed)
4.4.1	0.921	0.026*	0.487	0.406	0.580	0.306	0.860	0.061
4.4.2	0.975	0.005**	0.433	0.467	0.342	0.573	0.526	0.362
4.4.3	0.433	0.467	0.354	0.559	0.821	0.089	0.671	0.215
4.4.4	0.821	0.089	0.649	0.236	0.872	0.054	0.949	0.014*

Note: *p<0.05, **p<0.01

Table 9.30 Correlation analysis of regional specific internalization factors

Q. No	4.4.1	4.4.2	4.4.3	4.4.4
4.4.1	-	0.910	0.030*	0.038*
4.4.2		-	0.016*	0.028*
4.4.3				0.147
4.4.4			-	-

Note: The table presents the p-values of the corresponding Pearson's correlation coefficients of the pair factors. *p<0.05, **p<0.01

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Part IV

Implications and Conclusion

Chapter Ten

IMPLICATION ONE: A comparative study of top British and Chinese international contractors[10]

10.1 Introduction

As implied by the eclectic paradigm, there are no universally applicable rules to follow for MNCs' internationalization; different MNCs from different countries with different ownership advantages may internalize differently taking into consideration the different locational advantages. The implication of this study includes two parts, Chapter 10 and Chapter 11, where comparative studies between British and Chinese CMNCs, Singaporean and Chinese CMNCs are presented using various conclusions and implications from previous chapters in this thesis.

This chapter provides a comparative study of top British and Chinese international contractors in terms of their internationalization in the global market. Following a brief review of the past and present of the British construction firms in the international construction market, this chapter analyzes the strengths and advantages of the British and Chinese firms as identified in this study. Then the findings are compared with the results of the OLI+S model analysis proposed in Chapter 4. The internationalization ratios of the top international construction firms from the UK and China are also illustrated in the OLI+S star model.

[10] The major contents in this chapter have been published in Low and Jiang (2004c).

The British construction firms historically led the internationalization of their operations in advance of their industrial counterparts, and are with the longest history and the richest experience in the international construction industry. Presently, several largest British construction firms are among the strongest international contractors in the world both in terms of their international revenues and their international business distributions. On the other hand, as studied in this research, the Chinese construction firms are the latest entrants in the global construction market, and they have been increasingly involved with the international building and civil engineering construction projects during the past decade. This may generate the necessity to compare the international construction firms from the UK and China, for they are standing at the two ends of the international construction industry, i.e. the former with the longest history while the latter with the shortest.

10.2 Internationalization of British construction firms

From the international construction boom led by the rapid increase of oil price in Middle East in 1973, the British construction firms began to rely heavily on overseas market, and this trend continued to 1983 (Seymour, 1987; Harvey and Ashworyh, 1997). By 1984, the overseas contracting volume undertaken by the British firms started to decline until the end of 1980s. This decline coincided with the start of the boom in domestic construction market in the UK. However, during the boom conditions in the UK, many of the construction firms allowed their international business to shrink, and they had to pay the price of needing to rebuild their operations in the international market when many other economies were coming out of recession (Hillebrandt, Cannon, and Lansley, 1995). The British construction firms successfully regained their

international expansion, and consequently an increasing trend in the values of their overseas workload was observed from 1990 to 1996. Thereafter, they maintained their overseas contracting value at a relatively stable level (see Figure 10.1). During the most recent growing cycle, i.e. 1988-1996, the overseas work done by the British firms was increased by 17% annually and was maintained at an average of £ 3.94 billion (see Endnote 9) during 1997-2000.

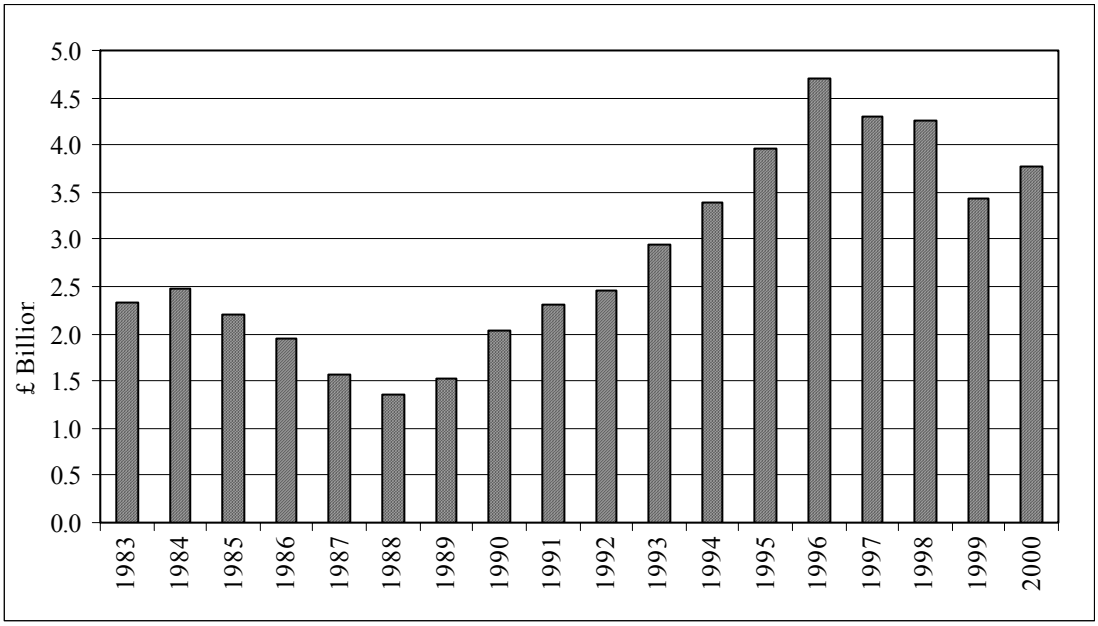
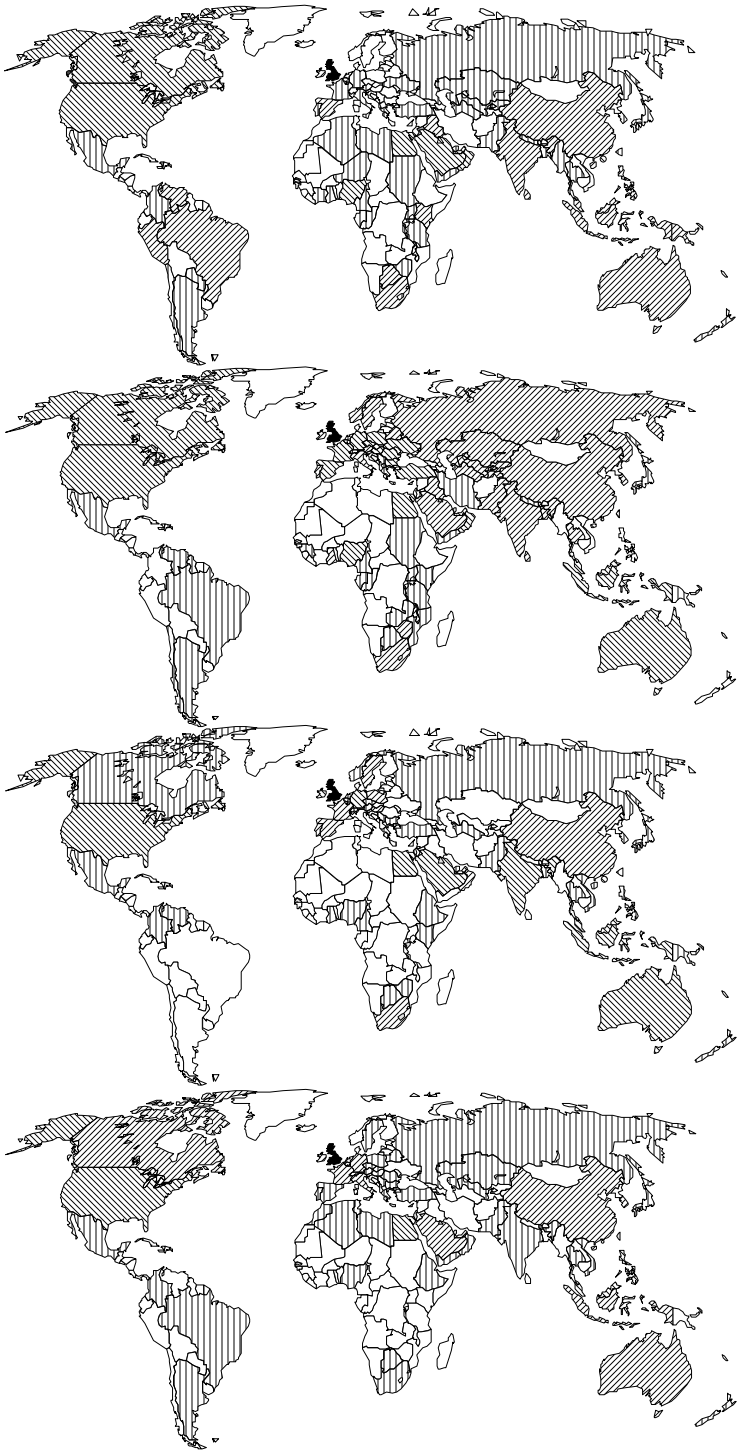


Figure 10.1 Value of work done overseas by British construction firms in 1983-2000 (£ Billion at current prices)
Source: DTI (2001)

Generally, the large British construction firms played very significant roles in the international contracting, especially during the recession period in the UK domestic market (Hillebrandt, Cannon, and Lansley, 1995). In 1997, the overseas construction activities of the top ten companies accounted for approximately 90% of the overseas activities by British firms (Crosthwaite, 1998). But according to the ENR annual survey of the top 225 international contractors, there is a declining trend observed in terms of the number of British construction firms ranked in the top 225 international contractors. In 1995, 12 British firms were ranked in the top 225 international contractors with their

international billings of US$ 11.444 billion accounting for 12.4% of the total of the top 225, while in 2002, 4 firms were ranked with their international billing of US$ 8.58 billion or 8.06% of the total of the top 225 (ENR, Aug. 26, 1996 and Aug. 26, 2002).

The geographical movement of the top British construction firms in the international construction market during the past two decades is shown in Figure 10.2. It can be seen that North America and Australia are the basic markets of the British firms with the consistent high intensity of the top firms' presence. Some UK contractors withdrew from the markets in Canada, Africa and South America during the study period, while some were returning to South America, which regained particular attention as a potential market. A decline in intensity of the number of contractors was seen in Middle East, and the attention in some East and South East Asian Countries was still drawn by many British contractors. East European market had been intensively involved by the British contractors, and still attracted some of them after a temporary decline.



1985

No. of firms	16
Middle East	800.0
Asia/Australasia	1500.0
Africa	2000.0
Europe	300.0
North America	900.0
Latin America	100.0
Total	5600.0

1990

No. of firms	14
Middle East	1392.1
Asia/Australasia	2407.2
Africa	934.3
Europe	2988.9
North America	4417.8
Latin America	345.0
Total	12485.3

1995

No. of firms	11
Middle East	474.5
Asia/Australasia	1201.9
Africa	321.8
Europe	958.5
North America	2084.2
Latin America	85.6
Total	5126.5

2000

No. of firms	7
Middle East	791.3
Asia/Australasia	1580.2
Africa	128.8
Europe	1675.4
North America	4982.5
Latin America	24.7
Total	9182.9

1~2 firms
3~4 firms
5~10 firms
Home

Figure 10.2 Global movement of top British construction firms in the international construction market (1985-2000)

Source: ENR, various issues.

Note: Figures in tables show the values of foreign contracts (1985 & 1990) and international billings (1995 & 2000) in US$ million at current prices.

The internationalization of British construction firms has been studied by many scholars and various reasons why they were continually seeking the opportunities abroad and advantages they possessed to compete with their counterparts from other countries were identified, such as in Seymour (1987), Hillebrandt, Cannon and Lansley (1995), Harvey and Ashworyh (1997) and Morton (2002). One of the key advantages for the British firms' venturing overseas is the backing up of the extensive and competitive capacity of the financial sector in the UK, which benefits the British firms specially when competing with the firms from less developed countries (Seymour, 1987 and Hillebrandt, Cannon and Lansley, 1995). The technical expertise is acknowledged as another important advantage of the British firms since the British firms undertook many large scale and sophisticated projects over the world. British consultant firms are heavily in demand overseas, which may also demonstrate the technical specialty advantages of the British firms as a whole and may benefit the British contractors and provide advantages for them. Seymour (1987) argued that Britain had many political and diplomatic links with ex-empire countries, and therefore provided the construction firms a country-specific ownership advantage.

In the current trends of the British construction firms in the international market, consolidation into core businesses of contracting or specific types of contracting and differentiation of services even beyond the construction activities such as the financial services and the facility management may be highlighted (Morton, 2002 and Hillebrandt, Cannon and Lansley, 1995). These strategies are perceived as the major competing wings when the British firms explore their ownership advantages in overseas construction markets. As a result, the contractors working overseas are differentiating their activities, including specializing in niche markets, concentrating on sophisticated

and complex projects in infrastructure projects. Meanwhile the diversification beyond undertaking the fairly run-of-mill civil engineering works overseas has been significantly built up on the extensive financial and technical capacities of these firms.

For most of the large British construction firms venturing overseas had once been seen as one way of overcoming the recession in the UK domestic construction market. However some argue that the British firms' overseas operations had done little to offset the downturn in domestic workload because the locational distribution of their overseas contracting works were relying on the English-speaking former colonies, where the cyclic recessions were experienced simultaneously with the UK (Seymour, 1992). It was further identified that the major overseas construction works of the British construction firms tended to be conducted within the developed, rather than developing, countries (Crosthwaite, 1998 and 2000). The reason underlying this is that the developed countries are preferred in seeking a secure environment, financial security and less corruption, and the shareholder influence also affects the overseas business locations for these firms.

Another significant feature identified by Morton (2002) is the merger and acquisition (M&A) among the major British firms in recent years. Consequently, a few firms appear to be in large scale with very diversified business lines. He argued that there seemed to have been a number of market factors driving this trend. One factor has been the Private Finance Initiative (PFI) since a number of recent takeovers have had as one major objective access to the expertise required to bid for and carry through PFI projects. Consolidation on core business line through a series of M&A either domestically or internationally, influence of the major shareholders who believe that

contracting alone does not yield sufficient profit margins and was too risky, have also contributed much to this trend.

10.3 Comparative analysis using OLI+S model

An overview of the top British and Chinese construction firms are illustrated in Figure 10.3 and Figure 10.4, in terms of the international billings and the number of firms in the top 225 international contractors ranking of ENR from 1995 to 2002. It reveals that the international revenue of the top British firms was maintained at over US$ 10 billion in 1995 – 2000 and followed a sliding in 2001 and 2002, except in 1996 and 1999 when the then giants, Trafalgar House PLC (1996), Kvaerner Group (1999) and Bovis Construction Ltd. (1999), were restructuring or changing ownership and did not participate in the ENR's survey in the corresponding year. Meanwhile, overseas workload was increasingly concentrated in the hands of a few giant British contractors. In contrast to the British firms, the internationalization process of Chinese construction firms was steadily speeding up with the increasing number of firms and increasing international billings in the international construction market.

To comparatively analyze the internationalization of the top British and Chinese construction firms, the OLI+S model proposed in this research is adopted and the internationalization ratios of the top British and Chinese firms were calculated (see Endnote 10) as shown in Table 10.1. Figure 10.5 also illustrates the internationalization ratios of the top 4 British and Chinese construction firms in OLI+S Star model. Meanwhile, by taking the average of the internationalization ratios of the firms, the internationalization of the top British and Chinese construction firms are also illustrated

in the OLI+S Star model (see Figure 10.6). In average, the British firms generated 58% of the total revenue from international market, which is higher than that of the Chinese firms and the latter is still higher than the average of all top 225 international contractors. All of the internalization, locational and specialty advantages of the British firms, in terms of the I-OMS, L-IBD and S-ISF, are higher than that of the Chinese firms and the average of all top 225 firms. The L-IBD and S-ISF of the Chinese firms are around the average of all top 225 firms, while their I-OMS shows at very low level. All the four internationalization ratios, as well as the Overall Internationalization Index (OII) of the British firms are higher than that of Chinese firms, and this conforms to the fact that the British firms possess much higher international strength than the Chinese firms.

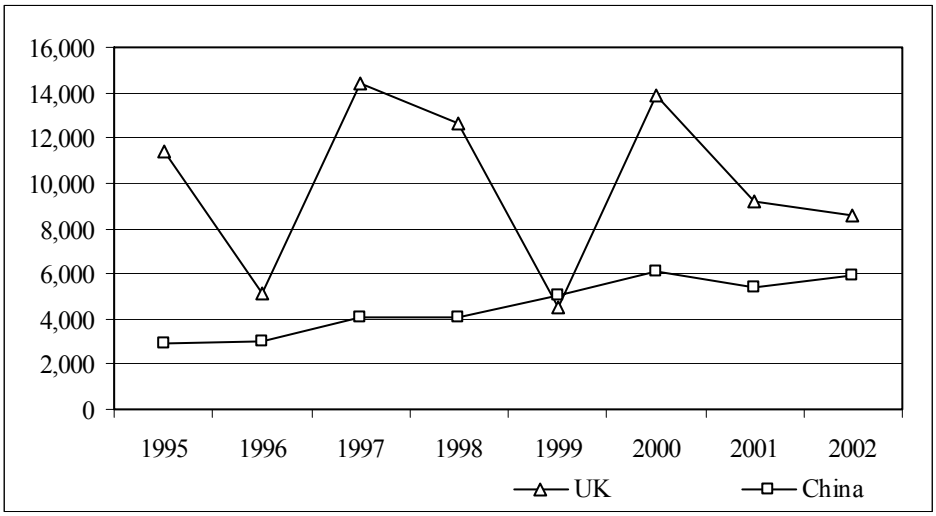


Figure 10.3 The international billings of the top British and Chinese construction firms in ENR top 225 international contractors 1995-2002 (US$ million at current prices)

Source: ENR, 1995-2002

Note: The sharp drops in 1996 and 1999 of the British firms were because the then giant British contractors, Trafalgar House PLC (1996), Kvaerner Group (1999) and Bovis Construction Ltd.(1999), did not participate the ENR's survey in the corresponding year.

