Creating and sustaining competitive advantage for small and medium-sized enterprises in the Chinese construction industry

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**CREATING AND SUSTAINING COMPETITIVE ADVANTAGE
FOR SMALL AND MEDIUM-SIZED ENTERPRISES IN THE
CHINESE CONSTRUCTION INDUSTRY**

Yan Shi Gang

SCHOOL OF CIVIL & ENVIRONMENTAL ENGINEERING

2007

**Creating and Sustaining Competitive Advantage
for Small and Medium-sized Enterprises in the
Chinese Construction Industry**

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School of Civil & Environmental Engineering

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ABSTRACT

This research is conducted in the context of construction SMEs in China. As the major force in Chinese construction, construction SMEs have played an important role in promoting construction industry growth. However, they are facing a myriad of problems and difficulties which have constrained their further development. The research investigates how construction SMEs in China compete for success via the use of core capability and competitive strategy in a transitional economy in China. It aims to answer the question “How can construction SMEs create and sustain their competitive advantage in the Chinese construction industry?”

The research integrates the industry organization approach and resourced-based view which have emerged in the literature related to the concept of competitive advantage. Based on these two approaches, a theoretical framework is developed to investigate the relationship among core capability, competitive strategy and industry structure factors within Chinese construction SMEs. The conceptual framework proposes that Chinese construction SMEs’ performance is critically dependent on three key constructs: core capability, competitive strategy and industry structure.

Based on the data collected from construction SMEs in China, the empirical findings of the study suggests that core capability, competitive strategy and industry structure related factors have significant impact on the construction SMEs’ performance. Research findings indicate that core capability significantly contributes to construction SMEs’ performance. Consistent with the industry organization approach, competitive strategy determines construction SMEs’ competitive advantage, which leads to superior performance. Research findings also show that there are positive relationships between core capability and competitive strategy. Moreover, the range

of correlations between competitive strategy dimension and construction SMEs' performance vary significantly in different core capability clusters. Finally, research findings suggest that industry structure, as a moderator, has a partial impact on the effect of competitive strategy on construction SMEs' performance.

The pattern among core capability, competitive strategy and industry structure factors are also observed with empirical evidences from case studies of three companies. The case studies illustrate the link between theory and practice as it relates to the relationship among core capability, competitive strategy and industry structure in the construction SMEs and their success. It further strengthens the use of the conceptual model for construction SMEs to improve competitive advantage in the construction market.

Despite the significance of the study, it is worth acknowledging the exploratory nature of this study. It is hoped that the framework developed in this study will provide the theoretical foundation for more rigorous research in the future.

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TABLE OF CONTENTS

ABSTRACT	i
ACKNOWLEDGEMENTS	iii
TABLE OF CONTENTS	iv
LIST OF TABLES	ix
LIST OF FIGURES	xi

Chapter 1 INTRODUCTION	1
1.1 Research Background	2
1.2 Research Purpose and Specific Problem.....	5
1.3 Justification for the Research.....	6
1.3.1 Lack of Research on Construction SMEs	7
1.3.2 Significance of Construction SMEs to Chinese Construction Industry.....	8
1.3.3 One of the First Empirical Studies on Construction SMEs	8
1.3.4 Usefulness of Theory and Practice	9
1.4 Research Methodology	9
1.5 Outline of the Study	10

Chapter 2 LITERATURE REVIEW AND THEORETICAL FRAMEWORK.....	13
2.1 Introduction.....	13
2.2 Theoretical Foundations of Strategic Management	14
2.2.1 Industry Organization Approach.....	15
2.2.1.1 The Bain-type Industrial-organization Perspective.....	16
2.2.1.2 Neoclassical Perfect Competition Theory	16
2.2.1.3 The Schumpeterian Perspective	17
2.2.1.4 The Chicago School.....	17
2.2.1.5 Transaction Costs Approach	18

2.2.1.6 Contingency Theory	19
2.2.2 The Resource-based View	19
2.2.2.1 Dynamic Capabilities Approach	22
2.2.2.2 The Competence-based Competition Perspective.....	23
2.2.3 Comparison between Industry Organization Approach and Resource-based View	24
2.2.4 The Contribution of Strategic Management Theories on SME's Competitive Advantage.....	27
2.2.4.1 Competitive Advantage of the SME's.....	28
2.2.4.2 The Framework of SMEs' Competitive Advantage.....	31
2.2.5 Summary	35
2.3 The Development of Construction SMEs in China	36
2.3.1 The Reform of Construction Industry in China	36
2.3.2 The Current Characteristics of Construction Industry in China	38
2.3.2.1 Construction Administration Hierarchy	39
2.3.2.2 Classification and Competition among Existing Contractors.....	40
2.3.2.3 Market Entry and Exit.....	42
2.3.2.4 WTO Impact on the Chinese Construction Industry.....	44
2.3.3 The Role of Construction SMEs in Chinese Construction	45
2.3.3.1 Definition of Construction SMEs	45
2.3.3.2 Ownership Composition of Chinese Construction SMEs.....	47
2.3.3.3 Development of Construction SMEs in China.....	49
2.3.3.4 Problems and Difficulties Faced by Construction SMEs in China.....	53
2.3.4 Summary	53
2.4 Theoretical Framework and Hypotheses	54
2.4.1 Theoretical Framework.....	55
2.4.2 Research Hypothesis.....	57
2.4.2.1 Core Capability and Performance.....	57
2.4.2.2 Competitive Strategy and Performance	60
2.4.2.3 Core Capability, Competitive Strategy and Performance	64
2.4.2.4 Moderating Role of Industry Structure	66
2.5 Conclusion	69

Chapter 3 RESEARCH METHODOLOGY	72
3.1 Introduction.....	72
3.2 Research Design.....	73
3.3 Quantitative Stage	74
3.3.1 Sample Selection.....	74
3.3.1.1 Sample Method	74
3.3.1.2 Sample Frame	75
3.3.2 Data Collection	75
3.3.2.1 Survey Instrument.....	76
3.3.2.2 Development of Questionnaire	76
3.3.2.3 Conducting the Survey.....	78
3.3.3 Variables and their Measurement.....	79
3.3.3.1 Measurement of Core Capability	79
3.3.3.2 Measurement of Competitive Strategy	80
3.3.3.3 Measurement of Industry Structure	82
3.3.3.4 Measurement of Performance	83
3.3.4 Data Analysis Methods	85
3.3.4.1 Reliability and Validity Assessment Method	85
3.3.4.2 Data Analysis Techniques	85
3.3.4.3 Multicollinearity Problem.....	86
3.4 Qualitative Stage.....	87
3.4.1 Justification of the Case Study.....	87
3.4.2 Selecting Multiple Case Studies	88
3.5 Conclusion	88
 Chapter 4 RESEARCH FINDINGS AND DISCUSSION	 89
4.1 Introduction.....	89
4.2 Company Profile	89
4.3 Analyses of Variables	92
4.3.1 Reliability Assessment.....	92
4.3.2 Validity of the Constructs.....	93
4.3.2.1 Validity of Core Capability Variables	95
4.3.2.2 Validity of Competitive Strategy Variables.....	97
4.3.2.3 Validity of Industry Structure Variables.....	99

4.3.3 Correlation Analysis.....	100
4.4 Research Findings.....	102
4.4.1 Core Capability and Performance.....	102
4.4.2 Competitive Strategy and Performance	104
4.4.3 Core Capability, Competitive Strategy and Performance	106
4.4.3.1 Fit among Core Capability, Competitive Strategy and Performance	107
4.4.3.2 Core Capability Patterns and Competitive Strategy Choice	109
4.4.4 Moderating Role of Industry Structure	112
4.4.4.1 Market Entry Barriers and Competitive Strategy	112
4.4.4.2 Competitive Pressure and Competitive Strategy	114
4.5 Discussion of the Findings.....	118
4.5.1 Dimensions of Core Capability.....	118
4.5.2 Dimensions of Competitive Strategy	119
4.5.3 Dimensions of Core Capability and Competitive Strategy	120
4.5.4 Dimensions of Industry Structure as the Moderator	121
4.6 Conclusion	123
Chapter 5 CASE STUDIES	126
5.1 Introduction.....	126
5.2 Selection of Case Companies.....	126
5.3 Case Study One: Guangsha.....	127
5.3.1 Challenges facing Guangsha.....	127
5.3.2 Reform and Development	129
5.3.3 Competitive Strategy of Guangsha	131
5.3.4 Competitive Advantage and Performance	134
5.4 Case Study Two: Longyuan	136
5.4.1 Challenges facing Longyuan.....	136
5.4.2 Capability and Development.....	137
5.4.3 Competitive Strategy of Longyuan	139
5.4.4 Competitive Advantage and Performance	144
5.5 Case Study Three: Baoye.....	145
5.5.1 Challenges facing Baoye.....	145
5.5.2 Capability and Development.....	146

5.5.3 Competitive Strategy of Baoye	150
5.5.4 Competitive Advantage and Performance	153
5.6 Summary of Case Studies	154
5.7 Conclusion	157
 Chapter 6 CONCLUSIONS, IMPLICATIONS	
AND RECOMMENDATIONS	158
6.1 Introduction.....	158
6.2 A Summary of the Research.....	158
6.2.1 Research Objective	158
6.2.2 Research Method	159
6.2.3 Summary of Research Findings	160
6.2.4 Summary of Case Studies	161
6.3 Implications.....	162
6.3.1 Theoretical Implications	162
6.3.2 Managerial Implications	163
6.4 Limitations of the Study.....	164
6.4.1 Limitations as a Result of the Research Design.....	164
6.4.2 Limitations as a Result of Data Collection	165
6.4.3 Limitations as a Result of the Operationalization of Variables.....	165
6.5 Directions for Future Research	166
6.5.1 Direction for Research Design.....	166
6.5.2 Direction for Data Collection.....	167
6.5.3 Direction for Operationalization of Variables.....	167
6.6 Conclusion	168
 REFERENCES.....	169
 APPENDIX.....	193

LIST OF TABLES

Table 2.1 A chronological overview of concepts used in the resource-based view	21
Table 2.2 A comparison of the IO approach and RBV view	25
Table 2.3 Summary of contributions to the development of the competitive advantage in SMEs.....	30
Table 2.4 The development of construction industry in China.....	38
Table 2.5 Classification of Chinese construction firms in 2000	41
Table 2.6 Concentration ratios among China, Japan, UK and US.....	42
Table 2.7 Definition of SMEs in certain countries	46
Table 2.8 The development of construction SMEs in China	49
Table 2.9 Summary of research hypotheses	70
Table 3.1 Performance measures for SMEs' competitiveness.....	84
Table 4.1 Respondent's location.....	90
Table 4.2 Respondent's position.....	91
Table 4.3 Age, size, and ownership of the respondent firms	91
Table 4.4 Variables and their reliability	93
Table 4.5 Factor analysis results of core capability	96
Table 4.6 Factor analysis results of competitive strategy	98
Table 4.7 Factor analysis results of industry structure	99
Table 4.8 Mean, standard deviation and correlation of variables	101
Table 4.9 The impact of core capability on construction SMEs' performance	103
Table 4.10 The impact of competitive strategy on construction SMEs' performance	106
Table 4.11 Means and standard deviations of the core capability in each cluster.....	110