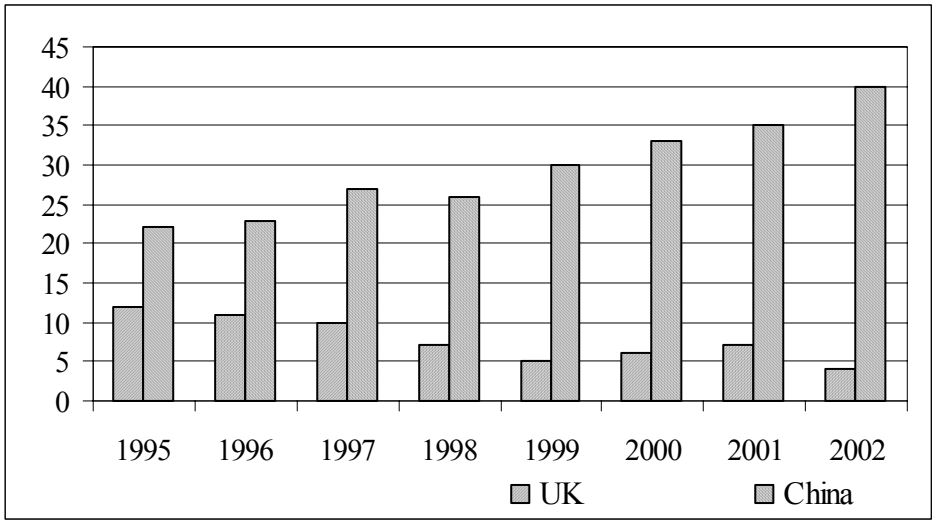


Figure 10.4 The number of the top British and Chinese construction firms in ENR top 225 international contractors 1995-2002
Source: ENR, 1995-2002

Table 10.2 shows the comparison of performance of the top British and top 20 Chinese contractors in domestic and international market. Although the average O-IRTR of British firms is much higher than the average of top 225 firms, the top 4 firms (Bovis Lend Lease, AMEC PLC, Balfour Beatty PLC and Joannou & Paraskevaides (Overseas) Ltd.) contributed the majority of the international shares in 2000. In fact, these four firms possess very strong internationalization strength, which can be demonstrated by their OIIs. Therefore it is not surprising that in the 2002 ENR ranking, only these four firms from the UK maintained their positions in top 225 ranking while they achieved much higher international revenues than the 40 Chinese firms. The Chinese firms show various facets in terms of the O-IRTRs. Due to the historical reason, some firms heavily rely on the overseas business even without sufficient strength in domestic market. This appears to contradict the argument that enterprises could expand their businesses beyond the border only if they had already achieved a certain capacity in their home country. Similarly to the top 3 British firms, the top 3 Chinese firms have developed their business lines with the arms both in domestic and international market.

Table 10.1 The internationalization ratios and OIIs of the top British and Chinese construction firms

No.	Firm	ENR Ranking for 2000			Ratio of Int'l Revenue to Total Revenue	Ratio of Domestic Revenue to Total Revenue	Ratio for Int'l Business Distribution	Ratio for Overseas Management Structure	Ratio for Involvement of Specialized Fields	Overall Internationali - zation Index OII	International Strength of Firm	
		ENR Rank	Int'l Revenue	Total Revenue	O-IRTR	O-DRTR	L-IBD	I-OMS	S-ISF			Rank
	The British firms:											
1	Bovis Lend Lease	6	4432.0	5782.0	0.77	0.23	0.29	0.46	0.40	2.62	11633	1
2	AMEC PLC	12	2427.3	4829.1	0.50	0.50	0.13	0.26	0.60	1.80	4376	2
3	Balfour Beatty PLC	28	937.0	3578.0	0.26	0.74	0.15	0.30	0.80	1.88	1760	4
4	Joannou & Paraskevaides (Overseas) Ltd.	29	929.2	929.2	1.00	0.00	0.08	1.00	0.70	2.97	2758	3
5	Keller Group PLC	69	337.3	475.7	0.71	0.29	0.26	0.93	NA	NA	NA	
6	Rotary Group Ltd.	122	85.0	220.0	0.39	0.61	0.04	0.29	0.10	0.92	78	5
7	Mivan Ltd.	157	35.0	83.0	0.42	0.58	0.06	0.33	0.20	1.17	41	6
	Average of all British firms				**0.58**	**0.42**	**0.14**	**0.51**	**0.47**	**1.89**	**3441**	
	The Chinese firms:											
1	China State Const. Engineering Corp.	19	1278.7	4703.8	0.27	0.73	0.14	0.12	0.80	1.63	2081	1
2	China Harbour Engineering Co. Group	42	631.2	1862.4	0.34	0.66	0.18	0.40	0.50	1.80	1139	2
3	Paul Y. - ITC Construction Holdings Ltd.	44	615.0	1457.0	0.42	0.58	0.09	0.12	0.40	1.20	739	3
4	China Civil Engineering Construction Corp.	70	272.2	288.0	0.95	0.05	0.10	0.40	0.20	1.85	503	4
5	China Road & Bridge Corp.	74	243.5	1181.1	0.21	0.79	0.12	0.10	0.30	0.98	238	9
6	China National Chemical Engineering Corp.	76	212.1	600.0	0.35	0.65	0.07	0.08	0.80	1.45	308	7
7	Shanghai Construction General Co.	78	201.4	2224.0	0.09	0.91	0.04	0.03	0.10	0.33	67	19
8	China Nat'l Complete Plant Imp. & Exp. Corp.	87	166.2	166.2	1.00	0.00	0.09	0.51	0.30	2.09	348	5
9	China Railway Engineering Corp.	88	165.9	3715.8	0.04	0.96	0.05	0.10	0.20	0.50	82	17
10	China Jiangsu Int'l Econ-Tech. Coop. Corp.	94	133.3	165.9	0.80	0.20	0.30	0.20	0.40	2.34	312	6
11	China Int'l Water & Electric Corp. (CWE)	101	120.3	175.7	0.68	0.32	0.09	0.21	0.50	1.66	199	10
12	China Metallurgical Const. (Group) Corp.	103	116.1	1550.3	0.07	0.93	0.08	0.40	0.80	1.51	176	11
13	Dongfang Electric Corp.	109	104.2	116.9	0.89	0.11	0.06	0.08	0.20	1.35	140	15
14	CMEC	110	104.0	155.7	0.67	0.33	0.06	0.09	0.50	1.45	151	13
15	China Petroleum Engineering Const. Corp.	114	100.0	167.3	0.60	0.40	0.04	0.45	0.30	1.48	148	14
16	China National Overseas Engineering Corp.	115	98.1	98.1	1.00	0.00	0.09	0.10	0.30	1.66	163	12
17	China Shanghai SFECO	119	89.8	95.3	0.94	0.06	0.33	0.54	0.70	3.18	286	8
18	Harbin Power Engineering Co. Ltd.	123	82.1	111.3	0.74	0.26	0.02	0.10	0.10	1.00	82	18
19	China Wanbao Engineering Corp.	125	78.5	87.9	0.89	0.11	0.13	0.20	0.20	1.68	132	16
20	Sinopec Engineering Inc.	132	65.2	585.2	0.11	0.89	0.01	0.00	0.20	0.35	23	20
	Average of the ENR top 20 Chinese firms				**0.55**	**0.45**	**0.10**	**0.21**	**0.39**	**1.48**	**366**	

Note: 1. The international revenue and total revenue are in US$ million at current prices.
2. The OII and International Strength of a firm refer to the Endnote 11.

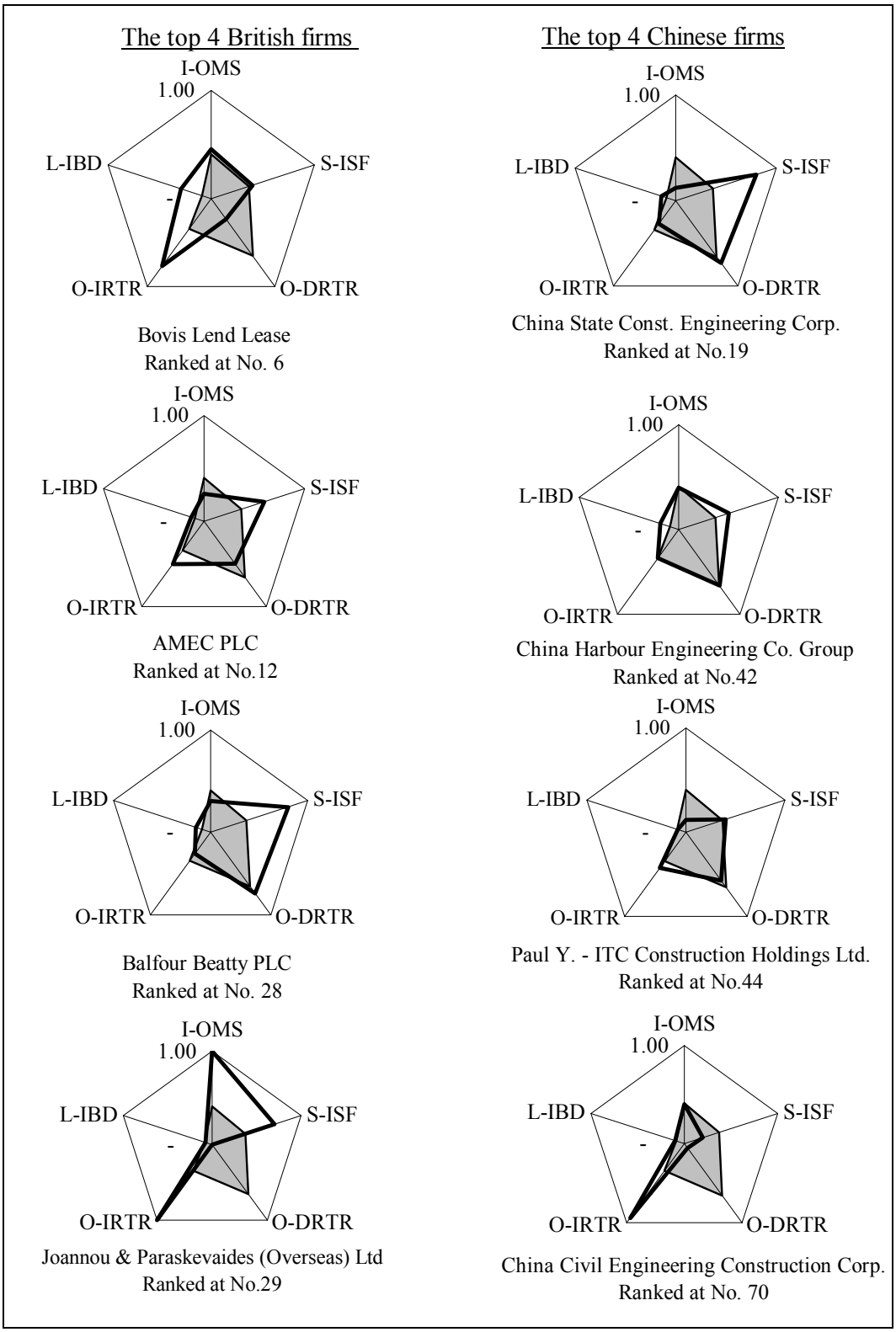


Figure 10.5 Internationalization Ratios of the top 4 British and Chinese construction firms in OLI+S Star model

Source: Table 10.1

Note: 1. The ranking refers to ENR (2001)

2. The background shading indicates the average internationalization ratios of all top 225 international contractors in ENR (2001).

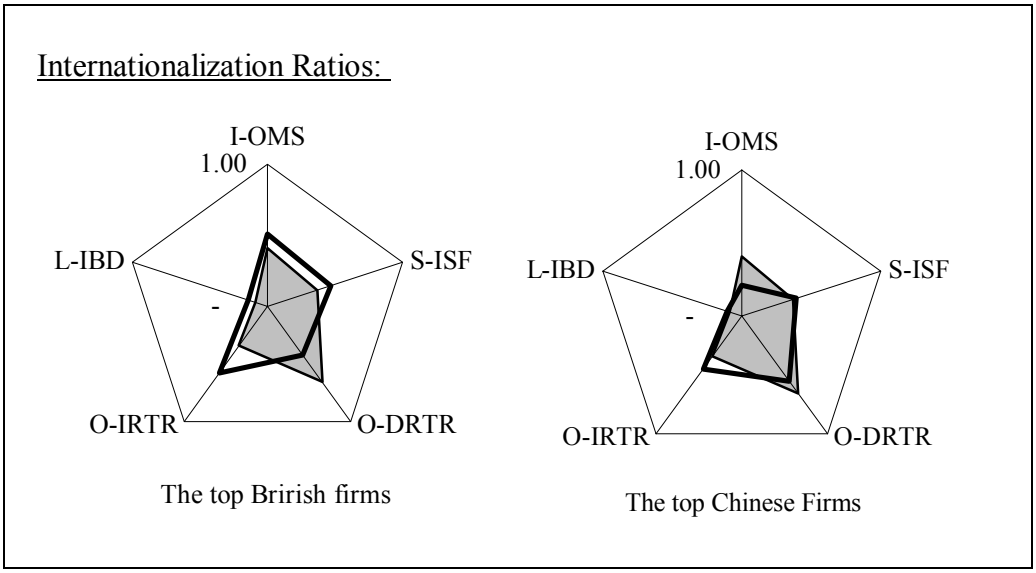


Figure 10.6 The average internationalization ratios of the top British and Chinese construction firms in OLI+S Star model
Source: Table 10.1
Note: The background shading indicates the average internationalization ratios of all top 225 international contractors in ENR (2001)

In terms of the international business distribution (L-IBD), the top 5 British firms show high L-IBD, averagely working in 25 countries in 2000. The Chinese firms show lower L-IBD with 17 countries worked averagely. The average of all Chinese firms' L-IBD is lower than that of the British firms, which indicates that the majority of the Chinese firms are concentrating their business in a few key markets, or regional markets. The firms with a high OII and a relative low L-IBD indicate that they are concentrating their international operations in certain well-developed markets, such as Joannou & Paraskevaides (Overseas) Ltd., Mivan Ltd., Paul Y. - ITC Construction Holdings Ltd., China Civil Engineering Construction Corp. and China National Chemical Engineering Corp. The British firms maintained a high presence in the global market as the high L-IBD revealed; meanwhile they attached high attention of their businesses in North America and some Asian countries as revealed in Figure 10.2. The high L-IBD and the global movement in Figure 10.2 of the British top firms

Table 10.2 The top British and Chinese international contractors in domestic and international market

No.	Firm	ENR Rank	Domestic Revenue in US$ Million	International Revenue in US$ Million	OII	International Strength
	The British Firms:					
1	Bovis Lend Lease	6	1,350.0	4,432	2.62	11633
2	AMEC PLC	12	2,401.8	2,427	1.80	4376
3	Balfour Beatty PLC	28	2,641.0	937	1.88	1760
4	Joannou & Paraskevaides (Overseas) Ltd.	29	-	929	2.97	2758
5	Keller Group PLC	69	138.4	337	NA	NA
6	Rotary Group Ltd.	122	135.0	85	0.92	78
7	Mivan Ltd.	157	48.0	35	1.17	41
	The Chinese Firms:					
1	China State Const. Engineering Corp.	19	3,425.1	1,279	1.63	2081
2	China Harbour Engineering Co. Group	42	1,231.2	631	1.80	1139
3	Paul Y. - ITC Construction Holdings Ltd.	44	842.0	615	1.20	739
4	China Civil Engineering Construction Corp.	70	15.8	272	1.85	503
5	China Road & Bridge Corp.	74	937.6	244	0.98	238
6	China National Chemical Engineering Corp.	76	387.9	212	1.45	308
7	Shanghai Construction General Co.	78	2,022.6	201	0.33	67
8	China Nat'l Complete Plant Imp. & Exp. Corp.	87	-	166	2.09	348
9	China Railway Engineering Corp.	88	3,549.9	166	0.50	82
10	China Jiangsu Int'l Econ-Tech. Coop. Corp.	94	32.6	133	2.34	312
11	China Int'l Water & Electric Corp. (CWE)	101	55.4	120	1.66	199
12	China Metallurgical Const. (Group) Corp.	103	1,434.2	116	1.51	176
13	Dongfang Electric Corp.	109	12.7	104	1.35	140
14	CMEC	110	51.7	104	1.45	151
15	China Petroleum Engineering Const. Corp.	114	67.3	100	1.48	148
16	China National Overseas Engineering Corp.	115	-	98	1.66	163
17	China Shanghai SFECO	119	5.5	90	3.18	286
18	Harbin Power Engineering Co. Ltd.	123	29.2	82	1.00	82
19	China Wanbao Engineering Corp.	125	9.4	79	1.68	132
20	Sinopec Engineering Inc.	132	520.0	65	0.35	23

Source: Table 10.1.

also reveal that their advantage from the historical likes with the ex-empire countries as identified by many literatures are no longer as significant as before, since the firms have moved into many newly emerging markets. The majority of Chinese firms were working in South and South East Asian countries, where over 70% of their total international revenues were generated. The Chinese firms were also maintaining their presences in Latin America and Africa.

The British firms possess overwhelming advantages on the overseas management structure (I-OMS) over the Chinese firms. This conforms to the earlier argument that the British firms own high advantages on financial capacity, and their diversification and differentiation result in the sophisticated presences of subsidiaries in many countries, which may include the diversification of business into financing service, investment and the property development and management in various countries. The high I-OMS and the high International Strength of the few top British firms are also consistent with the trend about the recent M&A as discussed earlier. In contrast, the Chinese firms do not have the advantages in terms of the I-OMS, which complies with the fact that most of the Chinese construction firms operate their overseas businesses through representative offices on a project basis, rather than the affiliates. Some of them may set up a local branch office or joint venture company in the case that preferable interests may be pursued in the countries where regulations are imposed. In addition, the foreign direct investments (FDI) to other countries conducted by Chinese construction firms are not very significant. Only in a few countries where they have operated for many years with intent for a longer stay, may they then establish a subsidiary or solely owned company.

The S-ISF of the British firms is higher than that of Chinese firms, but not as significant as the I-OMS. This may reveal that although the British firms still have the comparative advantage over the Chinese firms in technical specialty, but this advantage may not be as prominent as before generally. Some Chinese construction firms are capable to undertake the technically complex projects which are not possible for them before. The firms with a high OII but a moderate or low S-ISF demonstrate that they consolidate their business into the core business and main technical expertise instead of extending to all technical specialized fields, such as Bovis Lend Lease, China Harbor Engineering Co. Group and China Civil Engineering Construction Corp. This is also consistent with the current feature of the British firms as discussed earlier. Most Chinese construction firms have developed themselves as generalists in various civil engineering disciplines as the S-ISF revealed, but some are specializing in certain technical expertise with their background in China.

10.4 Concluding remarks

This chapter analyzes the strengths and advantages of the British and Chinese international construction firms in general and their top firms in particular through the four internationalization ratios in the OLI+S model. The results of the quantitative analysis are consistent with the suggestions in the literatures, and also provide a comparison of the internationalization process of the British and Chinese construction firms. It is suggested that the international involvement of the British firms was maintained at certain level in recent years while that of the Chinese firms was steadily speeding up.

All of the ownership, internalization, locational and specialty advantages of the British construction firms, in terms of the four internationalization ratios are higher than that of the Chinese firms. Although the number of Chinese construction firms ranked in the top 225 international contractors by ENR was higher than that of the British firms, the Chinese contractors are still in the initial internationalization stage in global market. The allocations of overseas businesses of the firms from these two countries did not clash in general and if they did in some countries, they actually did not compete at the same level. The I and S advantages of the British firms and some of the O advantages of the Chinese firms may provide opportunities for them to work together in many dimensions, which is specially beneficial for each other in many developing countries' market. In fact, this is what has happened in China and some Asian countries, and the trend seems to be continued.

Chapter Eleven

IMPLICATION TWO: A Comparative Study of Singaporean and Chinese International Contractors

11.1 Introduction

This chapter presents a comparative study of Singaporean and Chinese contractors in international market. It discusses the internationalization of Singaporean international construction firms. Based on previous studies, the advantages and disadvantages of Singaporean CMNCs are analyzed according to the OLI frameworks. Furthermore, a comparative analysis of the significant advantages Singaporean and Chinese CMNCs own in international market is presented.

11.2 Internationalization of Singapore construction firms

The internationalization of construction multinational companies from Singapore was backed by the fast growth of Singapore's domestic economy during past decades. With the significant economic development, Singapore has increased its total direct investment to other countries by the local-controlled companies from around S$ 20 billion in 1994 to S$40 billion in 1998 (SDS, 1997, 2000). Construction industry also experienced an increasing regionalization from the late 1980s to the mid-1997 when the Asian financial crisis negatively affected the regional economies. Up to 1998, Singapore CMNCs had increased its construction-related investment and construction service export constantly. According to the statistics of CIDB and Building and Construction Authority (BCA), there was an amount of construction export of S$ 118

million in 1984, while for the six-year period from 1992 to 1997, the export performance by Singapore CMNCs had reached S$ $1 billion (CIDB, various issues; BCA, 1999). After the turn of the century, the construction export from Singapore appears as an increasing trend as shown in Figure 11.1. According to the annual survey conducted by BCA, Singapore contractors clinched $1.2 billion overseas contracts in 2003. This was over three times higher than the construction export value in 2000. (BCA, 2004b).

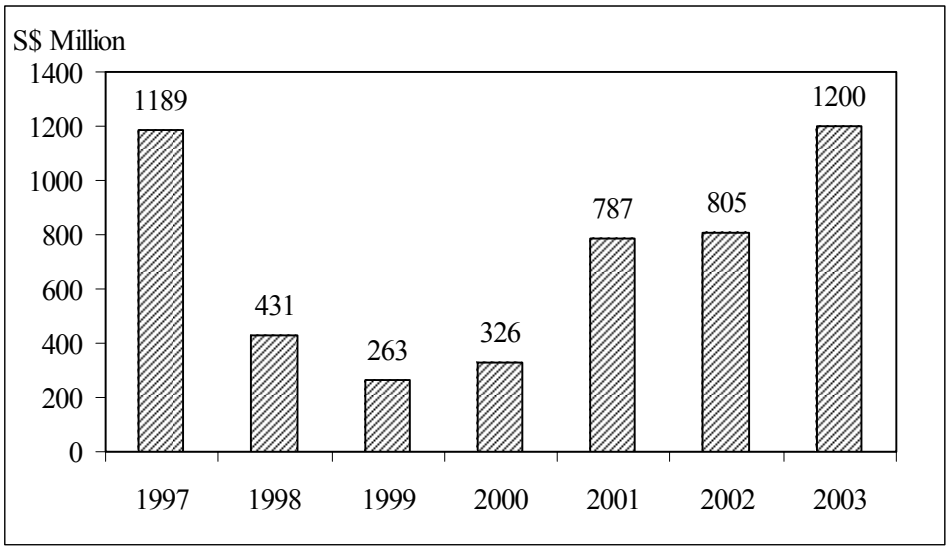


Figure 11.1 Value of construction export by Singaporean contractors 1997-2003
Source: BCA (1999, 2004a, 2004b)

The construction market in Singapore is open and competitive, where other international construction firms and local contractors may compete freely for any projects following certain regulations (CIBD, 1998). This situation provided good opportunities for Singaporean contractors to learn from others. Singapore contractors accumulated their financial, technical and managerial expertise in indigenous market by competing and cooperating with the international contractors from other nations. One of the significant features of Singaporean CMNCs' development is that the growth and development of some efficiently managed indigenous construction firms have been contributed through the policy of the government of Singapore in favoring

competition rather than protection (Cuervo, 2002). As concluded by Ofori, Leong and Teo (1999), foreign contractors have been beneficial to Singapore construction industry by transferring technologies to local contractors and encouraging local contractors to improve and compete effectively with them. In contrast, protection is a major policy formulated by the Chinese government due to the significant influence to the local economy of domestic construction industry.

The upturn of construction exporting from 1999 was underpinned by the recovery of the South East Asian economies, as well as the opening up of the China market. In terms of the locational distribution of Singapore CMNCs in international market, Southeast Asian and Northern Asian markets are the most important destinations for Singaporean CMNCs. In total, there were 51 exporting construction companies with over 320 overseas projects in 31 countries in 2003 (BCA, 2004b). With the recovery of the Southeast Asian economies, Singaporean contractors have managed to secure more overseas projects in the region, particularly in Indonesia and Malaysia. In 2003, Southeast Asia was the most preferred region for construction exports, accounting for 52% of the total construction export value (Figure 11.2). Another area that was preferred by Singaporean contractors for exports is North Asia, especially the Chinese market where foreign investment has been encouraged. Exports to Middle East and India also had been increased steadily, and three new countries - Lebanon, Italy and Tunisia - were added to the list of destinations in 2003.

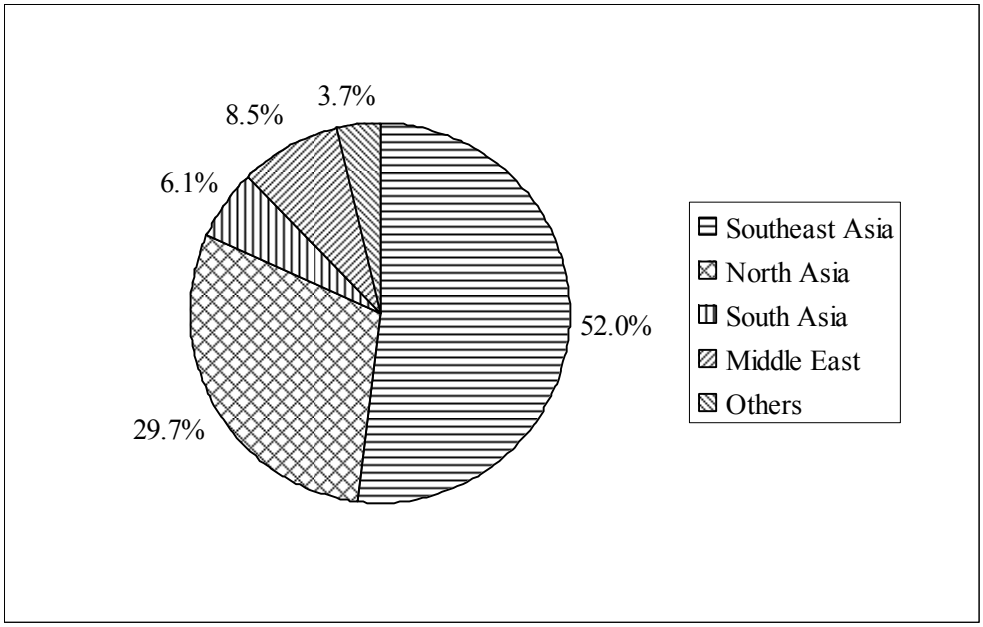


Figure 11.2 Overseas construction export by Singaporean contractors in 2003 by regions
Source: BCA (2004b)

In terms of the specialty of works undertaken, Singaporean CMNCs, with their traditional strength in building construction, took 90.4% of the overseas contracts being associated with building developments in 2001, while the remaining 9.6% were related to infrastructure construction. Among all sectors, the industrial sector was the most popular with Singaporean contractors in their overseas ventures as industrial projects accounted for close to half of the total value of construction exports in 2001 (see Figure 11.3). The second largest sector was the commercial sector, which accounted for 34% of the total export value in 2001. In 2003, the industrial projects accounted for more than half of total number of contracts secured (Figure 11.4), reflecting the rapid industrial development in the region. Total number of mechanical and electrical (M & E) engineering projects had also increased about five-fold since 2000, from 45 projects in 2000 to 210 projects in 2003 year. This reflects the significant improvement on strength and expertise of Singaporean contractors in engineering works.

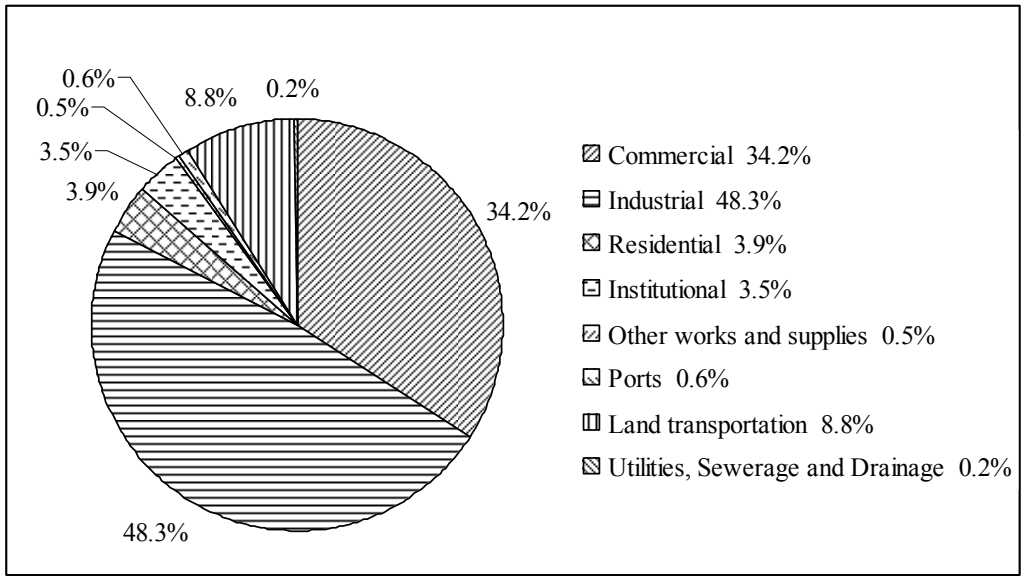


Figure 11.3 Overseas construction export by Singaporean contractors in 2001 by sectors

Source: BCA (2004a)

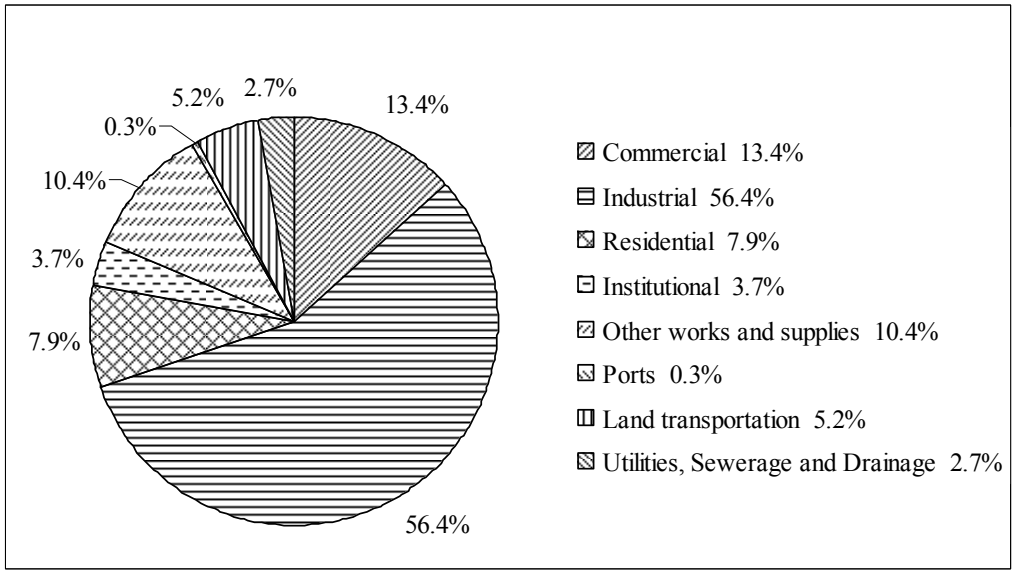


Figure 11.4 Overseas construction export by Singaporean contractors in 2003 by sectors

Source: (2004b)

As a typical structure of construction industry in developed countries, the top contractors in Singapore accounted for the majority of the overseas works. As in 2001, the top ten exporting firms accounted for nearly 97% of the total overseas contracts secured. Econ International with its construction exporting value of S$ 93.71 million, and Jurong Engineering with its exporting value of S$65.58 million were ranked as the top two CMNCs in Singapore in 2000. United Engineers (Singapore) Pte Ltd was

the leading exporter in 2001, with S$256 million worth of overseas contracts, and Sembcorp Engineers and Constructors Pte Ltd and Jurong Engineering Ltd were also among the top exporters, with S$249 million and S$132 million worth of contracts respectively. Similarly in 2003, the top five exporting firms accounted for more than 65% of total overseas contracts secured, and SembCorp Engineers and Constructors Pte Ltd emerged as the leading exporter, securing $238 million worth of overseas contracts (BCA, 2004a, 2004b). As suggested by BCA (2004a), despite an upturn in regional construction demand after the turn of the century, the total contract value clinched by the top Singaporean CMNCs had not improved as the stronger demand was mainly fuelled by civil engineering developments where Singaporean contractors are less competitive. However, the situation has been improved as shown in the data of 2003.

In general, with the domestic construction sector recording slowdown in Singapore during recent years, there is thrust for Singaporean CMNCs to be further regionalized and internationalized. The growing construction markets in Asia Pacific, especially in China with its open of construction market according to the WTO timetable, will provide numerous market opportunities for Singaporean contractors to expand their businesses. Therefore, a comparative analysis of the advantages owned by Singaporean and Chinese CMNCs may become pertinent.

11.3 OLI advantages of Singapore international contractors

The competitive advantages of Singaporean contractors in international market can be identified using the OLI framework. The conclusions presented in this section were

mainly sourced from and summarized based on the studies contributed by Cuervo and Low (2003), Cuervo (2002) and Ofori, Leong and Teo (1999).

In terms of the ownership advantages, Singaporean CMNCs took three intangible asset advantages as most significant when competing in their major international construction market. These advantages are, (i) information, knowledge, technology and R&D capability; (ii) the firm's name and reputation; and (iii) management and organizational capability. Through technological innovations, Singaporean CMNCs are able to differentiate their construction services and in the process develop a track record and thereby establish a good reputation and name in the industry. However, the enabling factor that is able to bring out the intangible asset advantages is the management capabilities of the firms. In particular, Cuervo (2002) mentioned that clients engaged Singaporean firms because of their superior technological know-how and relevant experience, while their experience and track record is supported by R&D.

In relation to non-ASEAN contractors (e.g. Korean, Japanese, American or European) in the ASEAN region outside Singapore, Singaporean CMNCs viewed their three most important intangible asset advantages as coming from (i) their firm's name and reputation; (ii) human resource management capabilities; and (iii) business development capabilities. This is because Singaporean CMNCs would be known in ASEAN region for having established a track record in a certain area of specialization. Moreover, they have greater familiarity with the people of the region in terms of their language, history, culture and ways of doing business compared with contractors from non-ASEAN countries. In terms of the most important transactional and organizational asset advantage Singaporean CMNCs viewed these as coming from (i)

their stakeholder's commitment to client's needs and (ii) their organizational competence in managing their domestic and foreign assets. The value of maintaining the stakeholder's commitment to client's needs was well recognized by Singaporean CMNCs.

In general, Singaporean CMNCs viewed their highly country-specific ownership advantages in relation to other ASEAN contractors to be (i) their facility with languages for international business communications; (ii) Singapore's superior technological infrastructure. In addition, the ownership advantages deriving from Singapore relative to non-ASEAN contractors as coming from the protection of their legal and property rights. This concerns the professional legal support available in Singapore for writing and enforcing international construction contracts; and to the protection of property rights of CMNCs in Singapore.

On the other hand, Singaporean CMNCs' greatest ownership disadvantage was identified as the reducing demand for construction services in Singapore. The two next important ownership disadvantages compared to contractors from other ASEAN countries is the latter's lower costs, and the other ASEAN contractors having a better knowledge of their country and clients. In order to sustain a track record, it is imperative for Singaporean CMNCs to maintain a continuous source of large projects in Singapore. The reduction of demand for construction projects coupled with the intense competition from international contractors is a significant source of ownership disadvantage for Singaporean firms. The Singapore construction market is highly competitive where margins are thin and international contractors dominate large projects.

Singapore CMNCs identified three most important locational factors when operating outside Singapore: (i) social, political, cultural and geographic factors; (ii) host government attitudes, policies and regulatory framework; (iii) cost of doing business factors. The most significant location factor is the social political situation because that eventually translates into business efficiency and profitability. In addition, they argued that the government is the first gatekeeper the company has to go through to serve a foreign construction market. They also noted the important influence of cost of doing business in host countries. The real wage differential between Singapore contractors and other contractors in non-ASEAN locations was viewed as the most important home-host country induced location advantages by Singapore CMNCs.

Regarding the internalization factors, two reasons were given as the most important factors for Singaporean CMNCs to internalize in the international construction market within the organization rather than dealing with other contractors at arm's length. The two reasons or incentives to internalize are: (i) to protect the reputation of the firm, and (ii) to protect the quality of the service of the firm. In particular, they argued that the fundamental reason for internalizing is one of retaining control in terms of quality, delivery, client relationship. The political stability of the host country was identified as the most important factor influencing their decision to set a wholly owned subsidiary outside Singapore. The liberal policy on the remittance of profit was identified as the second most important factor, while the actual and potential market demand for construction services in the host country came in third. The most popular reason for exporting construction services in international market was to improve profits, followed by the need to diversify risks and to utilize surplus capacity.

11.4 Comparison between Chinese and Singapore international contractors

Because of various endogenous and exogenous factors, Chinese and Singaporean international contractors demonstrated differences in many areas. A comparative analysis between the CMNCs from the two nations, in terms of their respective OLI advantages, is reported in this section.

In exploring the reasons and incentives of internationalization, both Singaporean and Chinese CMNCs considered the most important factors are to improve profits and to diversify risks. However, Chinese CMNCs also took into consideration the factor of maintaining a better cash and/or capital flow for the firm as a whole and to alleviate the pressure from competition in the domestic market in China. On the other hand, Singaporean firms took the factor "to utilize surplus capacity" as important.

In terms of the ownership advantages, Singaporean CMNCs were advantaged in international market by their (i) information, knowledge, technology and R&D capability; and (ii) management and organizational capability. In contrast, Chinese CMNCs in international market were disadvantaged in these two areas. In addition, they also had a disadvantage on working quality and Total Quality Management (TQM) capability when competing with other international contractors. Both of the firms from these two countries considered the firm's name and reputation as an important factor among firm-specific ownership factors. In relation to non-ASEAN contractors in international market, the study also suggested that Singaporean CMNCs had the advantages in terms of their human resource management capabilities; their stakeholder's commitment to client's needs and their organizational competence in

managing their domestic and foreign assets. In these three areas, there are no evident advantages found among the Chinese CMNCs in international market. Nevertheless, this may not necessarily mean that Chinese CMNCs do not focus on the client's needs, but in actual factor, there is agreement as suggested in the study that Chinese CMNCs are weak on the areas relating to management expertise when competing with other international contractors.

Regarding the country-specific ownership advantages, Singaporean CMNCs took their advantages in the areas of (i) their facility with languages for international business communications; (ii) Singapore's superior technological infrastructure; and (iii) the factor derived from the protection of their legal and property rights. On the other hand, Chinese CMNCs took the advantages largely from other aspects, such as (i) size and growth of the domestic construction market in China; (ii) Chinese government assistance and incentives on overseas contracting; (iii) governmental and historical relationship with developing countries; (iv) availability of low-cost workers from China; and (v) availability of low-cost machinery and materials from China. Due to the differences on the economic nature of the two countries, Singaporean CMNCs demonstrated their disadvantages regarding the reducing demand for construction services in their domestic market. In addition, they also identified two other disadvantages: the lower cost of works of other regional contractors and the other contractors having a better knowledge of their countries and clients. Another major disadvantage found with Chinese CMNCs is the lack of support from financial sector and banking system at home, while it is not obvious for Singaporean firms in this regard.