Table 4.12 Means and standard deviations of the competitive strategy and performance in each cluster	111
Table 4.13 The moderating effects of market entry barriers on the effectiveness of competitive strategy	116
Table 4.14 The moderating effects of competitive pressure on the effectiveness of competitive strategy	117
Table 4.15 Summary assessment of research hypotheses.....	124
Table 5.1 The three cost reduction approaches of Guangsha	132
Table 5.2 Quality objectives of Guangsha in 1990s	133
Table 5.3 Partnering activity of Guangsha	134
Table 5.4 Team building and project change management activities adopted by Longyuan.....	143
Table 5.5 The types of innovation activities of Baoye	149
Table 5.6 Quality assurance procedure of Baoye	152
Table 5.7 Partnering activity of Baoye in 1990s.....	153
Table 5.8 Main elements of the three case companies.....	155

LIST OF FIGURES

Figure 1.1 Justification for studying the research problem.....	7
Figure 1.2 Outline of the study	11
Figure 2.1 Outline of chapter 2	13
Figure 2.2 The strategic management research framework	14
Figure 2.3 From theories to SMEs' competitive advantage.....	28
Figure 2.4 Rangone's three-capability model.....	32
Figure 2.5 Lerner and Almor' environment-capability framework	33
Figure 2.6 Luo's environment-strategy framework	34
Figure 2.7 Chandler and Hanks' market-capability-strategy model	35
Figure 2.8 Construction administration hierarchies.....	40
Figure 2.9 Theoretical framework of competitive advantage for construction SMEs in China	56
Figure 3.1 Outline of chapter 3	72
Figure 4.1 Fit among core capability, competitive strategy and performance.....	108
Figure 5.1 Sale growth Vs profit growth of Guangsha in 1990s	135
Figure 5.2 Project organization structure of Longyuan	140
Figure 5.3 Quality control system of Longyuan	142
Figure 5.4 Sales growth of Longyuan in 1990s	144

Chapter 1 INTRODUCTION

The development of small and medium-sized enterprises (SMEs) was strictly limited under the traditional central planned economy in the early years in modern China. After the Third plenum of the 11th Central Committee of the Chinese Communist Party in December 1978, the government started to provide guidelines for reform and development of the agricultural economic system, which led to the legalization of small market-oriented businesses in the rural areas (Leo, 1999). In order to absorb the excess agricultural labor, SMEs were encouraged under the campaign of ‘Entering factories without moving into the city’. The policy led to the rapid growth of SMEs in the rural areas that stimulated development throughout the country.

The development of SMEs in China has followed an almost unique pattern (Chi and Chou, 2003). Despite lacking financial support from the government, SMEs took advantage of low-cost rural labor and locally available raw materials. They flourished in the market-oriented economy as the government gradually relaxed restrictions on the development of small enterprises. In the Chinese construction industry, construction SMEs have enjoyed rapid development since the adoption of the policy of reform and opening-up. The SMEs have grown to be an important force in promoting the development of Chinese construction. In addition, they have played an indispensable role in facilitating the reform of the construction industry system, promoting market orientation, improving industry structure, and creating job opportunities.

However, the rapid growth and the pervasive competition within the transitional Chinese economy have adversely affected the development of construction SMEs. Moreover, construction SMEs in China are behind that of the developed countries in aspects of enterprise organizational structure, level of technology, market

competitiveness, and human resource management. With China's WTO accession and the globalization of production and trade, the entrance of foreign capital, advanced technology and management expertise will have a profound socio-economic impact on the Chinese construction market, which brings forth challenges to the development of construction SMEs.

1.1 Research Background

During the 1970s, as the world began shifting from insular national economies to an interdependent global economy, the employment share of SMEs began to increase in most industrialized countries. In fact, compared with large enterprises (LEs), SMEs have increased their share of job creation, added value and even exports. In the process of this transition, SMEs act as a catalyst because they renew employment growth, improve market mechanism and channel innovation and technological change, contributing to the long-term health of the economy (Amboise, 1991).

The growth of SMEs has recently received considerable attention from researchers and policy-makers around the world. Researchers found new reasons for being interested in small firms. Three good characteristics for small firms are: they are the typical form of firm; they are relatively innovative and flexible; and they are significant contributors to employment growth (Reid, 1993). Jovanovic (1982) proposes that small firms have higher and more variable growth than larger firms. Birley and Westhead (1990) provide a general review of reporting empirical findings on growth and performance contrasts in SMEs. Gibb and Davies (1990) review and explain the dynamics of growth in SMEs in their research.

Although a large number of studies on SMEs have been produced over the past decades, most SME studies are conducted in the field of economics, and focused on the impact of SMEs on economic growth and industrial development of a country. Moreover, some sociologists also devote themselves to discovering the social characteristics of SMEs, and little is known about these SMEs in regards to their

composition, characteristics and functions. For example, some view SMEs as a source of competition, diversity and employment (Biggeri *et al.*, 1999); others have come to a negative assessment of their function and performance (Sun, 2001). While flexibility and innovation are the current focus of SMEs, they used to be considered primitive because of their inferior organization, poor management, and backward technologies (Sun, 2001).

In China, construction SMEs have flourished in the construction industry as ideological barriers have fallen. For a long time, a lot of attention has been directed towards examining the reform and development of state-owned enterprises (SOEs) (Chen, 1998; Flanagan and Li, 1997; Lan and Jackson, 2002; Mayo and Liu, 1995; Wang and Yang, 2002), with little attention given to the difficulties facing SMEs. Furthermore, few academics and professionals, in their analyses of the construction industry, assess the impact of external and internal factors on the survival of construction SMEs. Moreover, when the construction market shifts from planned-economy towards market mechanism, Chinese construction SMEs will face a dynamic and competitive environment. Hitherto, little research has been undertaken to systemically analyze the challenge and opportunity posed by such situation, which would give rise to an effective and integrative strategy for construction SMEs to compete in the Chinese construction market. For example, in Lei and Zhang's research (2003), the characteristics and development of Chinese SMEs are briefly presented, with no mentioning of the impact of competitive strategy to create their competitive advantage.

This study is conducted in the context of Chinese construction SMEs. For many years, the construction industry in China was controlled by the government and used to support China's centrally planned economy. Most construction projects were financed by the government, designed by state-owned design institutes, and built by state-owned construction companies (Mayo and Liu, 1995). The construction reform, which began in 1978, is designed to improve efficiency for the SOEs and establish an

open construction market. It is also to encourage private and collective firms (mainly SMEs), and make the Chinese construction firms more competitive with international firms. Since then, construction SMEs developed rapidly and began to play an important role in the development of Chinese construction.

As the major force in Chinese construction, construction SMEs have played an important role in promoting construction industry growth. However, construction SMEs are facing many problems and difficulties which have constrained their further development. Compared with their SOEs counterparts, construction SMEs are primarily engaged in labor intensive and lower-value-added activities (Harvie and Lee, 2002). Most of them have insufficient access to financial resources to meet any large-scale investments required for capital-intensive activities. In China, the underdeveloped banking sector, which is dominated by the four state-owned banks with traditional focus upon providing credit to the SOEs, has become a bottleneck to continual industry growth. This severe distortion of investment resources in the Chinese construction industry has dampened the prospects of construction SMEs.

What is the role of construction SMEs in Chinese construction? What are the unique capabilities of construction SMEs? And how can construction SMEs create and sustain their competitive advantage within the dynamic environment of Chinese construction? These are major questions to be examined in this research. In view of the diverse and uneven development of the Chinese construction industry, this research attempts to construct a theoretical framework for SMEs from a strategy perspective, using both the industry organization approach and the resource-based view.

1.2 Research Purpose and Specific Problem

Against this background, the research problem for this research is:

How can construction SMEs create and sustain their competitive advantage in the Chinese construction industry?

Given the competitive pressures in the construction market, the fundamental problem that must be resolved by construction SMEs pertains to the decision on what capability and strategy to be deployed and developed in order to survive and remain competitive.

In the Chinese construction industry, construction SMEs can be classified into four categories, namely state-owned SMEs, the collective enterprises, private and foreign sectors according to their ownership (Chen, 1998; Wei and Li, 1999). The purpose of this study is to explore, analyze, and understand the development process of construction SMEs and their competitive advantage from the standpoint of industry organization theory and resource-based view at the level of the firm. The industrial organizational economics takes an external market orientation to address this issue. This perspective typically stresses privileged end-product market positions as a basis for above-normal future returns and thus higher current firm value. The resource-based view focuses on the set of capability available for an SME, which comprises the internal capacity that the firm can mobilize through various business activities with customers, suppliers, co-operation partners, and so forth. Thus, it can be assumed that the formulation of competitive advantage for construction SMEs is affected by and realized through the interactions between internally available capability and external environment. The main objectives of this research are listed as follows:

1. To analyze the development process of construction SMEs in the Chinese construction industry, and provide a comprehensive perspective on construction SMEs in regards to their composition, characteristics, functions and roles;
2. To define the firm-specific capability and competitive strategy of Chinese construction SMEs based on the questionnaire survey and case studies;
3. To propose and develop a generic theoretical framework to support competitive advantage analysis, incorporating formulation of core capability, competitive strategy, and industry structure factors of Chinese construction SMEs;
4. To develop an instrument for measuring core capability, competitive strategy and industry structure factors; and
5. To investigate the relationship between core capability, competitive strategy and industry structure factors and construction SMEs' performance.

In this study, the formulation of competitive advantage is understood as a process determined by the firm-specific capabilities and external environment. In a research set-up of this kind, the process must be constructed on the basis of changes occurring in the firms during the period of research.

1.3 Justification for the Research

This research about creating and sustaining competitive advantage for construction SMEs in the context of Chinese construction can be justified on four grounds. First, the research of construction SMEs is a relatively new and important research area. Second, construction SMEs are an important contributor to the Chinese construction industry. Third, this research is one of the first empirical studies on construction SMEs using the industry organization approach and the resource-based view. Finally, the findings and implications of this study are useful for practice and theoretical advancement of the literature. These justifications are summarized in Figure 1.1 and are discussed in turn.