The most important locational factors taken into account by Singaporean CMNCs in international market are (i) social, political, cultural and geographic factors; (ii) host government attitudes, policies and regulatory framework; and (iii) cost of doing business factors. For Chinese CMNCs, the most important country-specific locational factors include (i) local construction market demand and potential in the host countries; (ii) local government attitudes, intervention and policies towards international contractors, including regulatory barriers of entry in the host countries; (iii) availability and costs of local workers in the host countries; (iv) local import and export control and tariff levels for construction machinery, equipment and materials in the host countries; and (v) accessibility to local financing resources in the host countries. In addition, Chinese CMNCs considered the most important locational factors as those relating to competition in the host countries. These include the competition from other Chinese international contractors in the same countries and from other international competitors. This may be reflected through the actual fact that many Chinese CMNCs are working in the countries with high concerns on social and political instability, and several kidnap incidents happened in recent years. Singaporean firms took the government as the first gatekeeper the company to go through to venture into international market, while generally Chinese contractors may not be able to obtain such helps from government when they work in international market. Both of the firms from the two countries took into account considerably regarding the cost of doing business in the host countries.

The most important internalization incentives, for Singaporean contractors working in international market, are those to protect the reputation of the firm, and to protect the quality of the service of the firm. In addition, the political stability of the host country,

and the liberal policy on the remittance of profit were also identified as the most important factors influencing their decision on choosing different internalization approaches in international market. For the case of Chinese CMNCs in international market, they do consider the incentive on protection of technological know-how of the firm and ensuring the quality of construction and services provided, but they also focus more on the factors of meeting the host government's policy requirements relating to construction business operations, and that of better utilizing and controlling the resources.

11.5 Concluding remarks

In summary, this chapter analyzes the various advantages of the Singaporean international contractors, and compares them with Chinese international construction firms in terms of their various OLI advantages. It suggests the firms from the two nations share some common attitudes regarding the different factors, and yet they own many different advantages and disadvantages in international market. Many of the differences between them are rooted in the economic nature of the two countries. Therefore, this may provide them the opportunities to work together and utilize their respective advantages.

Chapter Twelve
SUMMARY AND CONCLUSIONS

This chapter presents the summary and conclusions of this thesis. The relevance of research problem and research questions of the thesis is also discussed. This is followed by theoretical and practical conclusions.

12.1 Summary of the thesis

In this section, summaries of each part in this thesis are presented according to the structure of thesis as outlined in Chapter 1 (see Figure 1.4). Major points are reported without repetition on details.

12.1.1 Part I: Theoretical background

Part I covers all relevant theoretical background analysis for this thesis by concentrating on Dunning's eclectic paradigm and its application on international construction industry. After the literature reviews on various schools of theories on internationalization and MNCs in Chapter 2, intention was made to find out the relevance between these theories and international construction industry. Chapter 3 reviewed Dunning's eclectic paradigm, and focuses were drawn on the different variables in the paradigm, and its economic nature. Furthermore, Chapter 3 reviewed a number of application and extensions of eclectic paradigm in both construction and non-construction industries, and this may help the further extension of eclectic paradigm into domestic contexts as in Part III. Chapter 4 analyzed international construction industry and construction MNCs, these include the basic characteristics, and economic nature of international construction industry. The core in this chapter was the creation of OLI+S model and the formulation of two transaction chains in

international construction, and they were further tested, examined and applied in various sections in this thesis.

12.1.2 Part II: Chinese CMNCs in international market

After the development and overall performance of Chinese CMNCs in international construction market were studied in Chapter 5, Chapter 6 analyzed various OLI factors regarding Chinese CMNCs in international market using the proposed OLI framework. There are two major portions in this chapter: first is the identification and examination of the significant ownership, locational and internalization advantages and disadvantages of Chinese CMNCs in international market; and the second is the variation and correlation between these significant factors. The data from questionnaire survey were adopted using various statistical methods, and case studies were conducted. In order to establish causality relationship between various OLI factors, the new advanced technology of rough set analysis was applied to the significant OLI factors. This also brought a number of practical decision rules for reference to practitioners in international construction industry.

12.1.3 Part III: Chinese CMNCs in domestic market

Part III covers the study of Chinese CMNCs in domestic construction market. Chapter 8 studied the general status of China's domestic construction industry, in terms of its development, the macro economic perspectives, and the industrial structure. Various macro economic tools were adopted in this chapter, including the intermediate inputs ratios, industrial output impact ratios, economic and financial indexes, concentration ratios, and total factor productivities. Chapter 9 studied Chinese CMNCs in domestic construction market, using the proposed OLI framework. Major objective in this chapter was to test the validity of extending the OLI paradigm to domestic context.

With the identification and examination of the significance of ownership, locational and internalization advantages and disadvantages of Chinese CMNCs in domestic construction market, the study justified the extension of OLI paradigm. This is of theoretical importance in this research. Furthermore, the variation analysis and correlation analysis between various significant OLI factors were also provided regarding the practices of Chinese CMNCs at home.

12.1.4 Part IV: Implications and conclusions

Part IV covered two comparative studies as the implications of this research, and theoretical and practical conclusions. Chapter 10 analyzes and compares the advantages of the British and Chinese international construction firms through four internationalization ratios in the OLI+S model. The results suggest that all of the ownership, internalization, locational and specialty advantages of the British construction firms, in terms of the four internationalization ratios are higher than that of the Chinese firms. Chinese contractors are still in the initial internationalization stage in global market. Chapter 11 presented the comparison of Singaporean and Chinese CMNCs in intentional market. Their respective advantages and disadvantages in international operations are discusses and compared. It suggests the firms from the two nations share some common attitudes regarding the different factors, and yet they own many different advantages and disadvantages in international market. Many of the differences between them are rooted in the economic nature of the two countries. Therefore, this may provide them the opportunities to work together and utilize their respective advantages.

12.2 Conclusions on research problem

This research intends to bridge the practice of Chinese CMNCs and the application of international production theories, and therefore to answer the research problem of whether the internationalization of Chinese CMNCs can be explained by the received international production theories, given the fact that Chinese construction MNCs working in international construction market possess their own competitive advantages, and they are originated from China's transitional economy and experiencing structural reform. Chapter 5 and Chapter 8 reviewed the development of Chinese construction and analyzed their performance and general status enterprise in both international and domestic market. Following each of these two chapters, Chapter 6 and Chapter 9 studied Chinese CMNCs' various OLI advantages in international and domestic market respectively by applying the theoretical framework of eclectic paradigm. Therefore, the research problem was addressed accordingly, and the significance of various factors influencing Chinese CMNCs' construction related activities in both international and domestic construction market were also identified and examined.

In particular, the answers for the research questions set out in section 1.3 may be provided as follows:

- The current situation of Chinese construction MNCs in international market was analyzed in Chapter 5 and their development was illustrated in section 5.2. A general reflection drawn from the analysis is that Chinese CMNCs are at their initial internationalization stage in global market, and some competitive arms are being built up. The underlying reasons that drive Chinese CMNCs

growing fast in international construction market were elaborated in section 6.3; their competitive advantages, business strategies that contribute to their development and other factors that influence their expanding in international market were analyzed in section 6.4, 6.5 and 6.6 by applying the OLI paradigm. Comparing with other international contractors, Chinese CMNCs own various advantages and disadvantages as demonstrated in Chapter 10 and chapter 11. The OLI+S model were used to conduct the comparative analysis.

- Chapter 8 analyzed the current development of China's domestic construction market, and investigated the role of construction enterprises in domestic economy. Following the similar theoretical framework, the competitive advantages of Chinese CMNCs in domestic market were examined in Chapter 9 in terms of ownership, locational and internalization factors.

12.3 Theoretical conclusions

The following theoretical conclusions may be drawn from this research:

Firstly, this research re-examined and demonstrated the generality and flexibility of the eclectic paradigm. The paradigm has been applied and empirically tested in various economic sectors and in different countries, especially for the transnational activities of MNCs in manufacturing and financial sectors. However, despite the increasingly changed factors influencing the OLI advantages of CMNCs in international construction market, eclectic paradigm is still relevant in explaining the behaviors of construction MNCs. This may need to take into account the globalization trend of economy, the increasing involvement of CMNCs from developing countries,

the more complicated issues regarding to the tangible and intangible assets possessed by CMNCs, business strategies and other factors.

Secondly, this research shows that the eclectic paradigm can be successfully applied to the study of MNCs from developing countries by incorporating various relevant factors into the previous theoretical frameworks. Most of the existing studies are concentrated on the MNCs from developed countries, especially the triad countries, and more studies are focusing on the analysis of L advantages of the location in developed countries than that in developing countries. Hence, this research testifies that fact that the eclectic paradigm is possibly the most flexible tool to analyze MNCs regardless of the countries the MNCs come from.

Thirdly, the eclectic paradigm can be extended to the studies of MNCs' operation in domestic market. This point was explained in previous section.

Fourthly, derived from internalization and externalization concepts, two transaction chains in international construction were formulated to analyze the demand and supply from clients and CMNCs. In fact, by combining both the concept of transaction cost theory and that of internalization theory, identification of two transaction chains provided an integrated framework to analyze the various business strategies and procurement approaches in international construction market. Therefore, it may be argued that the eclectic paradigm not only provides an envelope to encompass various internationalization theories, but also provides a platform on which various relevant theories can be further developed to address other theoretical issues.

Fifthly, as mentioned in Chapter 3, “unquantifiable” and “a shopping list of variables” are two criticisms on the eclectic paradigm. However, in this research, the OLI+S model was created based on eclectic paradigm and tested through a number of samples. The samples used to test OLI+S model include various CMNCs from different countries and the model also was tested at country level. Hence, it may be stated that, if adopting appropriate variables by carefully considering the availability, reliability, comparability and consistency of data, it isn’t impossible to quantitatively analyze the OLI factors by concentrating on the key economic indicators.

Lastly, various OLI advantages and factors which contribute to the internationalization of Chinese CMNCs were identified in this research. Therefore, these advantages and factors may be contributed into the literature of MNCs studies, as well as the studies of international construction industry. The details in this aspect are not repeated here since they have been fully elaborated in previous chapters and summarized in previous section.

12.4 Practical conclusions and implication for policy

In addition to the two implications in Chapter 10 and Chapter 11, some practical conclusions may be drawn from this research regarding the international and domestic operations of Chinese CMNCs. Therefore, this research may offer some insights for practitioners in both international construction and China’s domestic construction market, as well as some implications for policy-makers.

12.4.1 Practical conclusions for CMNCs

First of all, the various OLI advantages and disadvantages identified in this research need to be well managed by Chinese CMNCs in both international and domestic market. The most important advantages and OLI factors are presented in Table 12.1 as a guideline. Based on this table, suggestions regarding these advantages/disadvantages and factors are self-explanatory, and therefore they are not fully presented here but remain as several examples. Each of the OLI factors determines one of the aspects of CMNCs' operations in construction market, and they need to be well managed by decision-makers in CMNCs. For example, the important ownership advantages of "business development capacity", "experience and knowledge about construction market" among others should be paid higher attention by the managers when working in the international market. The disadvantages of "management expertise", "technological and R&D capacity" need to be taken into account by the top management of CMNCs, and resources need to be mobilized to address these weaknesses on a corporate-wide basis. The most important locational factors, such as local construction market demand, government attitudes, interventions and policies, local regulatory protections for local contractors, and others need to be closely monitored by the managers who are working on the overseas projects. Likewise, the significant internalization factors also need to be taken into account by both the top management of CMNCs and their overseas managers and directors.

Table 12.1 Summary of OLI factors regarding Chinese CMNCs in international market

Ownership factors:		
	Comparing with other international contractors:	Comparing with local contractors:
Firm-specific:	Advantages: (i) business development capacity; (ii) firm's reputation; (iii) size of the firm; (iv) experience and knowledge about international construction market; (v) accessibility to technical resources; and (iv) lower costs in production Disadvantages: (i) technological and R&D capacity; (ii) management expertise; and (iii) working quality and Total Quality Management capability.	Advantages: (i) technological and R&D capacity; (ii) business development capacity; (iii) firm's reputation; (iv) size of the firm; (v) experience and knowledge about international construction market; (vi) accessibility to financial resources; (vii) accessibility to technical resources; (viii) management expertise; (ix) networking flexibility of headquarter and other affiliated overseas branches; (x) working quality and Total Quality Management capability; and (xi) lower costs in production
Country-specific:	Advantages: (i) size and growth of the domestic construction market in China; (ii) home government assistance and incentives on overseas contracting; (iii) governmental and historical relationship with developing countries; (iv) availability of low-cost workers from China; and (v) availability of low-cost machinery and materials from China. Disadvantage: (i) support from the financial sector and banking system at home.	(i) size and growth of the domestic construction market in China; (ii) home government assistance and incentives on overseas contracting; (iii) governmental and historical relationship with developing countries; (iv) support from the financial sector and banking system at home; (v) support from other related industries at home for international works; (vi) availability of professionals from China; and (vii) availability of low-cost machinery and materials from China.
	Locational factors	Internalization factors
Firm-specific	(i) large number of competitors from China in the host countries; (ii) large number of other international competitors in the host countries; (iii) intensive competition in the hosting country's market; (iv) lower cost of local contractors in the host countries; and (v) lower cost of other international contractors in the host countries.	(i) to avoid or reduce information search and business negotiation costs; (ii) To utilize international networking of the firm; (iii) to protect the reputation of the firm; (iv) to protect technological know-how of the firm; (v) to ensure the quality of construction and services provided; (vi) to facilitate the need for alternative investments for the profits earned; and (vii) to better utilize and control

		resources (construction materials, equipments, technology, human resources, etc.),
Country-specific	(i) local construction market demand and potential in the host countries; (ii) local government attitudes, intervention and policies towards international contractors, including regulatory barriers of entry in the host countries; (iii) local governmental and regulatory protection for local contractors in the host countries; (iv) political and social stability in the host countries; (v) availability and costs of local professionals in the host countries; (vi) availability and costs of local workers in the host countries; (vii) availability and costs of local machinery and materials in the host countries; (viii) local import and export control and tariff levels for construction machinery, equipment and materials in the host countries; (ix) accessibility to local financing resources in the host countries; and (x) currency conditions and policies in the host countries, i.e. exchange rate fluctuation and control on transferring of funds.	(i) to meet the host government's policy requirements relating to construction business operations; (ii) to better facilitate strategic alliances, partnering and networking with others for the business; (iii) to overcome price discrimination on projects in host country; (iv) to consolidate the market position and to facilitate the future growth and potential of the market; and (v) to avoid or reduce the host government's intervention such as quotas, tariffs, price controls, tax difference, etc.

Table 12.2 Summary of OLI factors regarding Chinese CMNCs in domestic market

	Compared with foreign contractors:	Comparing with local contractors:
Firm-specific:	(i) business development capacity; (ii) size of the firm; (iii) experience and knowledge about the local construction market; (iv) accessibility to technical resources; (v) marketing and project securing capability; (vi) networking flexibility of headquarter and domestic branches; and (vii) lower costs in production compared with other competitors.	(i) Business development capacity; (ii) Firm's reputation; (iii) Size of the firm; (iv) Accessibility to financial resources; (v) Accessibility to technical resources; (vi) Accessibility to construction machinery and materials; (vii) Management expertise; (viii) Networking flexibility of headquarter and domestic branches; (ix) Working quality and Total Quality Management capability; (x) Lower costs in production compared with other competitors.
Country-specific	(i) size and growth of the domestic construction market in China;	(i) Central government assistance and incentives on contracting in different

	(ii) central government's close relationship with the provincial and local governments; (iii) support from the financial sector and banking system at central government level; and (iv) availability of professionals from other regions in China.	regions in China; (ii) Central government's close relationship with the provincial and local governments; (iii) Support from the financial sector and banking system at central government level; (iv) Availability of professionals from other regions in China; (v) Availability of low-cost workers from other regions in China; (vi) Availability of low-cost machinery and materials from other regions in China.
	Locational factors	Internalization factors
Firm-specific	(i) large number of local competitors in the region; (ii) intensive competition in the regional market; and (iii) lower cost of local contractors in the region.	(i) to avoid or reduce information search and business negotiation costs; (ii) to utilize the networking of the firm's headquarter and its branches; (iii) to avoid the cost of moral hazard and adverse selection or under-performance of sub-contractors; (iv) to ensure the quality of construction and services provided; (v) to facilitate the increasing need for professionals and personnel; and (vi) to better utilize and control resources such as construction materials, equipments, technology, human resources, etc.
Regional-specific	(i) local construction market demand and potential in the region; (ii) the speed and level of local economic development in the region; (iii) availability and costs of local professionals in the region; (iv) local government attitudes, intervention and policies towards international contractors, including regulatory barriers of entry in the region; (v) local governmental and regulatory protection for local contractors in the region; and (vi) local commodity price levels in the region.	(i) to avoid client's uncertainty over the nature and value of services being sold and to better facilitate the client's needs; and (ii) to consolidate market position and to facilitate the future growth and potential of the market.

Secondly, in addition to consider the OLI factors individually, all the advantages and factors should be examined on an integrated basis. In fact, this point is also one of the implications from organizational theories (refer to Chapter 2). The OLI framework is

characterized as flexible and multi-dimensional, and this may imply that all of the factors should be considered appropriately. Oversight of any aspects may result in unpredictable consequences. However, this research suggests the strategies to rationally manage these factors with proper priorities regarding different business situation. Especially the rough set analysis in Chapter 7 provided straightforward decision rules for management to improve the firm's operations by concentrating on a few key factors with different priorities. Hence, considering all OLI factors synthetically and each of them strategically is the two aspects of one question, and this may require good skills in the art of management from the management teams in CMNCs.

Thirdly, the consideration of OLI factors in practice needs to distinguish those endogenous and exogenous factors for CMNCs, and those controllable and uncontrollable factors. Most of the firm-specific factors are of endogenous, while country-specific factors are of exogenous. Managers need to observe the differences between the two, and therefore to better manage their business strategies. Likewise for those controllable and uncontrollable factors, managers should be able to utilize the limited resources properly to address those factors, so as to maximize the possibility of success in international business.

Fourthly, the decision-makers in CMNCs should give attention to the dynamic nature of the OLI factors identified. This is related to the dynamic form of eclectic paradigm as analyzed in section 3.2.4. In practice, managers should be monitoring the development of each of the OLI advantages and factors, and should be able to respond

promptly regarding changes of any OLI configurations. This is important specially in the changing environments of the global market.

Lastly, but not least, good understanding of a company's OLI advantages may provide good opportunities for its mangers to strategize cooperation with business partners. Competition and cooperation always coexist in the international market. The various OLI advantages and disadvantages identified in this research regarding the competition with either other international contractors or local contractors, may be perceived as starting points for Chinese CMNCs to cooperate with others. This becomes increasingly important in both the international market and China's domestic construction market due to globalization.

12.4.2 Implications for policy makers

Several implications for policy makers may be drawn from this research as below, however, these implications are by no means exhaustive.

Firstly, many OLI advantages owned by MNCs are derived from country's ESP variables (Koopman and Montias, 1971), therefore, policy makers may take into account various issues to maintain the country-specific OLI advantages owned by Chinese CMNCs. This may include maintaining better governmental and historical relationship with developing countries, approaching host country government regarding possible discriminatory policies towards Chinese CMNCs, and others.

Secondly, since one of the major disadvantages of Chinese CMNCs is technological and research & development capacity, policy makers may pay separate attention to this aspect. All of Chinese CMNCs are SOE, and therefore the government as the owner of these enterprises may put some efforts on research and development for construction industry, in order to maintain the sustainability of CMNCs in international market.

Thirdly, this research also suggests that supporting industries for Chinese CMNCs taking construction works is crucial in terms of their competence in international market. These include support from financial sector and banking system in China, support from manufacturing sectors for materials, equipment and construction machineries. Government may provide some favorable conditions for the collaboration between these supporting sectors and construction MNCs when the latter contract international works. These conditions may involve import and export procedures, tax-refunding system, and foreign exchange regulations. Actually this may provide benefit for all parties involved with, and ultimately benefit for the nation.

Fourthly, policy makers need to enhance some regulations regarding the over-competition among Chinese CMNCs in international market. As analyzed in this research, the over-competition among Chinese international contractors had brought considerable economic loss and asset capability loss during the past decade. A healthy competition and coordination structure should be maintained among all Chinese construction enterprises; however, it seems necessary for the government to enhance the regulations among the Chinese bidders on particular international construction projects.

Lastly, the government may continue the reform of state-owned enterprises, and in this regard, the structural reform of Chinese CMNCs is very important for them in order to maintain their ownership advantages in both international and domestic market.

12.5 Limitations of the research

This research has achieved all the objectives as set out in Chapter 1, however, some limitations may be noted. As in many attitudinal surveys, one inherent limitation is the compromise between the objectivity and subjectivity of the attitudinal data collected from fieldwork. The subjective scores are calculated based on the respondents' perception and attitude towards the questions on Likert scales. It is therefore unavoidable that different respondents may attach different values to the different points of the scale. However, efforts had been done to address this issue. As mentioned in Chapter 6, good experience and knowledge of the respondents, face to face interview and discussion on the survey questions may help to overcome this limitation. In addition, the objective information in case studies, which involve with 13 companies and 9 construction projects, also helps to address this limitation.

This research attempts to encompass all aspects of Chinese CMNCs in both international and domestic market. However, this is impossible in reality. Following a comprehensive literature review, taking into consideration the various practical issues involved with Chinese CMNCs, this research studied most of the important aspects regarding Chinese CMNCs in international and domestic construction market. As

defined in section 1.4, the scope of this research is the analysis of Chinese CMNCs in connection with their various counterparts in international and domestic construction market. The focus of the research is Chinese CMNCs, rather than other international contractors or local contractors. Therefore, another limitation of this research is that most of the arguments and conclusions were drawn in the research regarding Chinese CMNCs. They may need to be re-considered regarding other international contractors or local contractors.

12.6 Suggestions for future research

Following this work, some future research may be suggested for both the theoretical and practical aspects.

In this thesis, international construction and CMNCs are analyzed based on several predominant economic theories, from which OLI+S model and two transaction chains model were established and applied. However, the development of these models would never be ended. The OLI+S model was derived from eclectic paradigm and formulated as a quantitative tool to benchmark and analyze the international performance of construction MNCs. A suggestion can be made to further transform the model to a qualitative one by itemizing the particular issues regarding construction MNCs in international market. This may provide a helpful analytical framework and mindset for practitioners and managers in market analysis and decision making process. Moreover, conceptual understanding of the dynamic relationship between the O, L, I and S arms may further help managers to strategize their ownership and specialty advantages in responding to locational factors.

The two transaction chains model in international construction, as created based on the transaction cost theory and internalization theory in this thesis is in fact an embryo of a more complicated model, which may provide a qualitative analytical framework for academic research, and a practical tool for decision making of management. Currently the relevant researches are being conducted in UK (University of Reading) and US (Arizona State University, Harvard University, US Federal Aviation Administration (FAA) and US Army MEDCOM) (see Endnote 2). It is potentially significant to apply the TCA into international construction management; this will provide an analytical and applicable method for both the owner and the contractor of international construction project. They may then be helped to choose the optimized strategy in international project management and contract management.

Due to the rapid development of information technology, the application of Rough Set Theory and its methodology have gained substantial success in many areas. In this thesis, the study using rough set analysis is an attempt to broaden the application of RSA into international construction. As a result the straightforward decision rules for international construction management may be provided. In fact, more works can be done in this direction and more ready-for-use decision rules can be achieved through further application of RSA regarding different issues in international construction.

Moreover, the eclectic paradigm and its OLI model can be applied to encompass the historical development of Chinese (including Chinese from mainland China and oversea Chinese) involvement with the international construction industry. A preliminary study in this regard has been done in Jiang, Low and Leong (2003).

Future study is suggested to use the OLI theoretical framework to analyze the role of the Chinese in international construction arena with their trace of a 150-year historical development. This proposed work should be based on an integration of three strands of received research, i.e. (i) the construction industry and its internationalization, (ii) the international business studies and (iii) the Chinese business studies. This work will be of significance in supplying a gap to literatures regarding the historical research of international construction industry and Chinese business study, and will additionally help to provide invaluable lessons and experience for Chinese and Chinese firms in undertaking future international construction business. During recent years, the rapid development of Chinese property market fostered many family-styled Chinese entrepreneurs in China. The experience of overseas Chinese family-styled entrepreneurs is especially helpful for these newly grown Chinese businessmen.

As mentioned earlier, this research focuses on Chinese CMNCs in international and domestic markets. In fact, many Chinese construction UNCs are emerging as important contenders in domestic market in China. Due to the economy of scale and the difference of ownership structure between these UNCs and MNCs, there will be a number of issues arising from their increasing involvement in construction industry. Future research may be suggested to work on these UNCs' operations.

After China's entry to WTO, more and more foreign CMNCs are entering Chinese domestic construction market. On one hand, they bring many new technology and new management expertise into China. On the other hand, they are facing increasingly strong competition from Chinese CMNCs and UNCs in the market. A future study is

suggested to analyze the operation of foreign CMNCs in China and the competition with their Chinese counterparts.

Another important issue regarding Chinese construction industry is the role of supervisory and consultancy firms in the sector. Their roles are increasingly influential in recent years. If considering that there were almost none of them present in the sector about ten years ago, how they rapidly developed in Chinese domestic market, how they are gaining strong position in the sector, and how they can better operate in future are suggestions for future research.

Some other particular issues are also interesting for future research. Asset floating as defined in this thesis is one of the important strategies used by Chinese firms. This helped them to lower tender price in international bidding, and assisted them to more effectively allocate resources in different international construction market. A further research in this regard is suggested to analyze how the ownership and organizational structure of Chinese construction firms may influence this operational strategy in practice. Joint venture between Chinese and foreign partners commonly took place in both international and domestic market. A suggestion may be made to identify the role of JV and consortia of Chinese and foreign construction firms, with the reference to the benefits and costs of such arrangement, and the criteria behind the emergence and successful operation of JV.

The last suggestion for future works is that, since all internationalization theories are evolving along with the changing practice in industry and the developing economic

situation in globalization, future research may incorporate more issues emerging in international market to consummate the internationalization theories.

ENDNOTES

1 According to the World Bank (2002), countries are classified among income groups based on their 2001 gross national income (GNI) per capita. The groups are: low income, US$745 or less; lower middle income, US$746–2,975; upper middle income, US$2,976–9,205; and high income, US$9,206 or more. Hence, the less developed country (LDC) is in the low-income economies, the newly industrializing country (NIC) is in the middle-income economies and the advanced industrialized country (AIC) is in the high-income economies. Generally LDCs and NICs are referred to as developing countries while AICs are regarded as developed countries.

2 A discussion group hosted by the University of Reading, UK is currently investigating how much resources are expended in the commercial process of construction projects, and to explore different empirical approaches to the quantification of transaction costs (see http://www.lists.rdg.ac.uk/mailman/listinfo/w55-sg3). Another related effort is also being made in the US through the Performance Information Procurement System (see http://www.eas.asu.edu/pbsrg/programs.htm)

3 The terms "subsidiary", "associate" and "branch" are defined in UNCTAD (2001) as follows:

- Subsidiary: an incorporated enterprise in the host country in which another entity directly owns more than a half of the shareholders' voting power and has the right to appoint or remove a majority of the members of the administrative, management or supervisory body.
- Associate: an incorporated enterprise in the host country in which an investor owns a total of at least 10 percent, but not more than half, of the shareholders' voting power.
- Branch: a wholly or jointly owned unincorporated enterprise in the host country which is one of the following: (i) a permanent establishment or office of the foreign investor; (ii) an unincorporated partnership or joint venture between the foreign direct investor and one or more third parties; (iii) land, structures (except structures owned by government entities), and/or immovable equipment and objects directly owned by a foreign resident; (iv) mobile equipment operating within a country other than that of the foreign investor for at least one year.

4 ENR classifies the construction industry into the following ten specialized fields: general building, manufacturing, power, water supply, sewerage/solid waste, industrial process, petroleum, transportation, hazardous waste, and telecommunications (ENR, 2001).

5 Dun & Bradstreet – Who Owns Whom (WoW) provides the information linking a company to its corporate family, showing the size of the corporate structure and family hierarchy, and key information on the parent company, headquarters, branches, and subsidiaries worldwide. The WoW's company family ownership tree was adopted to calculate the NSIs of MNCs in

UNCTAD's report (UNCTAD, 2001). In the data collection for this present study, the following WoWs were referred:

- *Who owns whom: United Kingdom & Republic of Ireland, 1996,* Who Owns Whom Ltd, London, UK.
- *Who owns whom: North America, 1996*, Dun & Bradstreet, Ltd, London, UK.
- *Who owns whom: Australasia and Far East, 1996*, Dun & Bradstreet International, High Wycombe, England.
- *Dun's guide who owns whom in Greater China, 1997*, Dun & Bradstreet, High Wycombe, England.

6 The following references were reviewed for data collection:

- *The top 5000 global companies 1999/2000*, Graham & Whiteside Ltd, London, UK, 1999.
- *The world's top 500 companies*, Waterlow Specialist Information Publishing Ltd, London, UK, 1998.
- *Major Companies of Europe*, Graham & Trotman, London, UK, 1999.
- *Germany's top 500: a handbook of Germany's largest corporations, Sixth Edition*. Frankfurt/Main: Information Services, Frankfurter Allegemeine Zeitung GmBtt, 1997, Maxim Worcester, Frankfurt, Germany.
- *Major Companies of Central & Eastern Europe and the Commonwealth of Independent States, 1999*, Graham & Whiteside, London; Dun & Bradstreet Europe, Bucks.
- *Major Companies of Latin America and the Caribbean*, Graham & Whiteside, London, UK 1998.

The subsidiary and associate information of Chinese firms were obtained mostly from their company brochures and on-line homepages.

7 This situation may change as the Chinese government is changing the administration of foreign exchange reserves.

8 a) Data from 1980 to 1992 are the figures of state-owned and collective-owned construction enterprises. Data from 1993 to 1995 are the figures of all economic types of construction enterprises above towns. The statistical coverage from 1996 to 2001 included the fourth and higher grades construction enterprises (old classification of grades), and that since 2002 included all grades construction enterprises, both general constructing contractors and professional contractors (excluding the construction enterprises of work subcontractors).
b) The number of employed persons refers to the annual average number from 1993 to 1997.

9 According to DTI (2001), the information of overseas work done by the British construction firms comes from an annual survey of all British firms involved in overseas construction. The survey covers only building & civil engineering contracts which are controlled from the UK with process engineering and power plant projects being excluded. For management contracts, only the fee income is collected. Where overseas work is conducted

through an associate company, only the proportion representing British ownership is included.

10 The data used to calculate O-IRTR, L-IBD and S- ISF are sourced from ENR (2001), i.e. the international revenue, the total revenue, the number of countries in which the firms worked in in 2000, the number of countries in which the firm may have the potential to work in, and the number of specialized fields the firm was involved in. The number of countries in which the firm worked in in 2000 can be found in the "*where the top 225 worked*" section, and according to the data in this section, the total number of countries in which the firms may have the potential to work in is 141. ENR classifies the construction industry into the ten specialized fields. The data for I-OMS are based on *Dun and Bradstreet (D&B)'s Who Owns Whom (WoW)* ownership tree structure database and the annual reports, financial reports of some companies, along with other relevant references. It should be noted that due to the sophisticated OMS of some firms, it was decided that regardless of the level the firm being studied stands in its family ownership tree, tracking the number of its subsidiaries/associates was limited only to the total number of subsidiaries/associates that are within three levels down from the level at which the firm itself stands in its family ownership tree. Other branch and representative offices of the firm were therefore not included for the reason explained.

11 The Overall Internationalization Index (OII) of a firm is calculated by the sum of O-IRTR, adjusted L-IBD, I-OMS, and S-ISF, where the L-IBD is adjusted by taking the biggest number of countries a British or Chinese firm worked in in the study year as the number of countries the firms may have potential to work in, so that the L-IBD can be stretched into 0~1 scale. The International Strength of a firm was calculated as the product of the OII, which reflects the internationalization of the firm on a relative basis, and the international revenue of the firm, which reflects the absolute internationalization capacity of the firm.

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APPENDIX A
Questionnaire for Chinese CMNCs in International Market

Questionnaire for International Market (English Version)

Part I.Basic information of the firm

In this section, we wish to know some basic information about your firm. Please check and/or answer the followings:

1.Type of your firm: State Owned Enterprise

2.Total number of employees in your firm in 2003:

3.Please indicate which kinds of international construction projects are mainly provided by your firm in the international market according to the types of clients (please tick up to 3)

- ☐ Projects funded by host country government
- ☐ Projects funded by foreign private sectors
- ☐ Projects funded by home country government and home clients
- ☐ Projects initiated by international financing institutions (World Bank, Asian Development Bank, etc)
- ☐ Projects funded by Non-Government Organizations (NGO)
- ☐ Others (please specify):

4.Please indicate the major types of services (please tick up to 4) your firm has provided in the international market:

- ☐ Project feasibility studies
- ☐ Design works
- ☐ Construction works
- ☐ Consultancy works
- ☐ Project financing
- ☐ Exporting of labor service
- ☐ Supply of construction material
- ☐ Supply and installation of construction machinery and equipment
- ☐ Operation and maintenance
- ☐ Others (please specify):

Part II. The ownership advantages and disadvantages of the firm in the international market

1. Some incentives or factors are considered when your firm undertake the international works, Please indicate how important the following incentives or factors are to your firm when going overseas:

1 = Least important 2 = Less important 3 = Important 4 = More important 5 = Most important

1	2	3	4	5	
○	○	○	○	○	1. To improve profits
○	○	○	○	○	2. To diversify business risks
○	○	○	○	○	3. To maintain a better cash and/or capital flow for the firm as a whole
○	○	○	○	○	4. To increase the foreign currency reserve
○	○	○	○	○	5. To alleviate the pressure from competition in the domestic market in China
○	○	○	○	○	6. To follow other contractors from home country who have been working overseas
○	○	○	○	○	7. To pursue home government incentives to work overseas, i.e. the "Going out" policy
○	○	○	○	○	8. To be invited by joint venture partners or other partners to venture overseas
○	○	○	○	○	9. To be invited by the host country's government
○	○	○	○	○	10. To utilize surplus capacity, i.e. employment, machinery, capital, etc.
○	○	○	○	○	11. Other incentives:

2. When your firm undertake the international works in foreign countries, the ownership advantages or disadvantages of your firm compared with other international contractors and local contractors may influence the operations and performance of your firm. Please indicate the degree of significance of the ownership advantages / disadvantages listed below for your firm:

1 = very significant disadvantage 2 = significant disadvantage 3 = disadvantage
4 = no influence or not applicable
5 = advantage 6 = significant advantage 7 = very significant advantage

Compare with other international contractors							Firm specific ownership advantages/disadvantages:	Compare with local contractors						
1	2	3	4	5	6	7		1	2	3	4	5	6	7
○	○	○	○	○	○	○	1. Technological and R&D capacity	○	○	○	○	○	○	○
○	○	○	○	○	○	○	2. Business development capacity	○	○	○	○	○	○	○
○	○	○	○	○	○	○	3. Product diversification	○	○	○	○	○	○	○
○	○	○	○	○	○	○	4. Firm's reputation	○	○	○	○	○	○	○
○	○	○	○	○	○	○	5. Size of the firm	○	○	○	○	○	○	○
○	○	○	○	○	○	○	6. Experience and knowledge about international construction market	○	○	○	○	○	○	○
○	○	○	○	○	○	○	7. Accessibility to financial resources	○	○	○	○	○	○	○
○	○	○	○	○	○	○	8. Accessibility to technical resources	○	○	○	○	○	○	○
○	○	○	○	○	○	○	9. Accessibility to construction machinery and materials	○	○	○	○	○	○	○
○	○	○	○	○	○	○	10. Management expertise	○	○	○	○	○	○	○
○	○	○	○	○	○	○	11. Marketing and project securing capability	○	○	○	○	○	○	○
○	○	○	○	○	○	○	12. Networking flexibility of headquarter and other affiliated overseas branches	○	○	○	○	○	○	○
○	○	○	○	○	○	○	13. Working quality and Total Quality Management capability	○	○	○	○	○	○	○
○	○	○	○	○	○	○	14. Lower costs in production compared with other international competitors	○	○	○	○	○	○	○
○	○	○	○	○	○	○	15. Others:	○	○	○	○	○	○	○

1 = very significant disadvantage 2 = significant disadvantage 3 = disadvantage
4 = no influence or not applicable
5 = advantage 6 = significant advantage 7 = very significant advantage

Compare with other international contractors							Country specific ownership advantages/disadvantages:	Compare with local contractors						
1	2	3	4	5	6	7		1	2	3	4	5	6	7
○	○	○	○	○	○	○	1. Size and growth of the domestic construction market in China	○	○	○	○	○	○	○
○	○	○	○	○	○	○	2. Home government assistance and incentives on overseas contracting	○	○	○	○	○	○	○
○	○	○	○	○	○	○	3. Governmental and historical relationship with developing countries	○	○	○	○	○	○	○
○	○	○	○	○	○	○	4. Support from the financial sector and banking system at home	○	○	○	○	○	○	○
○	○	○	○	○	○	○	5. Support from other related industries at home for international works	○	○	○	○	○	○	○
○	○	○	○	○	○	○	6. Availability of capable sub-contractors from China	○	○	○	○	○	○	○
○	○	○	○	○	○	○	7. Availability of professionals from China	○	○	○	○	○	○	○
○	○	○	○	○	○	○	8. Availability of low-cost workers from China	○	○	○	○	○	○	○
○	○	○	○	○	○	○	9. Availability of low-cost machinery and materials from China	○	○	○	○	○	○	○
○	○	○	○	○	○	○	10. Others:	○	○	○	○	○	○	○