Source: Developed for this research

Figure 1.1 Justification for studying the research problem

1.3.1 Lack of Research on Chinese Construction SMEs

Despite the rich source of literature for studying SMEs in China, there are four main challenges to these previous studies. First, little research investigates and analyzes the construction SMEs in Chinese construction. Most studies on SMEs in China are conducted with the growth and role of SMEs in China economy (Chi and Chou, 2003; Harvie and Lee, 2002; Wang and Yang, 2002). Second, with market-oriented economy, new investigations of SMEs are required as the dynamic environment impacts on the SMEs' operation and performance, especially the construction SMEs. Third, Chinese construction SMEs have their uniqueness characteristics compared to SMEs in other countries due to different institutional settings. They differ from SMEs elsewhere, especially in Western developed countries, in terms of management, ownership structure and activities. Fourth, there has been a lack of empirical studies of construction SMEs in China. It is necessary to conduct in-depth quantitative and qualitative work to explain the emerging dynamics and further validate the impact on Chinese construction SMEs.

1.3.2 Significance of Construction SMEs to Chinese Construction Industry

The second justification concerns the importance of construction SMEs' development in the Chinese construction industry. Although construction SMEs are facing many problems and difficulties, such as insufficient access to financial resources, obsolete technology and low level of employees' education (Harvie and Lee, 2002), they have enjoyed rapid development since 1980s. These enterprises have grown to be an important force in promoting the development of the Chinese construction. In addition, the SMEs have played an indispensable role in facilitating the reform of the construction industry system, promoting the market orientation and creating job opportunities.

Under the transition period, the Chinese construction industry will evolve a substantial process to streamline business through market mechanisms, and consolidate Chinese construction's legal and administrative framework that protects private property rights and private sector activity. Upon WTO accession, various restrictions on foreign participation in the construction market are to be phased out gradually, although not completely. Therefore, the WTO accession will bring forth opportunities and challenges to the development of Chinese construction SMEs.

1.3.3 One of the First Empirical Studies on Construction SMEs

The third justification is that the research is one of the first empirical studies on construction SMEs using the industry organization approach and the resource-based view. The industrial organization approach of competitive advantage proposes that the primary sources of above industry average performance are product/service and market factors. An organization can position itself on these industry factors via its strategy. The resource-based view contributes to understanding the role of internal differences between firms in the same industry. Rather than viewing a firm as made up of processes (for example, in the value chain model), it can more naturally be viewed as made up of tangible and intangible assets, or resources.

The development of construction SMEs is determined by the interactions between internally available capability and external environment. Construction SMEs possess some kind of special resources and capabilities on which they make the differentiation from larger firms, especially the larger SOEs. The special resources and capabilities are the sources of competitive advantage for construction SMEs. Competitive strategy refers to construction SMEs' strategy defining the company's competitive positioning in the construction industry with respect to product/service and market characteristics. These factors present significant potentials for gaining and sustaining competitive advantage. As there are few empirical studies conducted to examine the critical factors influencing construction SMEs' competitive advantage in China (Cao, 2003), this research presents a new exploratory study involving in-depth work which explores the unique capability and competitive strategy of construction SMEs. Using quantitative and qualitative methods, this research will establish a better representation and generalization of the findings on construction SMEs.

1.3.4 Usefulness of Theory and Practice

The answers to the research problem highlighted in Section 1.2 will enhance knowledge about the impact of construction SMEs on Chinese construction. Put simply, due to its multidisciplinary nature, this research will contribute to the literature on SMEs, strategic management and resource-based theory. Similarly, this research will have implications for practice. The conclusions to the research problem will help managers develop and manage their SMEs in Chinese construction. The research findings also help SMEs' managers to understand the impact of the unique resources of their enterprises and competitive strategy.

1.4 Research Methodology

The study can be seen as an equivalent status design as both quantitative and qualitative methods in understanding the competitive advantage of construction SMEs in China are employed. According to Tashakkori and Teddie (1998), in equivalent

status designs, both the quantitative and qualitative approaches are equally important in understanding the phenomenon under study.

The quantitative stage explores mainly the development of instrument and the testing of the hypotheses. The underlying approach for the design and development of this survey instrument is to modify and update the existing instruments for core capability, competitive strategy, and industry structure. With the instrument developed, a large sample mail survey is conducted on construction SMEs in China. The data collected were then analyzed statistically to conduct hypothesis testing of the relationships within the variables proposed in the study.

Qualitative methods, through the use of a scientific instrument, allow for the interpretation of this constructed meaning. The qualitative stage of the research involves case study analyses conducted to illustrate the findings from the surveys. The qualitative stage in this research analyzes the patterns among core capability, competitive strategy and industry structure. It is used mainly to address the research on what capability and strategy are required by construction SMEs to create and sustain their competitive advantage within the domestic market.

1.5 Outline of the Study

The thesis comprises six chapters, and the structure of the research follows from the theoretical and empirical objectives of the research (Figure 1.2).

Chapter 1 Introduction provides the foundation for this research. It outlines the background to the research and presents the research problem and objectives together with the contributions of the research. The research is justified and the methodology outlined. The outline of the thesis is given at the end.

Chapter 2 Literature Review and Theoretical Framework reviews the two theoretical approaches which have emerged in the literature related to the concept of competitive advantage. The theories and framework of SMEs' competitive advantage are then discussed. Following that, the development of construction SMEs is set out. In this

section, the reform and current characteristics of the construction industry in China are discussed respectively, and then the development of construction SMEs in China is presented. The conceptual model presented herein is a generic framework that allows industry practitioners and academic researchers to understand, sustain and extend the competitive advantage of construction SMEs. Based the conceptual model, hypotheses are built up to test patterns of core capability, competitive strategy, and industry structure.

Figure 1.2 Outline of the study

Chapter 3 Research Methodology aims to describe the methodology to provide data to investigate the relationship among core capability, competitive strategy, industry structure, and construction SMEs' performance. The study can be seen as an equivalent status design as both quantitative and qualitative methods are used to understand the competitive advantage of construction SMEs in China.

Chapter 4 Research Findings and Discussion presents a detailed discussion of the findings. In this chapter, the methods of conducting survey are discussed. Following

that, reliability and validity of the constructs are addressed to provide necessary information for inferring construct validation. Hypotheses are tested to show the patterns of core capability, competitive strategy, industry structure, and construction SMEs' performance. Finally, discussion of the findings and conclusion are presented.

Chapter 5 Case Studies provides three detailed case studies by using renowned Chinese construction firms as the subject. The purpose of case studies is to illustrate the findings from the survey, and reinforce the use of the conceptual model for construction SMEs to improve competitive advantage in the construction market.

Chapter 6 Conclusions, Implications and Recommendations summarizes the main conclusions of the thesis and contributions made by this research. The implications of these findings have also led to several imperatives that should be observed by any construction SMEs. This is then followed by recommendations made on possible future research directions, some of which would address the limitations that cannot be fulfilled by this research.

Chapter 2 LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Introduction

The purpose of this chapter is to review the extant literature to identify the main research issues. The outline of this chapter is shown in Figure 2.1. First, theoretical foundations of strategic management are presented in section 2.2. Following that the development of construction SMEs in China is set out in section 2.3. Arising from that, the theoretical framework and hypotheses are presented in section 2.4. It ends with conclusion in section 2.5.

Figure 2.1 Outline of chapter 2

2.2 Theoretical Foundations of Strategic Management

Understanding sources of sustained competitive advantage for firms has become a major area of research in the field of strategic management (Porter, 1985). Since the 1960s, strategic management research has operated within the “SWOT” framework (strengths-weaknesses and opportunities-threats), as summarized in Figure 2.2 (Barney, 1991). The framework suggests that firms obtain sustained competitive advantage by implementing strategies that exploit their internal strengths, through responding to environmental opportunities, while neutralizing external threats and avoiding internal weaknesses.

Source: Adapted from Barney (1991)

Figure 2.2 The strategic management research framework

In this research, two approaches to competitive advantage are discussed. The first is the industry organization approach by Bain (1968), and further developed by Porter in *Competitive Strategy* (1985). Porter advocates that the industry structure determines the market equilibrium by matching the products offered by competing firms with different market needs. The second approach, the resource-based view, was initiated in the mid-1980s by Rumelt (1984) and Wernerfelt (1984), and further developed by other researchers (Barney, 1991; Foss and Knudsen, 2003; Peteraf, 1993). The resource-based view states that the firm’s competence must remain rare for the competitive advantage to be sustained.

2.2.1 Industry Organization Approach

Industrial organization (IO) economics examines the impact of environment on firm's competitive behavior and performance at the industry level. The dominant paradigm is the industry structure-conduct-performance hypothesis articulated by Bain (1968). In this paradigm, the firm's performance is proposed to be determined by firm conduct and industry structure. Since industry structure is assumed as the antecedent to firm conduct, most of the studies within industrial organization economics have examined the association between industry structure and firm performance (Scherer, 1980). Within IO, industry structure is measured by properties of the industry that include the number and size of firms (concentration), advertising intensity, concentration of suppliers and customers, the degree of product differentiation, and barriers to entry.

Though the IO paradigm focuses on the industry level to investigate firm performance, it appears to be valid in examining individual firm's behavior and performance. Porter (1980) adapted this paradigm to strategic management and examined existing firm's strategic decision to enter a new business. He identifies factors that prevail in any industry, such as product differentiation, economies of scale, economies of scope, organizational learning, etc. These factors present threats and opportunities for gaining and creating competitive advantage and in turn superior performance. Porter's work built a bridge to the IO economics literature, which supported the structure-conduct-performance paradigm used in his work. Complementing the work of Porter, Dunning states that firms engaging in foreign direct investment possess more advantages than their indigenous counterparts from the host countries. He identifies three kinds of advantages: ownership advantages, internalization advantages and locational advantages (Dunning, 1981). The following pages provide a summary of the main industrial organization economics theories including: Bain-type industrial-organization perspective, neoclassical perfect competition theory, Schumpeterian school, the Chicago school, the transaction cost approach, and contingency theory. This discussion will be followed by a description of the resource-based view of strategic management and the firm.

2.2.1.1 The Bain-type Industrial-organization Perspective

A significant focus of the Bain-type perspective has been the structure-conduct-performance model (Bain, 1968). According to Bain, industry structure referred to relatively stable economic and technical dimensions of an industry that provided the context in which competition occurred. The primary elements of industry structure were barriers to entry, industry concentration, product differentiation and the overall elasticity of demand (Bain, 1968). Conduct or strategy was the firm's choice of decision variables such as the advertising and promotional strategy to be adopted. Industry structure determines a firm's conduct, which in turn determines economic performance of the firm. Another important determinant of above normal earnings in the Bain-type perspective is firm size. Large firms have substantial control over the market and have the opportunity and ability to pursue monopolistic behavior. The primary motivation of firms is to become a monopoly and prevent other firms from becoming monopolies. Integration, product differentiation and other tactics are designed to erect entry barriers and increase monopoly power.