Part III. Locational advantage of host country

1. Please indicate the regions which your firm have worked in for international works (Please tick one or more)

- ☐ Asia (excluding Middle East)
- ☐ Middle East
- ☐ Africa
- ☐ Europe
- ☐ Northern America
- ☐ Southern America
- ☐ Others

2. When your firm undertakes international works in foreign countries, many locational factors of the host countries may affect the decision making and business performance of your firm. Please identify the degree of significance of the locational factors listed below based on your firm's experience:

1 = Least important 2 = Less important 3 = Important 4 = More important 5 = Most important

Locational factors of the host country affecting your firm's operation

1	2	3	4	5	-- Firm specific locational factors:
○	○	○	○	○	1. Large number of local competitors in the host countries
○	○	○	○	○	2. Large number of competitors from China in the host countries
○	○	○	○	○	3. Large number of other international competitors in the host countries
○	○	○	○	○	4. Intensive competition in the hosting country's market
○	○	○	○	○	5. Lower cost of local contractors in the host countries
○	○	○	○	○	6. Lower cost of other international contractors in the host countries
○	○	○	○	○	7. Relationship amongst international and local contractors in the host countries
○	○	○	○	○	8. Expatriate social and living conditions in the host countries
○	○	○	○	○	9. Priority in the business strategy of your firm's headquarter relating to the host country market
○	○	○	○	○	10. Others:

1 = Least important 2 = Less important 3 = Important 4 = More important 5 = Most important

1	2	3	4	5	-- Country specific locational factors:
○	○	○	○	○	1. Local construction market demand and potential in the host countries
○	○	○	○	○	2. Local government attitudes, intervention and policies towards international contractors, including regulatory barriers of entry in the host countries.
○	○	○	○	○	3. Local governmental and regulatory protection for local contractors in the host countries
○	○	○	○	○	4. Political and social stability in the host countries
○	○	○	○	○	5. Psychic distance between home and host countries, i.e. language, religion, culture difference, etc.
○	○	○	○	○	6. Availability and capacity of local subcontractors in the host countries
○	○	○	○	○	7. Availability and costs of local professionals in the host countries
○	○	○	○	○	8. Availability and costs of local workers in the host countries
○	○	○	○	○	9. Availability and costs of local machinery and materials in the host countries
○	○	○	○	○	10. Local commodity price levels in the host countries
○	○	○	○	○	11. Local income and corporate taxation levels in the host countries
○	○	○	○	○	12. Local import and export control and tariff levels for construction machinery, equipment and materials in the host countries
○	○	○	○	○	13. Accessibility to local financing resources in the host countries
○	○	○	○	○	14. Currency conditions and policies in the host countries, i.e. exchange rate fluctuation and control on transferring of funds.
○	○	○	○	○	15. Local governmental bureaucratic system and possible corruption in the host countries

16. Interference of local unofficial societies in the host countries
17. Political and historical links between home and host countries
18. Others:

Part IV.Internalization advantages and disadvantages of the firm in the international market

1. Different procurement methods may be adopted in international construction works. How frequently are the following methods used by your firm

1 = never used 2 = seldom used 3 = sometimes used 4 = frequently used 5 = very frequently used

1	2	3	4	5	**Procurement method**
					1. BOOT & BOT
					2. Design & Build / Turnkey
					3. Traditional contracting
					4. Construction management (Management service package only)
					5. Management contracting (As a management contractor)
					6. Investment/development, build, own and operate
					7. Others:

2. Different business forms and modes of entry are adopted by international firms in international market. How commonly are the following business forms / modes of entry used by your firm?

1 = never used 2 = seldom used 3 = sometimes used 4 = commonly used 5 = very commonly used

					Business forms / modes of entry
1	2	3	4	5	**With equity involvement:**
					1. Foreign Direct Investment (wholly owned subsidiaries)
					2. Equity Joint Venture (partially owned subsidiaries)
					3. Asset Floating (investment in assets including machinery, is not fixed in particular location, but allocated on a project basis)
					4. Contractual Joint Venture (project-based joint venture)
1	2	3	4	5	**Without equity involvement:**
					5. Sub-contracting (to other contractors)
					6. Licensing Name / Franchising (e.g. licensing the firm's brand name to and contract with others with no or very little liability)
					7. Strategic Alliance / Partnering
					8. Through local agencies
					9. Others:

3. Different objectives or internalization incentives may be pursued by international companies when choosing the business forms and modes of entry in international market. Please indicate how important the following factors are in your firm when choosing business forms and modes of entry:

1 = Least important 2 = Less important 3 = Important 4 = More important 5 = Most important

					Objectives or incentives affecting the selection of business forms and modes of entry
1	2	3	4	5	**Firm specific:**
					1. To avoid or reduce information search and business negotiation costs
					2. To utilize international networking of the firm
					3. To avoid the cost of moral hazard and adverse selection or under-performance of sub-contractors
					4. To protect the reputation of the firm

○	○	○	○	○	
○	○	○	○	○	5. To protect technological know-how of the firm
○	○	○	○	○	6. To ensure the quality of construction and services provided
○	○	○	○	○	7. To avoid the costs of breach of contracts and ensuing litigation
○	○	○	○	○	8. To facilitate the increasing need for professionals and personnel
○	○	○	○	○	9. To facilitate the need for alternative investments for the profits earned
○	○	○	○	○	10. To better utilize and control resources (construction materials, equipments, technology, human resources, etc.)
1	2	3	4	5	**Country specific:**
○	○	○	○	○	1. To meet the host government's policy requirements relating to construction business operations
○	○	○	○	○	2. To better facilitate strategic alliances, partnering and networking with others for the business
○	○	○	○	○	3. To avoid client's uncertainty over the nature and value of services being sold and to better facilitate the client's needs
○	○	○	○	○	4. To overcome price discrimination on projects in host country
○	○	○	○	○	5. To consolidate the market position and to facilitate the future growth and potential of the market
○	○	○	○	○	6. To avoid or reduce the host government's intervention, (quotas, tariffs, price controls, tax difference, etc.)
○	○	○	○	○	7. To exploit the host government's interventions (quotas, tariffs, price controls, tax difference, etc.)
○	○	○	○	○	8. Others: _____

Part V.Information of respondent

We sincerely appreciate your time and efforts in answering the above questions. Your answers will be treated in strictest confidence. To complete this survey, please provide the following information about yourself

1.Name of your firm:

2.Your current position in your company:

- ○ President / CEO / Director (top management team member)
- ○ Senior consultant
- ○ Department director / manager
- ○ Executive / Manager of overseas branch
- ○ Project manager
- ○ Others:

3.Number of years you have been involved with international operations:

4.Number of countries you have worked in international construction market:

5.Please state any other comments that you would like to make regarding this survey:

6.If you would like to have the final results of this study sent to you, please leave your name and address below for us to send them to you when it is completed:

Thank you very much for taking the time to assist us in this study.

Send

第一部分 公司基本资料

本部分请您回答以下有关贵公司的问题：

1. 请问贵公司的类型： 国有企业
2. 请问贵公司在2003年的总雇员数：
3. 根据业主的不同类型，请问贵公司在国际市场上主要承揽以下那几种工程项目：（请选择最多3项）

- ☐ 由当地政府出资的项目
- ☐ 由外国私人企业出资的项目
- ☐ 由母国政府或母国公司出资的项目
- ☐ 由国际金融机构出资的项目（世界银行，亚洲开发银行等）
- ☐ 由其它非政府组织出资的项目(NGO)
- ☐ 其他：（请说明）

4. 请问贵公司在国际市场主要提供以下那几种工程服务：（请选择最多4项）

- ☐ 项目可行性研究
- ☐ 工程设计
- ☐ 工程施工
- ☐ 工程咨询
- ☐ 项目融资
- ☐ 劳务输出
- ☐ 提供施工材料
- ☐ 提供和安装施工机械设备
- ☐ 项目运行和维护
- ☐ 其他：（请说明）

第二部分 贵公司在国际市场的所有权优势和弱势

1. 在国际市场开展业务是考虑到一些目的和因素。请根据您的考量， 评估并圈选贵公司对以下因素的重视程度：

1 = 非常不重要 2 = 比较不重要 3 = 一般重要 4 = 比较重要 5 = 非常重要

1	2	3	4	5	开展国际业务的动机和目的因素
○	○	○	○	○	1. 为提高公司的利润
○	○	○	○	○	2. 为分散商业风险
○	○	○	○	○	3. 公司作为整体， 为保持较好的现金或资金流动
○	○	○	○	○	4. 为增加公司的外汇
○	○	○	○	○	5. 为减轻国内市场的竞争压力
○	○	○	○	○	6. 跟随其他到国际市场开展业务的母国公司
○	○	○	○	○	7. 为响应母国政府鼓励公司“走出去”的号召
○	○	○	○	○	8. 受到合资合作伙伴的邀请进入国际市场
○	○	○	○	○	9. 受到国外政府的邀请进入国际市场
○	○	○	○	○	10. 为充分利用过剩资源， 包括人员，设备，资金等
○	○	○	○	○	11. 其他：（请说明）

2. 在国外市场开展业务时，与其他国际公司或当地公司相比，公司的所有权优势或弱势会影响公司的运作。请您根据贵公司的经验，评估并圈选以下所有权优势或弱势对贵公司在国际市场运作的重要程

度：

1 = 非常重要弱势 2 = 重要弱势 3 = 弱势
4 = 没有影响或无关
5 = 优势 6 = 重要优势 7 = 非常重要优势

与其他国际公司比较							公司特定的所有权优势和弱势：	与东道国当地公司比较						
1	2	3	4	5	6	7		1	2	3	4	5	6	7
○	○	○	○	○	○	○	1. 技术和研发能力	○	○	○	○	○	○	○
○	○	○	○	○	○	○	2. 商业开发能力	○	○	○	○	○	○	○
○	○	○	○	○	○	○	3. 产品的多样化	○	○	○	○	○	○	○
○	○	○	○	○	○	○	4. 公司的声誉	○	○	○	○	○	○	○
○	○	○	○	○	○	○	5. 公司的大小	○	○	○	○	○	○	○
○	○	○	○	○	○	○	6. 在国际市场的经验和认知	○	○	○	○	○	○	○
○	○	○	○	○	○	○	7. 获得资金的能力	○	○	○	○	○	○	○
○	○	○	○	○	○	○	8. 获得技术资源的能力	○	○	○	○	○	○	○
○	○	○	○	○	○	○	9. 获得工程设备及材料的能力	○	○	○	○	○	○	○
○	○	○	○	○	○	○	10. 管理能力	○	○	○	○	○	○	○
○	○	○	○	○	○	○	11. 市场营销及获得项目的能力	○	○	○	○	○	○	○
○	○	○	○	○	○	○	12. 总公司与各海外公司的业务网络	○	○	○	○	○	○	○
○	○	○	○	○	○	○	13. 工程产品的质量与TQM（全面质量管理）的能力	○	○	○	○	○	○	○
○	○	○	○	○	○	○	14. 与其他国际竞争者相比有较低的生产成本	○	○	○	○	○	○	○
○	○	○	○	○	○	○	15 其他：（请说明）	○	○	○	○	○	○	○

1 = 非常重要弱势 2 = 重要弱势 3 = 弱势
4 = 没有影响或无关
5 = 优势 6 = 重要优势 7 = 非常重要优势

与其他国际公司比较							国家特定的所有权优势和弱势：	与东道国当地公司比较						
1	2	3	4	5	6	7		1	2	3	4	5	6	7
○	○	○	○	○	○	○	1. 母国工程市场的庞大与快速的发展	○	○	○	○	○	○	○
○	○	○	○	○	○	○	2. 母国政府的协助和对开展国际业务的鼓励	○	○	○	○	○	○	○
○	○	○	○	○	○	○	3. 母国与发展中国家政府间的和历史上的联系	○	○	○	○	○	○	○
○	○	○	○	○	○	○	4. 母国金融银行系统的支持	○	○	○	○	○	○	○
○	○	○	○	○	○	○	5. 母国其他相关行业对国际业务的支持	○	○	○	○	○	○	○
○	○	○	○	○	○	○	6. 有来自母国的有能力的分包商	○	○	○	○	○	○	○
○	○	○	○	○	○	○	7. 有来自母国的专业人士	○	○	○	○	○	○	○
○	○	○	○	○	○	○	8. 有来自母国的低成本的工人	○	○	○	○	○	○	○
○	○	○	○	○	○	○	9. 有来自母国的的成本的设备与材料	○	○	○	○	○	○	○
○	○	○	○	○	○	○	10. 其他：（请说明）_____	○	○	○	○	○	○	○

第三部分 东道国市场的区位优势与弱势

1. 为开展国际业务，请圈选您曾经在以下那些地区工作：

☐ 亚洲（不含中东地区） ☐ 中东 ☐ 非洲

☐ 欧洲 ☐ 北美洲 ☐ 南美洲

☐ 其他地区

2. 在国外市场开展业务时，东道国的区位优势或弱势会影响公司的运作。请您根据贵公司的经验，评估并圈选以下区位优势或弱势对贵公司在国际市场运作的重要程度：

1 = 非常不重要 2 = 不重要 3 = 一般重要 4 = 重要 5 = 非常重要

1	2	3	4	5	**影响公司的运作的东道国的区位优势或弱势**
					与公司相关的东道国区位优势或弱势：
◯	◯	◯	◯	◯	1. 大量的当地竞争者
◯	◯	◯	◯	◯	2. 大量的来自母国的竞争者
◯	◯	◯	◯	◯	3. 大量的来自其他国家的竞争者
◯	◯	◯	◯	◯	4. 东道国市场的激烈竞争
◯	◯	◯	◯	◯	5. 当地公司的较低的成本
◯	◯	◯	◯	◯	6. 其他国际公司较低的成本
◯	◯	◯	◯	◯	7. 当地公司与国际公司之间的关系
◯	◯	◯	◯	◯	8. 外派人员的社会和生活条件
◯	◯	◯	◯	◯	9. 贵公司总部对该东道国市场在商业战略上的优先程度
◯	◯	◯	◯	◯	10. 其他： （请说明）_____

1 = 非常不重要 2 = 不重要 3 = 一般重要 4 = 重要 5 = 非常重要

1	2	3	4	5	**与国家相关的东道国区位优势或弱势：**
◯	◯	◯	◯	◯	1. 东道国市场的需求和发展潜力
◯	◯	◯	◯	◯	2. 东道国政府对国际公司的态度，干涉和政策，包括政策性市场准入壁垒
◯	◯	◯	◯	◯	3. 东道国政府对当地公司的政策性保护
◯	◯	◯	◯	◯	4. 东道国的政治和社会的稳定性
◯	◯	◯	◯	◯	5. 母国与东道国之间的心里距离，包括语言、宗教和文化等的不同
◯	◯	◯	◯	◯	6. 当地分包商的可用性及其能力
◯	◯	◯	◯	◯	7. 当地专业人士的可用性及其成本
◯	◯	◯	◯	◯	8. 当地工人的可用性及其成本
◯	◯	◯	◯	◯	9. 当地设备和材料的可用性及其成本
◯	◯	◯	◯	◯	10. 当地物价水平
◯	◯	◯	◯	◯	11. 东道国的公司及个人收入的收税水平
◯	◯	◯	◯	◯	12. 东道国对设备仪器和材料的进出口管制及关税水平
◯	◯	◯	◯	◯	13. 当地资金的可用性
◯	◯	◯	◯	◯	14. 货币的情况及其政策，包括外汇汇率的波动，对资金移动的控制等
◯	◯	◯	◯	◯	15. 当地政府的官僚体制及可能的贪污
◯	◯	◯	◯	◯	16. 当地非正式社团的干预
◯	◯	◯	◯	◯	17. 母国与东道国的政治和历史联系
◯	◯	◯	◯	◯	18. 其他：（请说明）_____

第四部分 贵公司在国际市场的内部化优势和弱势

1. 在国际工程市场，采用不同的项目采购方式。请您圈选贵公司对以下不同的采购方式所使用的程度：

1 = 从未使用 2 = 很少使用 3 = 有时使用 4 = 经常使用 5 = 非常经常使用

1	2	3	4	5	项目采购方式
○	○	○	○	○	1. BOOT & BOT （建造，运营和移交）
○	○	○	○	○	2. D&B, Turnkey & EPC（设计与建造，交钥匙方式 或 “设计、采购与建造”）
○	○	○	○	○	3. 传统合同方式
○	○	○	○	○	4. 施工管理合同（仅提供项目管理服务）
○	○	○	○	○	5. 管理承包合同（作为管理承包商）
○	○	○	○	○	6. 投资/开发、建造、拥有和运营
○	○	○	○	○	7. 其他：（请说明）

2. 在国际工程市场，国际公司采用不同的公司运作模式或市场进入方式。请您圈选贵公司对以下不同的公司运作模式或市场进入方式所使用的程度：

1 = 从未使用 2 = 很少使用 3 = 有时使用 4 = 经常使用 5 = 非常经常使用

					公司运作模式或市场进入方式
1	2	3	4	5	有资本投入：
○	○	○	○	○	1. 外国直接投资 （建立全资子公司）
○	○	○	○	○	2. 资本合资 （建立部分股权子公司）
○	○	○	○	○	3. 资本流动运营 （资本的投资包括设备不是固定在某一地区，根据项目的需要进行流动调配）
○	○	○	○	○	4. 合同式合资 （以项目为基础的合资）
1	2	3	4	5	无资本投入：
○	○	○	○	○	5. 分包 （分包给其他公司）
○	○	○	○	○	6. 许可经营或特许经营 （例如允许其他公司使用本公司的牌子，并与之签订没有或很少义务的合同）
○	○	○	○	○	7. 战略联盟 / 伙伴关系
○	○	○	○	○	8. 安排当地代理
○	○	○	○	○	9. 其他：（请说明）

3. 在国际市场，国际公司在选择市场进入方式或公司运作模式时要考虑不同的目标和一些公司内部化因素。请您根据贵公司的经验，评估并圈选以下内部化优势因素对贵公司在选择国际市场进入方式或公司运作模式时所考虑的重要程度：

1 = 非常不重要 2 = 比较不重要 3 = 一般重要 4 = 比较重要 5 = 非常重要

					国际公司在选择市场进入方式或公司运作模式时，要考虑的不同的目标和内部化因素
1	2	3	4	5	与公司相关的内部化优势因素：
○	○	○	○	○	1. 避免或降低信息资料搜集和商务谈判的成本
○	○	○	○	○	2. 为充分利用公司和分公司的国际网络
○	○	○	○	○	3. 避免由于不当地选择了不合格的或运作不利的分包商而造成的损失
○	○	○	○	○	4. 保护公司的声誉
○	○	○	○	○	5. 保护公司的技术资源和专长
○	○	○	○	○	6. 保障工程和所提供的服务的质量
○	○	○	○	○	7. 避免合同被迫中止和进行诉讼所发生的费用
○	○	○	○	○	8. 满足日益增加的专业人士和其他雇员的需要
○	○	○	○	○	9. 满足要对所得的利润进行其他投资的需要
○	○	○	○	○	10. 更好地利用和控制资源，包括材料、设备、技术、人力资源等
1	2	3	4	5	与国家相关的内部化优势因素：