The Bain-type IO has appeal for researchers and practitioners. This may be because the theory was developed during the 1930s and 1940s. The theory developed when the prevailing paradigm of the economic theory of competitive markets was failing to explain the worldwide depression. The logic of Bain-type theory has not changed much since then. Researchers within the Bain-type school have tended to focus on the relationship between industry structure and performance. Research on firm size and industry concentration effects on market share and profits has been inconclusive (Conner, 1991).

2.2.1.2 Neoclassical Perfect Competition Theory

According to the neoclassical perfect competition theory, the firm exists to combine resources to produce an end product (Conner, 1991). The output is the result of a number of inputs, such as labor and capital, functioning in harmony. The firm owns the rights to production of inputs and so benefits from output. Perfect competition theory also posits that (1) the optimum input mix can be determined; (2) the marginal contribution of each input can be also calculated; (3) all players have perfect and complete information; and (4) the inputs or resources are mobile and can be allocated

to the most valuable application (Conner, 1991).

This theory focuses on a firm's response behavior to the external pressures that are exerted upon it by the industry to which it belongs. Unlike the Bain-type view, firms are considered to be small entities producing single products, so scope is not a major issue. As a result, little attention is directed to proactive strategic activity that emphasizes on the specific strengths of the firm, regardless of its size of the firm.

2.2.1.3 The Schumpeterian Perspective

The Schumpeterian perspective sees the firm as a seeker of new ways to compete in a dynamic environment. Schumpeter (1950) claims that the social value of the market structure cannot be assessed through a static perspective of competition. The purpose of the firm is to capture competitive opportunities by either creating or adopting innovations that make sure the competing firm's market position or product become obsolete (Schumpeter, 1950).

Contrary to the Bain-type view, Schumpeter posits that monopoly power is a positive factor for creating the scale and scope to seek radical innovations (as opposed to incremental innovations). Investing in radical innovation is extremely risky and the returns or payback may take years. Consequently, firms that have monopoly power have a reasonable incentive and financial asset to patiently wait for returns on the development of innovations (Conner, 1991). Empirical research on Schumpeter's theory has played an important role in strategic management development and has been somewhat popular. The topic that has received greater attention has been the relationships between industry concentration, firm size and innovation (Scherer, 1980).

2.2.1.4 The Chicago School

The Chicago school was a reaction to the intervention of public policy in the market. The Chicago school posits that the firm exists to improve efficiency in production and distribution of the firm and economy. The role of new entrants into the market is a critical factor in the efficiency of the existing firms (Demsetz, 1982). Another important premise of Chicago school is the role of expensive information. Stigler (1968) suggested that one should hardly have to tell academicians that information is

a valuable resource. For example, contrary to the Bain-type view which sees advertising as an entry barrier, the Chicago school considers advertising to be valuable service to consumers providing useful information for making effective choices (Stigler, 1968; Demsetz, 1982).

The Chicago tradition questions the power of government intervention to increase welfare, where the Bain-type IO supports the view that government intervention is necessary to fix the problems in the market. In addition, another difference between the Bain-type school and the Chicago school is that where Bain-type's might see firm behavior as monopolistic, Chicago believers see it as efficient operations. Also, the Chicago school suggests that natural monopolies should be privatized and in the bidding process the need for regulation will be resolved before they become necessary (Demsetz, 1982).

2.2.1.5 Transaction Costs Approach

The transaction cost approach suggests that firms and market exchange are alternative methods of production. According to Coase (1952), the firm exists because of the opportunity to replace market mechanisms by internalizing the process or inputs. In addition, a firm will expand until the costs of organizing an extra transaction within the firm become equal to the costs of carrying out the same transaction by means of an exchange on the open market or the costs of organizing in another firm. Thus, the boundaries of the firm are determined by transaction cost logic.

Williamson (1975) adds the construct of value to this school of thought. He focused on the situations where transaction cost avoidance would pay the highest dividends to the firm. Williamson's position is that a firm will exist to decrease the potential of significant opportunistic behavior in the market. The size and scope of the firm will depend on the decrease or increase in the costs of the internal management of a transaction instead of obtaining those services, parts, components and other resources from another firm in the marketplace. For example, vertical integration, horizontal integration, diversification and outsourcing are options that can be explained using the logic of transaction costs (Williamson, 1991).

2.2.1.6 Contingency Theory

Contingency theory argues that the most 'appropriate structure' for an organization is the one that best fits a given operating contingency, such as scale of operation (Pugh *et al.*, 1969; Blau, 1970), technology (Perrow, 1970) or environment (Burns and Stalker, 1961; Lawrence and Lorsch, 1967). This strand of research and theory underpins the understanding of relationships between nature of the task and technological environment, structure and performance.

Contingency theory accounts for the diversity of organizational forms in different technological and task environments. It assumes that as technology and product markets become more complex and uncertain, and task activities more heterogeneous and unpredictable, organizations will adopt more adaptive and flexible structures, and it will do so by moving away from bureaucratic to organic forms of organizing. The underlying difficulties in achieving the 'match', however, are not addressed in this strand of research. Contingency theory neglects the possibility that the factors identified as most important in this theory are susceptible to different interpretations by organizational actors (Daft and Weick, 1984), and ignore the influence of other factors such as managerial choice (Child, 1997) or institutional pressures (Powell and DiMaggio, 1991).

2.2.2 The Resource-based View

The resource-based view of the firm (RBV) has emerged in 1980s as a popular theory of competitive advantage even though it can be linked to earlier research of many scholars (Penrose, 1959; Andrews, 1980). Rather than emphasizing market structures, it highlighted firm heterogeneity and proposed that the unique assets and capabilities of firms were important factors giving rise to imperfect competition and the attainment of super-normal profits (Wernerfelt, 1984; Barney, 1991).

The resource-based view focuses on the firm's resources and capabilities to understand business strategy and to provide direction to strategy formulation. Resources include financial resources, tangible resources (such as plant, equipment, buildings), and intangible resources (such as patent, know-how, brand) (Barney, 1991; Hall, 1993). According to Teece *et al.* (1997), resources are firm specific assets that are difficult to imitate because of transaction costs and tacit knowledge. These

resources are the basis of the company's superior economic performance, and constitute organizational routines or core competence (Hamel and Prahalad, 1994; Rangone, 1999). Capabilities are features of the firm and managerial skills forming organizational routines, which lead to competitive advantage (Hadjimanolis, 2000). Capabilities allow a company to distinguish itself constantly on the dimensions that are important to its customers (Hoskisson *et al.*, 1999). Competences combine resources which enable firms to differentiate themselves from their competitors. The interaction of resources and capabilities is assumed to lead to competences (Hamel and Prahalad, 1994). In another view the term competences is reserved for managerial or organizational capabilities (limiting capabilities as such to technical ones). Table 2.1 summarizes the chronological overview of concepts used in the resource-based view.

The resource-based view assumes that firms can be conceptualized as bundles of resources, which are heterogeneously distributed across firms, and that resource differences persist over time (Amit and Schoemaker, 1993; Mahoney and Pandian, 1992; Penrose, 1959; Wernerfelt, 1984). Based on these assumptions, researchers have proposed that when firms have resources that are valuable, rare, inimitable, and nonsubstitutable, they can achieve sustainable competitive advantage by implementing value-creating strategies that cannot be easily duplicated by competing firms (Barney, 1991; Conner and Prahalad, 1996; Nelson, 1991; Peteraf, 1993; Wernerfelt, 1984). Finally, when these resources and their related activity systems have complementarities, their potential to create sustained competitive advantage is enhanced (Collis and Montgomery, 1995; Porter, 1985).

The resource-based view is based on the view of the firm that team specific assets within the firm are more valuable and productive to people inside the firm than those on the outside. In situations of rapid and unpredictable change, where the competitive landscape is shifting become sources of sustained competitive advantage. The recently proposed dynamic capabilities approach and competence-based competition perspective have extended RBV to dynamic markets. The two approaches investigate the mechanism of new assets and resources. The manipulation of resources, in particular, is critical in such markets.

Table 2.1 A chronological overview of concepts used in the resource-based view

Author(s)	Main concepts	Description or additional concepts
Wernerfelt (1984)	Resources	<ul style="list-style-type: none"> Resources position barriers
Itami (1987)	Invisible assets	<ul style="list-style-type: none"> Information-based resource/dynamic resource fit
Dierickx and Cool (1988)	Strategic assets	<ul style="list-style-type: none"> Stock accumulated through investments (flows)
Aaker (1989)	Assets and skills	<ul style="list-style-type: none"> Assts: something a firm possess superior to competition Skill: something a firm does better than competitors
Akerberg (1989)	Competence	<ul style="list-style-type: none"> Organizational competence depends on individual competences
Prahalad and Hamel (1990)	Core competence	<ul style="list-style-type: none"> Strategic architecture Collective learning: production skills and Technologies
Klein <i>et al.</i> (1991)	Metaskills	<ul style="list-style-type: none"> Metaskills: generate core skills
Barney (1991)	Firm resources	<ul style="list-style-type: none"> All assets, capabilities, processes, knowledge attributes, controlled by a firm
Grant (1991)	Resources	<ul style="list-style-type: none"> Resources: inputs to the production process Capability: capacity of resources to perform some tasks
Peteraf (1991)	Resources	<ul style="list-style-type: none"> Resources position barriers
Stalk <i>et al.</i> (1992)	Capabilities	<ul style="list-style-type: none"> Capability: more broadly based than core competence Key business processes
Amit and Shoemaker (1993)	Resources Capability Strategic asset	<ul style="list-style-type: none"> Stocks of available factors owned /controlled by the firm Capacity of firm to deploy resources using organizational processes, to effect desired end Set of difficult to trade, imitate, scarce and specialized resources and capabilities
Hall (1993)	Intangible resources	<ul style="list-style-type: none"> Skills or competence Assets: things which are owned Intangible resources may be linked with a functional, cultural, positional or regulatory capability
Teece <i>et al.</i> (1997)	Dynamic capability	<ul style="list-style-type: none"> The ability to integrate and reconfigure internal and external competences to address changing environment
Mosakowski (1998)	Entrepreneurial Resources	<ul style="list-style-type: none"> The creativity, foresight, intuition and alertness possessed by an individual
Rangone (1999)	Capability	<ul style="list-style-type: none"> Capacity of critical resources to provide a long term competitive advantage

Source: Developed by author

2.2.2.1 Dynamic Capabilities Approach

The dynamic capabilities approach analyzes the sources and methods of firms operating in environments of rapid technological change. The dynamic capabilities are a set of specific and identifiable processes such as product development, strategic decision making and alliance. According to Teece *et al.* (1997), dynamic capabilities are the antecedent organizational and strategic routines by which managers alter their resource base—acquire and shed resources, integrate them together, and recombine them—to generate new value-creating strategies. As such, they are the drivers behind the creation, evolution, and recombination of other resources into new sources of competitive advantage (Henderson and Cockburn, 1994).