- ◯ ◯ ◯ ◯ ◯ 1. 满足东道国政府在政策上对工程项目实施和运作的要求
- ◯ ◯ ◯ ◯ ◯ 2. 更好地促进与国际战略联盟、合作伙伴和商务网络地关系
- ◯ ◯ ◯ ◯ ◯ 3. 避免业主对所购买的工程和服务的不确定因素，和更好地满足业主的需求
- ◯ ◯ ◯ ◯ ◯ 4. 克服东道国对国际公司的价格歧视
- ◯ ◯ ◯ ◯ ◯ 5. 巩固市场占有程度，满足未来市场发展的需要
- ◯ ◯ ◯ ◯ ◯ 6. 避免或减少东道国政府的介入，包括配额、关税、价格管制和税收制度等
- ◯ ◯ ◯ ◯ ◯ 7. 开发和利用东道国政府的介入，包括配额、关税、价格管制和税收制度等
- ◯ ◯ ◯ ◯ ◯ 8. 其他：（请说明）_____

第五部分 受访者情况

现在您已经填完大部分问题。我们非常感谢您付出了宝贵的时间和精力来帮助我们。您在这里所有的意见和答案都将被严格保密。最后可否请您提供以下信息：

1. 贵公司的名称：_____
2. 您目前在贵公司的职位：

- ◯ 董事长 / 总经理 / 董事 / 公司核心领导成员
- ◯ 公司高级顾问
- ◯ 部门经理 / 经理
- ◯ 执行人员 / 海外公司经理
- ◯ 项目经理
- ◯ 其他

3. 您已经参与国际业务多少年 ？_____
4. 您已经在几个国家的海外市场中工作过？
5. 您是否有其他想法或建议可供我们参考，敬请写在下面：

_____

6. 本调查采用匿名方式，不需要签名。惟如您希望收到本研究的结果，请您留下您的姓名、电邮地址或通讯地址，以便日后邮寄研究报告给您。

非常感谢您的协助，并祝您万事如意！

发送

APPENDIX B
Questionnaire for Chinese CMNCs in Domestic Market

Part I.Basic information of the firm

In this section, we wish to know some basic information about your firm. Please check and/or answer the followings:

1.Please indicate which kinds of construction projects are mainly provided by your firm in the domestic market in China according to the types of clients (please tick up to 3)

- ☐ Projects funded by local government
- ☐ Projects funded by foreign private sectors
- ☐ Projects funded by central government
- ☐ Projects initiated by international financing institutions (World Bank, Asian Development Bank, etc)
- ☐ Projects funded by Non-Government Organizations (NGO)
- ☐ Others (please specify):

2.Please indicate the major types of services (please tick up to 4) your firm has provided in the domestic market in China:

- ☐ Project feasibility studies
- ☐ Design works
- ☐ Construction works
- ☐ Consultancy works
- ☐ Project financing
- ☐ Labor service
- ☐ Supply of construction material
- ☐ Supply and installation of construction machinery and equipment
- ☐ Operation and maintenance
- ☐ Others (please specify):

Part II. The ownership advantages and disadvantages of the firm in the domestic market in China

1. Some incentives or factors are considered when your firm undertakes domestic works in China, Please indicate how important the following incentives or factors are to your firm:

1 = Least important 2 = Less important 3 = Important 4 = More important 5 = Most important

1	2	3	4	5	
○	○	○	○	○	1. To improve profits
○	○	○	○	○	2. To diversify business risks
○	○	○	○	○	3. To maintain a better cash and/or capital flow for the firm as a whole
○	○	○	○	○	4. To increase the share in domestic market
○	○	○	○	○	5. To alleviate the pressure from competition in the market and explore new market
○	○	○	○	○	6. To be invited by joint venture partners or other partners to venture into new market
○	○	○	○	○	7. To be invited by the local government
○	○	○	○	○	8. To utilize surplus capacity, i.e. employment, machinery, capital, etc.
○	○	○	○	○	9. To maintain existing business involvement and to continue to develop in various regions in China
○	○	○	○	○	10. Other incentives:

2. When your firm undertake domestic works in the various regions of China, the ownership advantages or disadvantages of your firm compared with other international contractors and local

contractors may influence the operations and performance of your firm. Please indicate the degree of significance of the ownership advantages / disadvantages listed below for your firm:

1 = very significant disadvantage 2 = significant disadvantage 3 = disadvantage
4 = no influence or not applicable
5 = advantage 6 = significant advantage 7 = very significant advantage

Compare with other international contractors							Firm specific ownership advantages/disadvantages:	Compare with local contractors						
1	2	3	4	5	6	7		1	2	3	4	5	6	7
○	○	○	○	○	○	○	1. Technological and R&D capacity	○	○	○	○	○	○	○
○	○	○	○	○	○	○	2. Business development capacity	○	○	○	○	○	○	○
○	○	○	○	○	○	○	3. Product diversification	○	○	○	○	○	○	○
○	○	○	○	○	○	○	4. Firm's reputation	○	○	○	○	○	○	○
○	○	○	○	○	○	○	5. Size of the firm	○	○	○	○	○	○	○
○	○	○	○	○	○	○	6. Experience and knowledge about the local construction market	○	○	○	○	○	○	○
○	○	○	○	○	○	○	7. Accessibility to financial resources	○	○	○	○	○	○	○
○	○	○	○	○	○	○	8. Accessibility to technical resources	○	○	○	○	○	○	○
○	○	○	○	○	○	○	9. Accessibility to construction machinery and materials	○	○	○	○	○	○	○
○	○	○	○	○	○	○	10. Management expertise	○	○	○	○	○	○	○
○	○	○	○	○	○	○	11. Marketing and project securing capability	○	○	○	○	○	○	○
○	○	○	○	○	○	○	12. Networking flexibility of headquarter and domestic branches	○	○	○	○	○	○	○
○	○	○	○	○	○	○	13. Working quality and Total Quality Management capability	○	○	○	○	○	○	○
○	○	○	○	○	○	○	14. Lower costs in production compared with other competitors	○	○	○	○	○	○	○
○	○	○	○	○	○	○	15. Others: _____	○	○	○	○	○	○	○

1 = very significant disadvantage 2 = significant disadvantage 3 = disadvantage
4 = no influence or not applicable
5 = advantage 6 = significant advantage 7 = very significant advantage

Compare with other international contractors							Country specific ownership advantages/disadvantages:	Compare with local contractors						
1	2	3	4	5	6	7		1	2	3	4	5	6	7
○	○	○	○	○	○	○	1. Size and growth of the domestic construction market in China	○	○	○	○	○	○	○
○	○	○	○	○	○	○	2. Central government assistance and incentives on contracting in different regions in China	○	○	○	○	○	○	○
○	○	○	○	○	○	○	3. Central government's close relationship with the provincial and local governments	○	○	○	○	○	○	○
○	○	○	○	○	○	○	4. Support from the financial sector and banking system at the central government level	○	○	○	○	○	○	○
○	○	○	○	○	○	○	5. Availability of professionals from other regions in China	○	○	○	○	○	○	○
○	○	○	○	○	○	○	6. Availability of low-cost workers from other regions in China	○	○	○	○	○	○	○
○	○	○	○	○	○	○	7. Availability of low-cost machinery and materials from other regions in China	○	○	○	○	○	○	○
○	○	○	○	○	○	○	8. Others:	○	○	○	○	○	○	○

Part III. Locational advantage of the regional markets

1. Please indicate the regions which your firm have worked in for domestic works (Please tick one or

more)

- ☐ Capital city region, including Beijing, Tianjin and Hebei
- ☐ Eastern economic region, including Shanghai, Jiangsu, Zhejiang, Liaoning, Fujian, Shandong, Guangdong and Hainan
- ☐ Middle economic region, including Shanxi, Jilin, Heilongjiang, Anhui, Jiangxi, Henan, Hubei, Hunan
- ☐ Western economic region, including Chongqing, Sichuan, Guizhou, Yunnan, Tibet, Shanxi, Gansu, Qinghai, Ningxia, Xinjiang, Guangxi and Inner Mongolia

2. When your firm undertake domestic works in different regions in China, many locational factors of the regions may affect the decision making and business performance of your firm. Please identify the degree of significance of the locational factors listed below based on your firm's experience:

1 = Least important 2 = Less important 3 = Important 4 = More important 5 = Most important

Locational factors of the region affecting your firm's operation

1	2	3	4	5	-- Firm specific locational factors:
○	○	○	○	○	1. Large number of local competitors
○	○	○	○	○	2. Large number of competitors from firms at the central government level
○	○	○	○	○	3. Large number of other international competitors
○	○	○	○	○	4. Intensive competition in the regional market
○	○	○	○	○	5. Lower cost of local contractors in the region
○	○	○	○	○	6. Lower cost of other international contractors in the region
○	○	○	○	○	7. Relationship amongst international and local contractors in the region
○	○	○	○	○	8. Expatriate social and living conditions in the region
○	○	○	○	○	9. Priority in the business strategy of your firm's headquarter relating to the regional market
○	○	○	○	○	10. Others:

1 = Least important 2 = Less important 3 = Important 4 = More important 5 = Most important

1	2	3	4	5	-- Regional specific locational factors:
○	○	○	○	○	1. Local construction market demand and potential in the region
○	○	○	○	○	2. Local government attitudes, intervention and policies towards international contractors, including regulatory barriers of entry in the region.
○	○	○	○	○	3. Local governmental and regulatory protection for local contractors in the region
○	○	○	○	○	4. Local social security and stability in the region
○	○	○	○	○	5. The speed and level of local economic development in the region
○	○	○	○	○	6. Availability and capacity of local subcontractors in the region
○	○	○	○	○	7. Availability and costs of local professionals in the region
○	○	○	○	○	8. Availability and costs of local workers in the region
○	○	○	○	○	9. Availability and costs of local machinery and materials in the region
○	○	○	○	○	10. Local commodity price levels in the region
○	○	○	○	○	11. Accessibility to local financing resources in the region
○	○	○	○	○	12. Local governmental bureaucratic system and possible corruption in the region
○	○	○	○	○	13. Interference of local unofficial societies in the region
○	○	○	○	○	14. Others:

Part IV.Internalization advantages and disadvantages of the firm in the domestic market in China

1. Different procurement methods may be adopted in domestic construction works in China. How

frequently are the following methods used by your firm?

1 = never used 2 = seldom used 3 = sometimes used 4 = frequently used 5 = very frequently used

1	2	3	4	5	**Procurement method**
○	○	○	○	○	1. BOOT & BOT
○	○	○	○	○	2. Design & Build / Turnkey /EPC
○	○	○	○	○	3. Traditional contracting
○	○	○	○	○	4. Construction management (Management service package only)
○	○	○	○	○	5. Management contracting (As a management contractor)
○	○	○	○	○	6. Investment/development, build, own and operate
○	○	○	○	○	7. Others:

2. Different business forms and modes of entry are adopted by international firms in different regions. How commonly are the following business forms / modes of entry used by your firm?

1 = never used 2 = seldom used 3 = sometimes used 4 = commonly used 5 = very commonly used

					Business forms / modes of entry
1	2	3	4	5	**With equity involvement:**
○	○	○	○	○	1. Direct Investment (wholly owned subsidiaries)
○	○	○	○	○	2. Equity Joint Venture (partially owned subsidiaries)
○	○	○	○	○	3. Asset Floating (investment in assets including machinery, is not fixed in particular location, but allocated on a project basis)
○	○	○	○	○	4. Contractual Joint Venture (project-based joint venture)
1	2	3	4	5	**Without equity involvement:**
○	○	○	○	○	5. Sub-contracting (to other contractors)
○	○	○	○	○	6. Licensing Name / Franchising (e.g. licensing the firm's brand name to and contract with others with no or very little liability)
○	○	○	○	○	7. Strategic Alliance / Partnering
○	○	○	○	○	8. Through local agencies
○	○	○	○	○	9. Others: _____

3. Different objectives or internalization incentives may be pursued by international companies when choosing the business forms and modes of entry in different regions. Please indicate how important the following factors are in your firm when choosing the business forms and modes of entry:

1 = Least important 2 = Less important 3 = Important 4 = More important 5 = Most important

					Objectives or incentives affecting the selection of business forms and modes of entry
1	2	3	4	5	**Firm specific:**
○	○	○	○	○	1. To avoid or reduce information search and business negotiation costs
○	○	○	○	○	2. To utilize networking between the firm's headquarter and its branches
○	○	○	○	○	3. To avoid the cost of moral hazard and adverse selection or under-performance of sub-contractors
○	○	○	○	○	4. To protect the reputation of the firm
○	○	○	○	○	5. To protect technological know-how of the firm
○	○	○	○	○	6. To ensure the quality of construction and services provided
○	○	○	○	○	7. To avoid the costs of breach of contracts and ensuing litigation
○	○	○	○	○	8. To facilitate the increasing need for professionals and personnel
○	○	○	○	○	9. To facilitate the need for alternative investments for the profits earned

○	○	○	○	○	10. To better utilize and control resources (construction materials, equipments, technology, human resources, etc.)
1	2	3	4	5	**Regional specific:**
○	○	○	○	○	1. To meet the local government's policy requirements relating to construction business operations
○	○	○	○	○	2. To better facilitate strategic alliances, partnering and networking with others for the business
○	○	○	○	○	3. To avoid client's uncertainty over the nature and value of services being sold and to better facilitate the client's needs
○	○	○	○	○	4. To consolidate market position and to facilitate the future growth and potential of the market
○	○	○	○	○	5. Others:

Part V.Information of respondent

We sincerely appreciate your time and efforts in answering the above questions. Your answers will be treated in strictest confidence. To complete this survey, please provide the following information about yourself:

1.Name of your firm:

2.Your current position in your company:

- ○ President / CEO / Director (top management team member)
- ○ Senior consultant
- ○ Department director / manager
- ○ Executive / Manager of branch
- ○ Project manager
- ○ Others:

3.Number of years you have been involved with domestic operations in China:

4.Please state any other comments that you would like to make regarding this survey:

5.If you would like to have the final results of this study sent to you, please leave your name and address below for us to send them to you when it is completed:

Thank you very much for taking the time to assist us in this study.

Send

第一部分 公司基本资料

本部分请您回答以下有关贵公司的问题：

1. 根据项目的不同类型，请问贵公司在国内市场上主要承揽以下那几种工程项目：（请选择最多3项）

- ☐ 由当地政府(省级及其以下政府部门)出资的项目
- ☐ 由外国私人企业出资的项目
- ☐ 由中央政府出资的项目
- ☐ 由国际金融机构出资的项目（世界银行，亚洲开发银行等）
- ☐ 由其它非政府组织出资的项目(NGO)
- ☐ 其他：（请说明）_____

2. 请问贵公司在国内市场主要提供以下那几种工程服务：（请选择最多4项）

- ☐ 项目可行性研究
- ☐ 工程设计
- ☐ 工程施工
- ☐ 工程咨询
- ☐ 项目融资
- ☐ 劳务引进及输出
- ☐ 提供施工材料
- ☐ 提供和安装施工机械设备
- ☐ 项目运行和维护 _____
- ☐ 其他：（请说明）

第二部分 贵公司在国内市场的所有权优势和弱势

1. 在国内市场开展业务是考虑到一些目的和因素。请根据您的考量， 评估并圈选贵公司对以下因素的重视程度：

1 = 非常不重要 2 = 比较不重要 3 = 一般重要 4 = 比较重要 5 = 非常重要

1	2	3	4	5	开展国内业务的动机和目的因素
○	○	○	○	○	1. 为提高公司的利润
○	○	○	○	○	2. 为分散商业风险
○	○	○	○	○	3. 公司作为整体， 为保持较好的现金或资金流动
○	○	○	○	○	4. 为增加公司的国内市场占有率
○	○	○	○	○	5. 为减轻市场的竞争压力而拓展新市场
○	○	○	○	○	6. 受到合资合作伙伴的邀请进入该市场
○	○	○	○	○	7. 受到当地政府的邀请进入该市场
○	○	○	○	○	8. 为充分利用过剩资源， 包括人员，设备，资金等
○	○	○	○	○	9. 维持公司原有的业务范围而继续在各地开展业务
○	○	○	○	○	10. 其他：（请说明） _____

2. 在国内市场开展业务时，与其他国际公司或当地地方公司相比，公司的所有权优势或弱势会影响公司的运作。请您根据贵公司的经验，评估并圈选以下所有权优势或弱势对贵公司在国内市场运作的重要程度：

1 = 非常重要弱势 2 = 重要弱势 3 = 弱势
4 = 没有影响或无关
5 = 优势 6 = 重要优势 7 = 非常重要优势

与其他国际公司比较							公司特定的所有权优势和弱势：	与当地地方公司比较						
1	2	3	4	5	6	7		1	2	3	4	5	6	7
○	○	○	○	○	○	○	1. 技术和研发能力	○	○	○	○	○	○	○
○	○	○	○	○	○	○	2. 商业开发能力	○	○	○	○	○	○	○
○	○	○	○	○	○	○	3. 产品的多样化	○	○	○	○	○	○	○
○	○	○	○	○	○	○	4. 公司的声誉	○	○	○	○	○	○	○
○	○	○	○	○	○	○	5. 公司的大小	○	○	○	○	○	○	○
○	○	○	○	○	○	○	6. 在当地市场的经验和认知	○	○	○	○	○	○	○
○	○	○	○	○	○	○	7. 获得资金的能力	○	○	○	○	○	○	○
○	○	○	○	○	○	○	8. 获得技术资源的能力	○	○	○	○	○	○	○
○	○	○	○	○	○	○	9. 获得工程设备及材料的能力	○	○	○	○	○	○	○
○	○	○	○	○	○	○	10. 管理能力	○	○	○	○	○	○	○
○	○	○	○	○	○	○	11. 市场营销及获得项目的能力	○	○	○	○	○	○	○
○	○	○	○	○	○	○	12. 总公司与各地方分公司的业务网络	○	○	○	○	○	○	○
○	○	○	○	○	○	○	13. 工程产品的质量与TQM（全面质量管理）的能力	○	○	○	○	○	○	○
○	○	○	○	○	○	○	14. 与其他竞争者相比有较低的生产成本	○	○	○	○	○	○	○
○	○	○	○	○	○	○	15 其他：（请说明）_____	○	○	○	○	○	○	○

1 = 非常重要弱势 2 = 重要弱势 3 = 弱势
4 = 没有影响或无关
5 = 优势 6 = 重要优势 7 = 非常重要优势

与其他国际公司比较							国家特定的所有权优势和弱势：	与当地地方公司比较						
1	2	3	4	5	6	7		1	2	3	4	5	6	7
○	○	○	○	○	○	○	1. 国内工程市场的庞大与快速的发展	○	○	○	○	○	○	○
○	○	○	○	○	○	○	2. 中央政府的协助和对开展各地业务的鼓励	○	○	○	○	○	○	○
○	○	○	○	○	○	○	3. 中央政府与当地政府间的密切联系	○	○	○	○	○	○	○
○	○	○	○	○	○	○	4. 中央金融银行系统的支持	○	○	○	○	○	○	○
○	○	○	○	○	○	○	5. 有来自各地的专业人士	○	○	○	○	○	○	○
○	○	○	○	○	○	○	6. 有来自各地的低成本的工人	○	○	○	○	○	○	○
○	○	○	○	○	○	○	7. 有来自各地的低成本的设备与材料	○	○	○	○	○	○	○
○	○	○	○	○	○	○	8. 其他：（请说明）_____	○	○	○	○	○	○	○