In the dynamic capabilities approach, the competitive advantage of firms lies with its managerial and organizational process, shaped by its specific asset position, and the paths available to it. Managerial and organizational process refers to the way things are done in the firm, or what might be referred to as its routines, or patterns of current practice and learning. Position is related to its current specific endowment of technology, intellectual property, complementary assets, customer base and its external relations with suppliers. Path depends on the strategic alternatives available to the firm, and the presence or absence of increasing returns and attendant path dependencies. Thus, the competitive advantage of firms is seen as resting on distinctive process, including ways of coordinating and combining, shaped by the firm's specific asset positions, such as the firm's portfolio of difficult-to-trade knowledge assets and complementary assets, and the evolution paths it has adopted or inherited (Teece *et al.*, 1997).

The pattern of effective dynamic capabilities depends upon market dynamism (Eisenhardt and Martin, 2000). In moderately dynamic markets, dynamic capabilities resemble the traditional conception of routines. They are detailed, analytic, stable processes with predictable outcomes. In contrast, in high-velocity markets, they are simple, highly experiential and fragile processes with unpredictable outcomes. Finally, well-known learning evolutionary mechanisms guide the evolution of dynamic capabilities. In moderately dynamic markets, the evolutionary emphasis is on variation.

2.2.2.2 The Competence-based Competition Perspective

The competence-based competition perspective extends the traditional notion of strategy as seeking a “fit” of a firm’s capabilities with its environment. Adapting many concepts developed under the resource-based view of the firm (Wernerfelt, 1984; Barney, 1991; Grant, 1991; Peteraf, 1991) and dynamic capabilities (Teece *et al.*, 1997; Eisenhardt and Martin, 2000), the competence-based competition perspective appears to build a conceptual framework capable of addressing key dimensions of strategic competition not adequately addressed by those perspectives. It seeks to discover ways to leverage resources across businesses and products, and emphasizes on the notion that a firm can stretch to acquire new competences that can change the competitive environment (Sanchez *et al.*, 1996).

Hamel and Heene (1994), and Rumelt (1994) identify four key components of the concept of core competence as follows:

- Corporate span: the powerful core competencies of the firm that support several products and businesses of the firm.
- Temporal dominance: products are an expression of a firm’s core competencies which are more stable and change more slowly than products or services of the firm.
- Learning-by-doing: firm can gain and enhance competence through the work of the firm.
- Competitive locus: product-market competition is just an expression of a more complex level of competition over core competencies.

In essence, it describes firms as competing by proactively learning-by-doing in order to develop competence that span cross business activities and make possible a stream individual products (Sanchez, 1996).

In addition, Hamel and Heene (1994) posit that they are three major types of core competencies: market-access, integrity-related and functionality-related competencies. Market-access competencies include management of brand development, sales and marketing, distribution and logistics, technical support and others that keep the firm in touch with its customers. Integrity-related competencies consist of quality, cycle time

management, just-in-time inventory management, flexibility, reliability. Finally, functionality-related competencies focus on skills which enable the company to invest its services or products with unique functionality, which invest the product with distinctive customer benefits, rather than merely making it incrementally better. In a dynamic environment, maintaining competences requires continual adaptation to maintain an effective coordinated deployment of assets under changing conditions. Even in a stable environment, maintaining competences requires efforts to overcome systematic tendencies to organizational entropy in the form of gradual declines in coordination capability or in the clarity of the intentions that motivate an on-going deployment of assets (Sanchez *et al.*, 1996).

2.2.3 Comparison between Industry Organization Approach and Resource-based View

The primary similarities and differences between the two approaches depend on the type of IO perspectives. As can be seen in Table 2.2, the RBV reflects both a strong industry organization economics history and also provides a unique explanation to the theory of the firm. While the industry organization literature focuses externally on the industry and product markets (Tirole, 1988) and the resource-based view focuses internally on the firm and its resources, there is nonetheless a duality between the economists' constrained maximization problem of maximizing production given resource constraints and the constrained minimization problem of minimizing resource costs given a desired production level (Mahoney and Pandian, 1992).

The main difference between the Bain-type IO and RBV is that Bain-type scholars believe that earnings reflect an exercise of monopoly power or collusion, coupled with the construction of entry barriers and predatory marketing and pricing practices. The RBV on the other hand suggests that above-normal earnings are rents from productive assets, which are costly to copy. Moreover, RBV posits that diversification and vertical integration are optimal uses of gains from unique assets. It does not suggest that assets be used as a means to Bain-type goals of expanding the monopoly power or capital barriers to entry.

The fundamental paradox of the neoclassical theory of the firm is that the firm need not exist. The neoclassical theory assumes away transaction costs (Williamson, 1975), technological uncertainty (Schumpeter, 1950), consumer or producer learning

(Lieberman and Montgomery, 1988) and prices as signals of quality (Spence, 1974). The neoclassical view of the firm as resource integrator is at the heart of resource-based theory. However, a resource-based view rejects neoclassical theory's assumptions about perfect information, resource mobility and divisibility.

Table 2.2 A comparison of the IO approach and RBV

IO approach	Resource-based view	
	Similarity to IO approach	Selected unique contributions
Bain-type IO	<ul style="list-style-type: none"> ● Firm's environment poses critical constraints on strategy ● Persistent above-normal returns are possible 	<ul style="list-style-type: none"> ● Restrains on output through monopolistic or collusive action ● Internal organization is critical
Neoclassical perfect competition theory	<ul style="list-style-type: none"> ● Firm as input-combiner ● Emphasizes physical production of goods and/or services 	<ul style="list-style-type: none"> ● Identification of resources and combinations is problematic ● Critical resources may be immobile and byproducts of teamwork ● Firm size and scope are important issues
Schumpeterian perspective	<ul style="list-style-type: none"> ● New ways of competing can result in spectacular above-normal returns ● Entrepreneurial vision is at the heart of the firm ● Potential imitators always exist 	<ul style="list-style-type: none"> ● Feasibility of new competitive ways does not rest on monopolistic practices ● Imitators are constrained by costly-to-copy resources ● Good earning can result from less than revolutionary innovation
Chicago school	<ul style="list-style-type: none"> ● Firms are production and distribution efficiency seekers ● Firm size and scope reflect extent to which production and distribution efficiencies are achieved 	<ul style="list-style-type: none"> ● Focus more on intermediate term ● Efficiency seeking goes beyond current products, and extend to new products
Transaction costs approach	<ul style="list-style-type: none"> ● Asset specificity and small numbers are critical factors constraining the firm's strategic options 	<ul style="list-style-type: none"> ● Firms should focus on deployment and combination of specific inputs rather than on avoidance of opportunism
Contingency theory	<ul style="list-style-type: none"> ● Organization and technology are key factors for achieving competitive advantage 	<ul style="list-style-type: none"> ● Firms should adopt flexible organization structures according to changes in technology and product market

Source: Adapted from Conner (1991)

RBV embraces the Schumpeterian construct of the dynamic processes of “creative destruction” whereby firms can make extraordinary gains in their competitive position through constant change. This Schumpeterian competition may be translated into the resource-based framework by considering the firm’s new combinations of resources (Penrose, 1959) as a means of achieving the goal of sustained competitive advantage (Ghemawat, 1986). Penrose (1959), following Schumpeter (1950), views the competitive process as dynamic involving uncertainty, struggle and disequilibrium. Firms accumulate knowledge as a strategic asset through R&D and learning.

The Chicago-school view questions whether economies of scale, advertising and R&D expenditure can ever be a barrier to entry (Demsetz, 1982; Stigler, 1968). Many industrial economists take an effective view between the two approaches. Perteraf (1990) argues that the resource-based view is closer to the Chicago school in emphasizing efficiency rents rather than monopoly rents. However, Chicago view shares the notion of efficiency seeker in production and distribution, RBV does not share Chicago school’s focus on the long-term. Instead the RBV focuses on the analysis of short and intermediate length problems in which inputs may remain costly to copy.

In the translation of the transaction cost approach into the resource-based view, a firm is considered both an administrative organization and a pool of productive resources (Penrose, 1959). In planning expansion, the firm considers the active combination of its own inherited endowment of resources and those that it must obtain from the market in order to carry out its program of activities (Barney, 1991). These resources endowments factors are assumed to be semi-permanently tied to the firm due to reconstructive costs and market imperfections (Teece, 1990; Yao, 1988). Firm-specific resources may result in sustainable performance differences (Hill and Jones, 1989; Hoskisson *et al.*, 1999). The analysis of these resources extends quite naturally to international business competition and cooperation (Collins, 1991).

The contingency theory proposed that superior organizational performance is a result of the proper alignment of endogenous design variables with exogenous context variables (Child, 1997). Internal contingencies, and the existing firm’s resources in particular, should be important variables in contingency-based approach to the process of strategy. The relative emphasis on resource selection and accumulation depends on

the environment. In order to maintain alignment between changing managerial perceptions of an exogenous general business and complex capabilities for managing the business natural environment interface, organizations need to develop the dynamic capability of a proactive environmental strategy.

With the aforementioned arguments at hand, it can be argued that the IO and RBV schools are complementary. The resource-based view is complementary to the analytic and empirical literature based on the Bain-Porter framework (Bain, 1968; Porter, 1985). Peteraf (1990) provides a contribution to the resource-based literature by systematically contrasting the classical Porter framework (1980), and the resource-based view of the firm. Peteraf (1990) also contrasts the Chicago School (Stigler, 1968) to the resource-based view. The emphasis in this section is on the common ground shared between these ‘two systems of belief’ (Demsetz, 1994) in industrial organization and the resource-based approach.

2.2.4 The Contribution of Strategic Management Theories on SME’s Competitive Advantage

The concept of competitive advantage has received much academic attention and has become well established in the literature (Barney, 1991; Porter, 1985; Coyne, 1986). Regardless of which theoretical perspective is represented, there is a general agreement that the purpose of strategic competitive activity in the firm is to achieve a sustainable competitive advantage, and thereby enhance a business’ performance (Porter, 1985; Coyne, 1986; Hall, 1992; Bharadwaj *et al.*, 1993). The industrial organization approach, which emphasizes the importance of forces outside of the firm, acknowledges that a profitable and sustainable position against the forces that determine industry competition is the aim of competitive strategy (Porter, 1985). On the other hand, resource-based view stresses that any member of an industry can successfully compete through the wise use of resources and careful strategic decision-making (Barney, 1986). Thus, as shown in Figure 2.3, the two important schools of thought provide the relevant theoretical contributions to the competitive advantage of SMEs.

A firm is rewarded with a competitive advantage when it offers uniqueness and/or value. Porter (1985) has identified differentiation as one of the two types of

competitive advantage, the other being cost leadership. In his discussion, competitive advantage stems from being either unique in an industry along some dimension that is valued by a significant portion of the target market or by establishing the position of being the low cost producer in an industry. Similarly, Hall (1992) emphasized this concept of value when he states that sustainable competitive advantage is the result of the consistent production of products and/or delivery systems. Hoskisson *et al.* (1999) reiterates the industrial organization approach of importance of position in an industry. They stress that competitive advantage is dependent on those unique characteristics that a firm possesses that enable it to maintain a dominant position in its industry.

Source: Adapted from Collis and Montgomery (1995)

Figure 2.3 From theories to SMEs' competitive advantage

2.2.4.1 Competitive Advantage of the SME's

The large body of academic literature dedicated to the concept of competitive advantage is evidence that it is a viable strategic tool for use by today's well-managed firm. This literature, however, has been most often directed to strategic activity in the large firm, with little attention paid to the needs of small firms wishing to compete

successfully. Nevertheless, some academic research has been focused specially on the application of the importance of competitive advantage in small firms. The development of a competitive advantage on the part of the small firm is presented as not only a means of achieving success but rather as a technique necessary for the survival of the firm in industries where competition is fierce and members' sizes are unequal (Barker and Gimble, 1982; Stoner, 1987). Table 2.3 summarizes the contributions to the development of competitive advantage in SMEs.

In the study of the competitive advantages developed by small businesses in operations, researchers have acknowledged that generic competitive strategy influence the SMEs' performance. Barker and Gimpl (1982) stress that large firms typically have the advantage due to economies of scale in fiercely competitive situations, differentiation strategy through ancillary intangibles may prove effective to achieve success for small firms. Neil (1986) follows this article with an exploratory research project designed to determine the effectiveness of the employing the distinctive competence strategy on the part of small firms in the highly competitive real estate industry. Lee *et al.* (1999) further suggest that SMEs can free-ride on the bigger firms' market development efforts and/or they can form strategic alliances to force accommodation by the bigger rivals.

The firm's competitive advantage is not only affected by the environment and strategy it involved, but also depends on the firm-specific resources and capabilities. Wiklund and Shepherd (2003) suggest that knowledge-based resources are positively related to SMEs' performance. Premaratne (2001) identifies two types of resources, namely entrepreneurial resources and gratis (supporting) resources, which contribute to SMEs' success. Rangone (1999) proposes a strategy analysis framework which integrates the resource-view notions of resources and capabilities with the traditional strategy view. Using this framework, Rangone argues that the focus of SMEs' competitive advantage should be to make the most effective use of critical resources and capabilities, and to maintain and continue developing its resources. Jaafar (2004) suggest that management capabilities, including financial management, project management, and marketing management, forms a very important function to the construction SMEs. Also developing good relationship marketing techniques with stakeholders, especially powerful parties, can help construction SMEs to achieve competitive advantage in the industry.

Table 2.3 Summary of contributions to the development of competitive advantage in SMEs

Author(s)	Target	Competitive advantage (CA) for SMEs
Barker and Gimpl (1982)	Small firms in service businesses	CA relies on the ability of differentiating one's service in competitive markets where identical services are offered through identical channels.
Neil (1986)	Small real estate firms	Developing and use of differentiation strategy brings to success for small real estate firms.
Chaganti <i>et al.</i> (1989)	Small manufacturing firms	Firm should match strategy to the type of competitive in the market, and the effective strategies vary with the type of competition.
Chandler and Hanks (1994)	Small manufacturing firms	The CA lies in the market attractiveness, resourced-based capabilities, and competitive strategies. Moreover, the fit between capabilities and competitive strategy is required to enhance the performance.
Ostgaard and Birley (1994)	Small new ventures	Small firms can gain competitive advantage through the linkages between the entrepreneur's network and firm's competitive strategy.
Lee <i>et al.</i> (1999)	SMEs	The choice of generic strategy depends on the anticipated behavior of the bigger rivals.
Rangones(1999)	SMEs	Competitive capabilities, including innovation, production and market management capability, provide a long term competitive advantage
Brooksbank <i>et al.</i> (2001)	Medium-sized manufacturing firms	Specific marketing practices are described as key determinants of success
Premaratne (2001)	SMEs in Sri Lanka	The success of small business depends on entrepreneurial resources and gratis (supporting) resources.
Lerner and Almor (2002)	Women-owned small firms	The venture's capabilities are significant to the firm's performance and achieve competitive advantage.
Bartb (2003)	SMEs	CA is resulted form the fit between competitive strategy and administrative mechanism (managerial skills and organization structure).
Wiklund and Shepherd (2003)	SMEs	Knowledge-based resources are positively related to firm performance and entrepreneur orientation enhances this relationship. .
Jaafar (2004)	Construction SMEs in Malaysia	Management capabilities contribute to sustainable competitive advantage.

Source: Developed by author

The environment undoubtedly impacts firms' survival and growth. Likewise, the firm's resource, capability and competitive strategy are thought to impact performance (Chandler and Hanks, 1994; Grant, 1991; Mahoney and Pandian, 1992). The external environment supports the critical resources and capabilities. Different critical resources and capabilities and related internal links and external interfaces can increase its competitive position in the industry. These elements or variables must somehow fit together if an organization is to perform well (Haan *et al.*, 2002).

2.2.4.2 The Framework of SMEs' Competitive Advantage

A number of authors have proposed analytical frameworks to pull together various threads of research and present visually a comprehensive and integrated view of strategic analysis in SMEs (Chandler and Hanks, 1994; Rangone, 1999; Lerner and Almor, 2002; Luo, 1999). In this research, four relevant models are summarized to provide both industry organization and resource-based approach to strategic management of SMEs.

Rangone's three-capability model Resource-based approach analyzes the internal mechanisms through which a company converts the influence of the external environment into useful internal capability. Based on 14 case studies of SMEs in different industries, Rangone (1999) proposes a model of a SME's sustainable competitive advantage (Figure 2.4). In the model, the competitive advantage is attributed to three basic capabilities as follows:

- Innovation capability: a company's ability to develop new products and processes, and achieve superior technological and/or management performance (e.g., development cost, time-to-market, etc.);
- Market management capability: a company's ability to market and sell its products effectively and efficiently, and achieve marketing performance by realizing brand, awareness, brand reputation, etc.; and
- Production capability: the ability to produce and deliver products to customers, while ensuring competitive priorities, such as quality, flexibility, lead time, cost, dependability, etc.

According to this model, the SMEs' competitive advantage depends on critical resources possessed by the company and their alignment with company's strategic intent (Rangone, 1999). To achieve competitive advantage, a SME explicitly or implicitly puts its strategic focus on one or more of the above basic capabilities.

Source: Adapted from Rangone (1999)

Figure 2.4 Rangone's three-capability model

Lerner and Almor's environment-capability framework Derived from the resource-based view, the model developed by Lerner and Almor posits that strategic capabilities play a central role in small venture's performance (Lerner and Almor, 2002). As Figure 2.5 shows, the performance of small ventures is influenced by the following capabilities: (1) strategic planning, (2) firm's specific resources, (3) entrepreneurial skills, including management style, and (4) previous experience. Perception of the environment is also expected to impact business performance because the development of capabilities depends among other things upon perception of the environment.

This study examines empirically how the capabilities of small ventures influence the performance. Using data collected from small ventures, Lerner and Almor (2002) test the relationship among environment, capabilities and venture's performance. The results suggest the influence of the strategic capabilities and environment in relation

to the venture's performance. Especially, the findings confirm the importance of owners' business skills and capabilities.

Source: Adapted from Lerner and Almor (2002)

Figure 2.5 Lerner and Almor's environment-capability framework

Luo's environment-strategy model Since the adoption of the policy of reform and opening-up, SMEs have played an increasingly important role in shaping the Chinese national economy and structural reform. Working within the context of industry origination theory, Luo (1999) investigated the relationships between business environment and managerial strategies, and developed the environment-strategy model for small firms in China.

As shown in Figure 2.6, there are three dimensions from each segment of the environment, including complexity, dynamism and hostility. Environmental complexity refers to the heterogeneity and range of factors in various environmental segments. The dynamism can be conceptualized as the rate of change and the degree of instability of the environment. Environment munificence is defined as the availability of external resources that are crucial for firm growth. For SMEs, the choice of strategies for SMEs involves innovativeness, proactiveness, and risk-taking.

Source: Adapted from Luo (1999)

Figure 2.6 Luo's environment-strategy framework

Based on an analysis of survey data collected from SMEs, Luo (1999) suggested that small businesses in transitional economy need to use particular strategies when facing circumstances. In a dynamic environment, small businesses should use innovative, proactive, and risk-taking strategies in seeking opportunities and achieve competitive advantage. The result also confirmed that environmental characteristics have a significant influence on SMEs' strategic orientations. Moreover, the result suggested an appropriate match between strategic orientation and environmental characteristics would be lead to superior performance.

Chandler and Hanks' market-capability-strategy model The market attractiveness and the firm's specific resources play key roles in small firms' success (Chandler and Hanks, 1994). To illustrate the relevance of these constructs in small manufacturing firms in US, Chandler and Hanks (1994) developed a model to identify the relationship among market attractiveness, resource-based capability and competitive strategy. Figure 2.7 shows the relationship among these constructs. In the framework, Chandler and Hanks (1994) proposed that both market attractiveness and resource-based capabilities are directly related to small ventures' competitive advantage. In addition, specific resource-based capabilities significantly contribute to the competitive strategies chosen by a firm. Finally, the fit between strategies and capabilities is related to venture performance.

Source: Adapted from Chandler and Hanks (1994)

Figure 2.7 Chandler and Hanks' market-capability-strategy model

Using data collected from small manufacturing firms, Chandler and Hanks (1994) confirmed that higher levels and broader varieties of resource-based capabilities are significantly related to venture performance. They also found that market attractiveness is not directly related to business performance, thus supporting the resource-based argument that business performance is mainly a result of the firm's ability to exploit a market and not of market attractiveness. Moreover, the findings suggest that there is a fit between firm-specific capability and competitive strategy. The performance is not only a result of resource-based capabilities, but also of the fit between resource-based capabilities and chosen firm strategies.

2.2.5 Summary

Two theoretical frameworks have emerged in the literature related to the concept of competitive advantage. First, although the industrial organization approach emphasized the importance of the power of the members of an industry, this theory also allowed for the creative use of niche strategies (specifically the employment of differentiation) to gain in competitiveness. Second, the resource-based view stressed the importance of the development of the unique internal strengths of a firm, regardless of its size. This theory suggested that the smallness of a firm could actually serve as a competitive advantage to be carefully nurtured by management.

The literature in both approaches emphasized the importance of the development of a competitive advantage that was sustainable over time. Especially, the literature indicated that firms could improve firm' performance over time if they developed a sustainable competitive advantage. While most of the research conducted in this area had been directed toward large businesses, there is sufficient research to indicate that small firms could also enjoy improved performance through the strategic development of competitive advantage by integrating firm-specific capabilities, competitive strategy and environmental factors. The four conceptual models presented here integrate the two dominant perspectives and lay the foundation for framework building in the study.