第三部分 国内当地市场的区位优势与弱势

1. 为开展国内业务，请圈选您曾经在以下那些地区/国内经济区工作过：

☐ 首都经济区，包括北京、天津和河北等3个省市；

☐ 东部地区，包括上海、江苏、浙江、辽宁、福建、山东、广东和海南等 8 个省市；

☐ 中部地区，包括山西、吉林、黑龙江、安徽、江西、河南、湖北、湖南等 8 省；

☐ 西部地区，包括重庆、四川、贵州、云南、西藏、陕西、甘肃、青海、宁夏、新疆、广西、内蒙古等 12 个省、自治区。

2. 在国内市场开展业务时，各地当地的区位优势或弱势会影响公司的运作。请您根据贵公司的经验，评估并圈选以下区位优势或弱势对贵公司在国内市场运作的重要程度：

1 = 非常不重要 2 = 不重要 3 = 一般重要 4 = 重要 5 = 非常重要

影响公司的运作的当地地方区位优势或弱势

1	2	3	4	5	与公司相关的当地区位优势或弱势：
◯	◯	◯	◯	◯	1. 大量的当地地方公司竞争者
◯	◯	◯	◯	◯	2. 大量的中央级国际公司的竞争者
◯	◯	◯	◯	◯	3. 大量的来自其他国家的竞争者
◯	◯	◯	◯	◯	4. 当地市场的激烈竞争
◯	◯	◯	◯	◯	5. 当地公司的较低的成本
◯	◯	◯	◯	◯	6. 其他国际公司较低的成本
◯	◯	◯	◯	◯	7. 当地公司与国际公司之间的关系
◯	◯	◯	◯	◯	8. 外派人员的社会和生活条件
◯	◯	◯	◯	◯	9. 贵公司总部对该地区市场在商业战略上的优先程度
◯	◯	◯	◯	◯	10. 其他： （请说明）_____

1 = 非常不重要 2 = 不重要 3 = 一般重要 4 = 重要 5 = 非常重要

1	2	3	4	5	与当地地域相关的区位优势或弱势：
◯	◯	◯	◯	◯	1. 当地市场的需求和发展潜力
◯	◯	◯	◯	◯	2. 当地地方政府对国际公司的态度，干涉和政策，包括政策性市场准入壁垒
◯	◯	◯	◯	◯	3. 地方政府对当地公司的政策性保护
◯	◯	◯	◯	◯	4. 当地社会的治安与稳定
◯	◯	◯	◯	◯	5. 当地社会的经济发展速度和水平
◯	◯	◯	◯	◯	6. 当地分包商的可用性及其能力
◯	◯	◯	◯	◯	7. 当地专业人士的可用性及其成本
◯	◯	◯	◯	◯	8. 当地工人的可用性及其成本
◯	◯	◯	◯	◯	9. 当地设备和材料的可用性及其成本
◯	◯	◯	◯	◯	10. 当地物价水平
◯	◯	◯	◯	◯	11. 当地资金的可用性
◯	◯	◯	◯	◯	12. 当地政府的官僚体制及可能的贪污
◯	◯	◯	◯	◯	13. 当地非正式社团的干预
◯	◯	◯	◯	◯	14. 其他：（请说明）_____

第四部分 贵公司在国内市场的内部化优势和弱势

1. 在国内市场，采用不同的项目采购方式。请您圈选贵公司对以下不同的采购方式所使用的程度：

1 = 从未使用 2 = 很少使用 3 = 有时使用 4 = 经常使用 5 = 非常经常使用

1	2	3	4	5	项目采购方式
◯	◯	◯	◯	◯	1. BOOT & BOT （建造，运营和移交）
◯	◯	◯	◯	◯	2. D&B, Turnkey & EPC（设计与建造，交钥匙方式 或 “设计、采购与建造”）
◯	◯	◯	◯	◯	3. 传统合同方式
◯	◯	◯	◯	◯	4. 施工管理合同（仅提供项目管理服务）
◯	◯	◯	◯	◯	5. 管理承包合同（作为管理承包商）
◯	◯	◯	◯	◯	6. 投资/开发、建造、拥有和运营
◯	◯	◯	◯	◯	7. 其他：（请说明）_____

2. 在国内各地区的工程市场，国际公司采用不同的公司运作模式或市场进入方式。请您圈选贵公司对以下不同的公司运作模式或市场进入方式所使用的程度：

1 = 从未使用 2 = 很少使用 3 = 有时使用 4 = 经常使用 5 = 非常经常使用

					公司运作模式或市场进入方式
1	2	3	4	5	**有资本投入：**
○	○	○	○	○	1. 直接投资 （建立全资子公司）
○	○	○	○	○	2. 资本合资 （建立部分股权子公司）
○	○	○	○	○	3. 资本流动运营 （资本的投资包括设备不是固定在某一地区，根据项目的需要进行流动调配）
○	○	○	○	○	4. 合同式合资 （以项目为基础的合资）
1	2	3	4	5	**无资本投入：**
○	○	○	○	○	5. 分包 （分包给其他公司）
○	○	○	○	○	6. 许可经营或特许经营 （例如允许其他公司使用本公司的牌子，并与之签订没有或很少义务的合同）
○	○	○	○	○	7. 战略联盟 / 伙伴关系
○	○	○	○	○	8. 安排当地代理
○	○	○	○	○	9. 其他：（请说明）_____

3. 在国内各地区的市场，国际公司在选择市场进入方式或公司运作模式时要考虑不同的目标和一些公司内部化因素。请您根据贵公司的经验，评估并圈选以下内部化优势因素对贵公司在选择国内不同市场的进入方式或公司运作模式时所考虑的重要程度：

1 = 非常不重要 2 = 比较不重要 3 = 一般重要 4 = 比较重要 5 = 非常重要

					国际公司在选择市场进入方式或公司运作模式时，要考虑的不同的目标和内部化因素
1	2	3	4	5	**与公司相关的内部化优势因素：**
○	○	○	○	○	1. 避免或降低信息资料搜集和商务谈判的成本
○	○	○	○	○	2. 为充分利用总公司和分公司的关系网络
○	○	○	○	○	3. 避免由于不当地选择了不合格的或运作不利的分包商而造成的损失
○	○	○	○	○	4. 保护公司的声誉
○	○	○	○	○	5. 保护公司的技术资源和专长
○	○	○	○	○	6. 保障工程和所提供的服务的质量
○	○	○	○	○	7. 避免合同被迫中止和进行诉讼所发生的费用
○	○	○	○	○	8. 满足日益增加的专业人士和其他雇员的需要
○	○	○	○	○	9. 满足要对所得的利润进行其他投资的需要
○	○	○	○	○	10. 更好地利用和控制资源，包括材料、设备、技术、人力资源等
1	2	3	4	5	**与当地地域相关的内部化优势因素：**
○	○	○	○	○	1. 满足当地政府在政策上对工程项目实施和运作的要求
○	○	○	○	○	2. 更好地促进与商业战略联盟、合作伙伴和商务网络的关系
○	○	○	○	○	3. 避免业主对所购买的工程和服务的不确定因素，和更好地满足业主的需求
○	○	○	○	○	4. 巩固市场占有程度，满足未来市场发展的需要
○	○	○	○	○	5. 其他：（请说明）_____

第五部分 受访者情况

现在您已经填完大部分问题。我们非常感谢您付出了宝贵的时间和精力来帮助我们。您在这里所有的意见和答案都将被严格保密。最后可否请您提供以下信息：

1. 贵公司的名称：_____

2. 您目前在贵公司的职位：

- ◯ 董事长 / 总经理 / 董事 / 公司核心领导成员
- ◯ 公司高级顾问
- ◯ 部门经理 / 经理
- ◯ 执行人员 / 分公司经理
- ◯ 项目经理
- ◯ 其他

3. 您已经参与国内业务多少年 ？

4. 您是否有其他想法或建议可供我们参考，敬请写在下面：

5. 本调查采用匿名方式，不需要签名。惟如您希望收到本研究的结果，请您留下您的姓名、电邮地址或通讯地址，以便日后邮寄研究报告给您。

非常感谢您的协助，并祝您万事如意！

发送

APPENDIX C
LIST OF PUBLICATIONS

I. **Internationalization of Chinese Construction Enterprises**
Low, S.P. and Jiang, H.B.
Journal of Construction Engineering and Management, December, Vol. 129, No.6, pp. 589-598 American Society of Civil Engineers (ASCE), U.S. (2003)

II. **Estimation of International Construction Performance: Analysis at the Country Level**
Low, S.P. and Jiang, H.B.
Construction Management and Economics, 22(3), pp. 277-289, London, UK. (2004)

III. **A comparative study of top British and Chinese international contractors in the global market**
Low, S.P. and Jiang, H.B.
Construction Management and Economics, (September 2004) 22, pp. 717–731, London, UK. (2004)

IV. **Chinese Connections in International Construction: The Past 100 Years**
Jiang, H.B, Low, S.P. and Leong, C.H.Y.
In Proceedings of CIB W55, W65, W107 International Conference of Knowledge Construction, 22-24 October 2003, Singapore, pp.352-367. (2003)

V. **Domestic issues, international construction and lessons in international project delivery systems for Singapore**
Low S.P. and Jiang H.B.
Keynote Paper, *In Proceedings of the 20th Symposium of Building Construction and Management of Projects,* Shuzo Furusaka (Editor), organized by the Research Committee on Building Economics, Architectural Institute of Japan, Kyoto, Japan, 22-24 July 2004, pp.65-74. (2004)

VI. **Measuring International Performance: Case Study of a Chinese Construction Multinational Corporation (MNC)**
Low, S.P, Jiang, H.B. and Leong, C.H.Y.
In Proceedings of the CRIOCM International Conference of Advancement of Construction Management and Real Estate, Dec. 3-5, 2003, Macau, pp. 133-155. (2004)

VII. **Analyzing Ownership, Locational and Internalization Advantages of Chinese Construction MNCs using Rough Set Analysis**
Low S.P. and Jiang H.B.
Submitted to *Construction Management and Economics,* London, UK. (2005)

I. Internationalization of Chinese Construction Enterprises
Low, S.P. and Jiang, H.B.
Journal of Construction Engineering and Management, December, Vol. 129, No.6, pp. 589-598 American Society of Civil Engineers (ASCE), U.S. (2003)

Internationalization of Chinese Construction Enterprises

Low Sui Pheng[1] and Jiang Hongbin[2]

Abstract: Thirty-five international contractors from China were included by the Engineering News Record in the list of the Top 225 International Contractors in 2000. Although Chinese international contractors are increasingly playing a significant role in the global construction market, relatively few studies have been completed on their historical background and foray into the international arena. Apart from seeking to fill this lacuna, this paper also provides an analysis of the these 35 Chinese international contractors to evaluate their achievements using the following performance indicators: International Revenue/Total Revenue, International Business Distribution, Overseas Management Structure, Involvement in Specialized Fields, and Overall Index of Internationalization. The analysis identified the top ten Chinese international contractors who are truly global in outlook. The study also suggests that the traditional multinational enterprise theories may not explain the development of Chinese international construction firms adequately.

DOI: 10.1061/(ASCE)0733-9364(2003)129:6(589)

CE Database subject headings: China; International factors; Contractors; Construction industry; Foreign projects.

II. Estimation of International Construction Performance: Analysis at the Country Level
Low, S.P. and Jiang, H.B.
Construction Management and Economics, 22(3), pp. 277-289, London, UK. (2004)

Construction Management and Economics (March 2004) **22**, 277–289

Spon Press
Taylor & Francis Group

Estimation of international construction performance: analysis at the country level

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Received 7 October 2002; accepted 20 February 2003

The measurement or estimation of the degree of internationalization of multinational corporations (MNCs) remains lacking although many studies have been completed on MNCs in the construction industry. Dunning's Eclectic Paradigm suggests that the determinants of internationalization depends on the ownership (O), locational (L) and internalization (I) advantages of a firm. Another important factor relates to the involvement of a firm among specialized fields in the construction industry, i.e. the specialty (S) advantages. This paper proposes the OLI+S model for measuring/estimating the internationalization process of construction MNCs, according to nationalities, using the following ratios: O-IRTR, L-IBD, I-OMS and S-ISF. Major players in the international construction market were analysed using these ratios. The OLI+S model shows that construction MNCs from different nationalities demonstrated different patterns in the internationalization process depending on their business strategies, indigenous market situations, historical factors, etc. among others.

Keywords: internationalization, construction, ownership, locational, internalization, specialty, nationalities

III. A comparative study of top British and Chinese international contractors in the global market

Low, S.P. and Jiang, H.B.

Construction Management and Economics, (September 2004) 22, pp. 717–731, London, UK. (2004)

Construction Management and Economics (September 2004) **22**, 717–731

Spon Press

A comparative study of top British and Chinese international contractors in the global market

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Department of Building, National University of Singapore, 4 Architecture Drive, Singapore 117566

Received 7 April 2003; accepted 15 December 2003

While British contractors have one of the longest history and experience in the international construction market, Chinese contractors are relative newcomers where the global market is concerned. This study compares the performance of top British and Chinese contractors based on the OLI+S model, which incorporates the ownership (O), locational (L), internalization (I) and specialty (S) factors. The study suggests that the international involvement of top British contractors has declined from a peak in 1996, while that of the top Chinese contractors has grown steadily since the 1980s. All the OLI+S advantages of top British construction firms were higher than those of their Chinese counterparts even though the number of Chinese construction firms ranked in the top 225 international contractors by the US-based *Engineering News Record* was higher than that of the British firms. This study further recommends that the internalization and specialty advantages of top British firms and some of the ownership advantages of top Chinese firms may provide them with opportunities to work together in many areas.

Keywords: International construction, firms, performance, Great Britain, China

IV. Chinese Connections in International Construction: The Past 100 Years

Jiang, H.B, Low, S.P. and Leong, C.H.Y.

In Proceedings of CIB W55, W65, W107 International Conference of Knowledge Construction, 22-24 October 2003, Singapore, pp.352-367. (2003)

ABSTRACT

Although internationalization of the construction industry has been studied over the past few decades, relatively few works have been completed on the Chinese involvement in the internationalization process. This may be because the involvement of Chinese firms in the international construction market occurred mostly over the past 10 to 20 years. However, on a broader view, the role of the Chinese in the international construction arena may be traced back to more than 100 years ago. In this paper, three major strands of involvement of the Chinese in the international construction industry are reviewed and analyzed, namely (i) involvement of the Chinese in the international construction industry prior to the 1940s, (ii) modern overseas Chinese firms in the international construction market, and (iii) the international construction firms from Mainland China. Relevant international business theories were identified and applied to interpret these three main strands of development. The roles of the Chinese and Chinese firms in the international construction industry were identified and explained. This study suggested that although the Chinese people were already involved with international construction activities as laborers more than 100 years ago, Chinese entrepreneurs were not significantly present in the global construction market until very recently.

Keywords: international construction, China, Chinese, Chinese firms, historical development

V. Domestic issues, international construction and lessons in international project delivery systems for Singapore

Low S.P. and Jiang H.B.

Keynote Paper, *In Proceedings of the 20th Symposium of Building Construction and Management of Projects,* Shuzo Furusaka (Editor), organized by the Research Committee on Building Economics, Architectural Institute of Japan, Kyoto, Japan, 22-24 July 2004, pp.65-74. (2004)

Abstract

There is a need in Singapore's construction industry for procurement methods that are agile enough to meet the constantly changing needs of the industry as well as capitalize on the strengths and weaknesses of Singaporean construction firms as they venture into the international market. An insight into international construction business based on the internalization theory of economics was undertaken. Grounded in internalization, two transaction chains relating to the internationalization process and international project procurement identified the various practices of construction clients and contractors. The international case studies presented supported the assertion that the company involved need to switch between different types of contract depending on the transaction costs likely to be incurred in different projects in different countries. No one single universal type of contract and type of internationalization approach applicable across a wide spectrum of project types was identified for adoption. The decision would depend on the facts and circumstances of each particular case, not the least of which are the anticipated transaction costs. Acknowledging the existence of and appropriately responding to the two transaction chains relating to the internationalization process and international project procurement would serve to ease Singaporean construction firms' access into the international market.

Keywords: Procurement, Internalization, International Construction, Transaction Chains, Singapore

VI. Measuring International Performance: Case Study of a Chinese Construction Multinational Corporation (MNC)

Low, S.P, Jiang, H.B. and Leong, C.H.Y.

In Proceedings of the CRIOCM International Conference of Advancement of Construction Management and Real Estate, Dec. 3-5, 2003, Macau, pp. 133-155. (2004)

CRICM2003 INTERNATIONAL RESEARCH SYMPOSIUM ON "ADVANCEMENT OF CONSTRUCTION MANAGEMENT AND REAL ESTATE"

Measuring International Performance: Case Study of a Chinese Construction Multinational Corporation (MNC)

Sui Pheng Low, Hongbin Jiang, Christopher H.Y. Leong

National University of Singapore

ABSTRACT

The measurement of the degree of internationalization of multinational corporations (MNCs) remains lacking although many studies have been completed on MNCs in the construction industry. Dunning's Eclectic Paradigm suggests that the determinants of internationalization depends on the Ownership (O), Locational (L) and Internalization (I) advantages of a firm. Another important factor relates to the involvement of a firm among specialized fields in the construction industry, i.e. the Specialty (S) advantages. This paper proposes the OLI+S model for measuring the internationalization process of construction MNCs using the following ratios: O-IRTR, L-IBD, I-OMS and S-ISF. Major players in the international construction market were analyzed using these ratios, including that of China State Construction Engineering Corporation (CSCEC) as a comparative case study. The OLI+S model shows that construction MNCs demonstrated different patterns in the internationalization process depending on their business strategies, indigenous market situations, historical factors, etc. among others.

Keywords: internationalization, construction, ownership, locational, internalization, specialty, China

VII. Analyzing Ownership, Locational and Internalization Advantages of Chinese Construction MNCs using Rough Set Analysis

Low S.P. and Jiang H.B.

Accepted for publication by *Construction Management and Economics,* London, UK. (2005)

Abstract

Although the increasing involvement of Chinese construction multinational corporations (MNCs) in the international market has received some attention, the studies on their performance, their competitive advantages and the various factors which they encountered remain very limited. This paper identified and analyzed the ownership, locational and internalization advantages of Chinese construction MNCs in the international market under the framework derived from Dunning's eclectic paradigm. Due to the macro nature of research relating to MNCs, existing studies often encountered a situation where the sample size may not be large enough when faced with many influencing factors. Such studies were generally brought to a pre-mature end at the identification and examination stage, rather than to further examine the causality patterns of these factors due to the methodological constraints of the conventional statistical methods. A methodology which is based on new advancements in rough set theory provides a solution out of this situation. It uncovers the significant attributes that influence the firm's performance, and establish the causal relationship between these factors and the performance indicators. In addition, it also provides straightforward decision rules which offer valuable suggestions for management to improve the firm's operations by concentrating on a few key factors with different priorities. It is believed that this present study is the first ever study that applied the rough set analysis in the domain of construction management and economics to analyzing Chinese construction MNCs.

Keywords: Rough Sets, Eclectic Paradigm, International Construction, Chinese Multinational Corporations.