2.3 The Development of Construction SMEs in China

Traditionally, the construction industry in China was controlled by the government and used to support China's planned economy. In this situation, the development of small and medium-sized enterprises (SMEs) was strictly limited under the central planned economy. With the transition from a centrally directed to an open market economy, construction industry in China has undergone dramatic changes since early 1980s, and construction SMEs are developing rapidly. Moreover, the rapid economic expansion in China has resulted in many construction activities and provided opportunities for the development of construction SMEs. Next, the development of construction SMEs will be discussed in three perspectives, which include (1) the reform of construction industry in China, (2) the current characteristics of construction industry in China, and (3) the role of construction SMEs in Chinese construction.

2.3.1 The Reform of Construction Industry in China

For many years, the construction industry in China was controlled by the government and used to support China's centrally planned economy (Mayo and Liu, 1995). The state owned, planned, controlled and financed all projects, and supervised them during construction. It assigned projects to construction firms and supplied the required construction materials. The Chinese construction industry was considered a non-profit-making sector in the national economy. The main objective of a construction firm was to meet the planned completion target. If the cost went over

budget, the additional cost would be met by the government. As a result, there was no competition among construction enterprises and no motivation for them to reduce project costs and improve their productivity and management skill. This bureaucratic system, combined with the poor project management skills of the enterprises, resulted in low-quality work, cost overruns, and the late completion of projects (Flanagan and Li, 1997).

Since 1978, China has been slowly reforming the construction industry, and pushing at adopting an open-door policy directed at overseas business. The goal of the industry-wide reform is to shift from the old assignment systems to a system in which the survival of a construction business is determined by the competitive market (Shen and Song, 1998). The construction reforms are designed to improve efficiency in the state-owned construction enterprises, to establish a construction market, and to make the Chinese construction firms more competitive with international firms. The basic components of the current reform programs include reducing central control over state-owned enterprises, encouraging private and collective sectors, and expanding competition in construction.

As a result of reduced central control over state-owned enterprises and the introduction of competition and incentives for people to make and share in profits, the Chinese construction industry has been growing rapidly. Table 2.4 summarizes the development of construction industry in China. As indicated, the contribution of the construction industry to the GDP of China increased from 4.16% in 1980 to 7.01% in 2004. The gross output value of the construction industry, which was RMB 28.69 billion in 1980, had reached RMB 2,774.54 billion in 2004. The number of people involved in the industry rose from 6.48 million in 1980 to 25.58 million in 2004. The average annual growth rate of the industry has been over 10% since 1980. In addition, Chinese contractors have become important players in the international construction market (Chen, 1998).

Table 2.4 The development of construction industry in China

Year	Number of employees (10,000)	Gross construction output (Billion RMB)	The contribution To GDP (%)
1980	648.0	28.69	4.16
1985	911.5	67.51	4.66
1989	1,004.8	128.30	4.70
1990	1,010.7	134.5.0	4.63
1995	1,497.9	579.38	6.53
1996	2,121.9	828.23	6.67
1997	2,101.5	912.65	6.46
1998	2,030.0	1,006.20	6.63
1999	2,020.1	1,115.29	6.67
2000	1,994.3	1,249.76	6.58
2001	2,110.7	1,536.16	6.55
2002	2,245.2	1,852.72	6.68
2003	2,414.3	2,308.34	7.00
2004	2,557.9	2,774.54	7.01

Source: National Bureau of Statistics of China (2006)

2.3.2 The Current Characteristics of Construction Industry in China

The construction industry started to change in the early 1980s, with the introduction of economic reforms and the opening up process (Mayo and Liu, 1995). At the central level, the government started to introduce laws and regulations to set the basic ground rules. At the enterprise level, the entities were gradually given flexibility to operate as ‘commercial entities’. Competitive bidding and international construction have been introduced. Most construction enterprises, though state-owned, are operating as separate entities competing across sectors and regional boundaries (Chen, 1998). In this research, the current characteristics of construction industry in China are summarized in four aspects, including construction administration hierarchy, classification and competition among existing contractors, market entry and exit, and WTO impact on the Chinese construction industry, and discussed respectively in detail.

2.3.2.1 Construction Administration Hierarchy

After twenty years of economic reform, the Chinese government still plays an important role in investment, finance, and construction production in construction industry. The dominance of the state affects construction market, especially through the state's administrative intervention.

China has 29 ministry-level government agencies including administrations, commissions, and ministries. The Ministry of Construction (MOC), established in 1989, is the primary agency for implementing new strategies and policies for the construction industry. MOC is responsible for administering all projects related to commercial and residential building and public utilities, overseeing and directing the central line ministries and the local governments in the activities such as design and construction, and promoting overseas operations of construction enterprises (Luo and Gale, 2000). The central organization of the MOC has its local administration departments, called the construction commission, in the levels of the provinces and the independent cities. Meanwhile, there are construction administration departments in each of the other ministries, all doing similar work but focusing on their own industries. Since entities are interconnected by both vertical and horizontal structures, many departments have enforcement responsibilities and power of control over construction works. Conflicting orders and guidelines from different authorities are not uncommon, and the consequent legal and regulatory implications are complex.

The construction firms are under these complicated administrative arrangements from the government on different levels. According to Jin (1999), 37.9% of the total construction firms are affiliated with the ministries and 62.1% are directly administrated by the local authorities. State-owned enterprises (SOEs), urban collective-owned enterprises (UCEs) and rural construction teams (RCTs) are three major types of firms in the Chinese construction industry. Figure 2.8 presents the hierarchies of Chinese construction firms. As the figure shows, there are two types of state-owned construction enterprises. One is affiliated with the different levels of the government—central, provincial, city and county. The second type is established by different ministries in order to undertake construction projects to build up their fixed assets. In addition to state-owned construction enterprises, there are two other types of firms. Urban collective-owned construction firms include firms that are affiliated with

cities, counties, towns, and district governments under collective ownership. The rural construction teams are established by various levels of local government in the countryside or by the farmers themselves.

Source: Adapted from Luo and Gale (2000)

Figure 2.8 Construction administration hierarchies

2.3.2.2 Classification and Competition among Existing Contractors

The Ministry of Construction has incorporated the grading system for Chinese contractors based on the size, technical capability and capital status with the intent to optimize their organizational structure for competitive behavior (Wang and Yang, 2002). According to the Qualifications of Construction Enterprise Provisions issued by MOC in July 2001, construction enterprises can be categorized into one of three main categories, namely general contractors, specialized contractors and labor contractors. These categories are then further differentiated in five grades according to specific industry groups. Table 2.5 presents the classification of Chinese construction

firms in 2000. Qualification Class One was the highest class and its holders usually have thousands of employees. The size of the construction in the lower qualification class firms is smaller to varying degrees depending on class.

Table 2.5 Classification of Chinese construction firms in 2000

Qualification class	Contractors			Output		
	Number of firms	Percentage (%)	Cumulative percentage	Output (Billion RMB)	Percentage (%)	Cumulative percentage
Without class	49,745	51.14	51.14	319.01	25.53	25.53
Class Four	17,562	18.06	69.20	78.11	6.25	31.78
Class Three	19,228	19.77	88.97	186.11	14.89	46.67
Class Two	8,307	8.54	97.51	258.64	20.70	67.36
Class One	2,421	2.49	100	407.89	32.64	100
Total	97,563	100	100	1,249.76	100	100

Source: National Bureau of Statistics of China (2001)

Under the new contracting practice, construction firms have been transforming to individual business entities similar to typical firms in developed countries, and a market system has been developing in the industry. However, as the earlier study indicated, the current construction market structure in China is still affected by the former system. The similarity in size and services among firms forms an inappropriate firm size distribution in the industry, leading to fierce competition. The intensity of competition can be measured with concentration of the industry. It provides information about the relative size of firms in a market (Jacobson, 1996). Concentration ratio (CR_n) is widely used to represent the share of total industry output, turnover, value added, numbers employed or assets accounted for by the n largest firms in the industry. Table 2.6 illustrates the total number of firms and concentration ratios in the construction industry as a whole in China, Japan, UK and US.

As shown in Table 2.6, the concentration ratios in Chinese construction market are low among these four countries. For example, China's C_4 is only 1.08 in 1997, which is much lower than the C_4 of 4.20 in the US in 1997, and 8.65 in UK in 1999, indicating that the largest four Chinese contractors are much weaker in the market than their counterparts in the two developed countries. The low concentration ratio indicates that the construction market in China is less concentrated, even with fewer

firms, which show the highly competitive market structure of the construction industry as a whole.

Table 2.6 Concentration ratios among China, Japan, UK and US

Concentration Cn(%)	China	Japan	UK	US
	1997	1999	1999	1997
C ₄	1.08	3.30	8.65	4.20
C ₁₀	2.39	5.82	16.21	5.39
C ₂₀	8.26	8.13	22.96	12.33
C ₁₀₀	12.90	N/A ^a	38.98	15.21

Note: ^a means data not available

Source: Adapted from Wang and Yang (2002) and Wang (2004)

Based on the above analyses of classification and concentration ratios and compared with the more advanced market economies, concentration in the emerging Chinese construction industry is relatively low. The largest Chinese contractors have a much smaller market share of total revenues, and their market power is much less in the construction market compared to the three developed countries. Because of the similarity between firms, many comparable firms compete in the general contracting market instead of concentrating on specialized market niches. Large, medium and small contractors often compete in the same market. As a result, the market structure is less concentrated and competition is more intense.

2.3.2.3 Market Entry and Exit

Ease of entry and exit is important in determining market structure and the subsequent performance of firms (Carlton and Perloff, 1994). Firms will wish to enter the construction market if they think they can make at least normal profits in the market. Meanwhile, a construction firm will leave the industry if it is not making normal profits.

Barriers to entry Anything that decreases the likelihood, scope, or speed of potential competitor's coming in is an entry barrier. Potential competitors are those firms outside the market that are likely to enter and become actual competitors. According to Porter (1985) and Langford and Male (2001), barriers to entry in construction industry generally include (1) product differentiation, (2) capital requirements, (3)

switching costs for buyers, and (4) distribution channels, (5) scale economies and the experience curve, and (6) government policy. Subjective judgments of the height of the entry barrier are often used to predict how difficult it would be for a new firm to enter an industry based on how frequently entry has occurred in the past (Bain, 1968).

The concept of economies of scale is from manufacturing industries, in which products are repeatedly manufactured. Economies of large scale production will require large capital expenditures, a barrier to a new entrant. However, because of the uniqueness of each construction project and the contracting construction process, the effect of economies of scale and project differentiation is not obvious in the construction industry. Moreover, the Chinese construction industry as a whole is labor intense and close to a service industry. The capital requirements are very limited and markets are comparatively easy to satisfy. Although the qualification class system in China requires a firm to hold a certain qualification class, it must satisfy certain requirements such as a certain amount of registered capital and an adequate number of qualified employees. These regulations lead to a decrease in entry. However, since the approval right of a qualification class is decentralized in organizations at different levels and regions, the barrier of regulations has been greatly lowered.

Barriers to exit Barrier to exit refers to a cost that must be incurred by a firm to exit the industry (Carlton and Perloff, 1994). The major barriers for Chinese SOEs to exiting from the market include barriers of settlement costs, sunk costs, debt, social responsibility, and government regulations and intervention. Construction SOEs are responsible for arranging for their employees if they want to exit from the industry, leading to significant settlement costs. In addition, since assets of construction firms are very specific to the industry, there is the barrier of sunk costs. Moreover, firms' social responsibility, such as burden of retired employees, makes it difficult for firms to exit. Compared to construction SOEs, the collective and private firms are more flexible in that they are free to negotiate labor-hiring term or retrench workers, and to establish prices. Therefore, the barriers to exit for collective and private sectors are relatively lower than SOEs.

2.3.2.4 WTO Impact on the Chinese Construction Industry

After a long period of negotiation, China has become a member of World Trade Organization (WTO) in December 2001. The underlying principle of the WTO is to encourage global trade liberalization with the core criteria of market access and national treatment. For Chinese construction, prior to China's entry into WTO, foreign contractors were only allowed to tender for World Bank projects, Asian Development Bank projects, and other multilateral or donor-funded projects. Following China's accession to the WTO, various restrictions on foreign participation in the construction market are to be phased out gradually. For example, 'Construction Regulations' (dated September 27, 2002) and 'Design Regulations' (dated December 1, 2002) issued by MOC and Ministry of Foreign Trade and Economic Cooperation (MOFTEC) are signs of further opening of construction market and removal of entry barriers for foreign contractors.

According to the 'Construction Regulations', foreign majority ownership in construction joint ventures is supposed to be allowed upon China's WTO accession. Within three years after the accession, wholly foreign-owned enterprises will be permitted, but they may only participate in the following five types of construction projects:

- Construction works funded totally by foreign investments or grants;
- Projects assisted by international financial institutions and awarded through international tendering in accordance with the terms of the loans;
- Sino-foreign joint ventures where the foreign investment is equal to or greater than 50 percent;
- Joint ventures with less than 50 percent foreign investment may be formed with Chinese companies to undertake technologically complex projects, subject to special approval from the relevant authorities;
- Participation in projects funded from Chinese sources which cannot be undertaken independently by Chinese construction enterprises, subject again to special approval.

Therefore in the future, more foreign-funded enterprises will enter the Chinese construction market, bringing along foreign capital, advanced technology and management expertise, which present opportunities and challenges to the

development of Chinese construction SMEs.

2.3.3 The Role of Construction SMEs in Chinese Construction

Construction SMEs in China have enjoyed rapid development since the adoption of the policy of economic reform and opening-up in 1980s. The SMEs have grown to be an important force in promoting the development of the Chinese construction. They are the major driving force in the Chinese construction industry, constituting the major channel for creating jobs and are the basic absorber of the urban and rural labor force. Moreover, they facilitate industry restructuring and market revitalization. Next, the role of construction SMEs will be discussed in four perspectives, which include (1) definition of Construction SMEs, (2) ownership composition of Chinese construction SMEs, (3) development of construction SMEs in China, and (4) problems and difficulties faced by construction SMEs in China.

2.3.3.1 Definition of Construction SMEs

Although commonly used, the term ‘small and medium-sized enterprises’ (SMEs), is nevertheless vague, suggesting mainly the idea of a firm which is not large, without being more specific (Goss, 1991). Generally speaking, there are qualitative and quantitative criteria to define SMEs. Qualitative criteria refer to those enterprises with a relatively small-scale production and operation. For quantitative criteria, Western countries usually take employment, sales, turnover and invested capital, as measuring standards. Quantitative criteria have been widely used by most countries.

Different countries have different criteria of defining SMEs, while the criteria of each country also differ in different historical periods. Table 2.7 summarizes common practices of SMEs in certain countries. In China, the new Tentative Classification Standards on the SMEs was published by relevant government agencies with the approval from the State Council on February, 2003. The new standards replace the old classification standards which came into effect in 1988 and the supplementary standards published in 1992. Major elements of consideration cover the payrolls, revenue and total assets of enterprises. According to this SMEs standard, medium-sized construction enterprises employ between 600 and 3,000 people with annual revenue between RMB 30 million and RMB 300 million. Small enterprises employ less than 600 people with annual revenue less than RMB 30 million (SETC, 2003).

Table 2.7 Definition of SMEs in certain countries

	United States	England	Japan	China
Overall Measure	< 500 employees			
Industry measure				Industrial sector: < 2,000 employees , or < RMB 300 million in annual revenue, < RMB 400 million in total assets
Manufacturing	< 500 employees	< 200 employees	< 300 employees or < Yen 100 million in capital	Transportation and posts: < 3,000 employees, or < RMB 300 million in annual revenue.
Construction	No distinction	< 25 employees	< 300 employees or < Yen 100 million in capital	Construction: < 3,000 employees, or < RMB 300 million in annual revenue, or < RMB 400 million in total assets
Wholesale trade	No distinction	< £730,000 in annual sales	< 100 employees or < Yen 30 million in capital	Wholesale and retail: < 500 employees, or < RMB 150 million in annual revenue.
Retail trade and services	< 100 employees	< £185,000 in annual sales	< 50 employees or < Yen 10 million in capital	Hotels and restaurants: < 800 employees, or < RMB 150 million in annual revenue,

Source: Developed by author

2.3.3.2 Ownership Composition of Chinese Construction SMEs

The SMEs' business types in most developed countries are relatively homogeneous. Government documents in the U.S. distinguish among types of businesses on the basis of factors such as minority ownership. Overall, most business is privately owned and business regulation is relatively homogeneous (Bruton *et al.*, 2000). In contrast, Chinese construction SMEs evolve from traditional state and collective ownership towards more diversified ownership forms when the construction market shifts from the centrally-planned system towards market mechanism. The different ownership forms lead to unique organizational structures in construction SMEs, which have significantly influenced their behavior and operating mechanism (Biggeri *et al.*, 1999; Cao, 2003; Wang, 2004). Following the historical administrative classification, the ownership of Chinese construction SMEs can be classified into four categories, namely state-owned SMEs, the collective enterprises, private and foreign enterprises (Chen, 1998; Wei and Li, 1999). The four different types of economic organization possess distinctive features and apply different types of resources and operating mechanism.

The state-owned SMEs Traditionally, the county and city governments have come to control all small and a large proportion of medium-sized SOEs. County and city SOEs have typically been the most inefficient ones. They are often too small to apply economies of scale, but too bureaucratic to be able to exploit the advantage of their small size. Construction SME ownership reform in the state sector is best seen as a relatively passive response to the pressing financial and business difficulties faced by the state SMEs and local governments (Cao *et al.*, 1999; Sun, 2000). In the state sector, the ownership reform focuses on restructuring of the existing operations, formation of business alliances with other firms, and merger and acquisition. The methods of sales, leasing, and bankruptcy are also employed. The reform has been once again initiated and led by local governments, mainly, by counties and cities with a city- or county-rank within the administrative hierarchy.

The collective SMEs sector Collective-owned enterprises are defined as economic units where the assets are owned collectively (National Bureau of Statistics of China, 2002), and comprise urban collective-owned enterprises and township and village collective enterprises in rural areas. Collectives differ from state-owned enterprises

since they operate largely in a market-based environment, but are regarded as publicly-owned, because the community shares their ownership. Construction SMEs in the collective sector need not to rely on assignment of projects by government. Their management structures are much simpler and have more flexibility. They are more competitive because their profits are linked firmly to employees' income and benefit, and have less social welfare and debt burden.

The private enterprises This sector has experienced rapid growth since 1992 due to the change in the ideological environment and enhanced policy treatment following the renewed momentum of reform (Cao, 2003). Two specific features of this sector are of great interest to research. First, production firms in this sector especially those in rural areas, have operated in tandem with community authorities such as village governments and with community-run SMEs. Second, an increasing number of these firms are adopting the ownership form of joint-stock cooperative and some of them have grown out of joint-stock cooperatives and become limited liability companies.

Joint-ventures and foreign enterprises Foreign investors are now allowed to take an interest in certain state-owned enterprises, and as a consequence, the performance records of these enterprises are undergoing significant improvement. Joint ventures between China and other countries have developed numerous channels of communication through which new concepts, ideas, and methods in quality management are being introduced into the country, keeping China abreast of the latest developments and enabling it to respond adequately to changes in the market place.

In summary, Chinese construction SMEs is in a dynamic transitional period. There are a variety of forms of ownership between traditional state-owned, collective-owned and private construction SMEs in the industry, and ownership structures in the industry are changing rapidly. The construction SMEs have become diversified in recent years as the importance of state-owned enterprises has progressively declined. The increasing growth of joint public-private and private firms has accounted for the greatest source of change in the construction SMEs' ownership structure. The transformation of traditional enterprises into joint public-private and private firms is currently accelerating. The complete transformation of state-owned and collective-owned enterprises is predicted to extend through the current decade.

2.3.3.3 Development of Construction SMEs in China

As a result of construction industry reform and the introduction of competition and incentive mechanisms for construction enterprises, Chinese construction SMEs have been growing rapidly over the past fifteen years. Table 2.8 summarizes the development of construction SMEs in China. As indicated, the contribution of the construction SMEs to the construction industry increased from 51.9% in 1990 to 73.2% in 2001. The gross output value of the construction SMEs, which was RMB 69.81 billion in 1990, had reached RMB 1,124.79 billion in 2001. The number of construction SMEs involved in the industry rose from 69,800 in 1990 to 88,100 in 2001. Majority of these SMEs were congregated in the rural areas where they were involved in local infrastructure development. The figures were inclusive of construction-related enterprises such as materials and labour suppliers, and other service providers. Thus construction SMEs have grown to be an important force in promoting the development of the Chinese construction.

Table 2.8 The development of construction SMEs in China

Year	Number of SMEs	Gross construction output (Billion RMB)	The contribution to construction industry (%)
1990	69,800	69.81	51.9
1995	89,400	355.74	61.4
1996	99,400	530.90	64.1
1997	86,200	581.36	63.7
1998	81,400	671.14	66.7
1999	87,200	758.40	68.0
2000	88,300	874.83	70.0
2001	88,100	1,124.79	73.2

Source: Adapted from Li (2005)

The development of construction SMEs is affected by and realized through the interactions between internal resources and external environment. Some factors, including entrepreneurs, internal conditions, and external environment, have been reported to influence the growth of construction SMEs (Cao, 2003; Chandler and Hanks, 1994; Wei and Li, 1999). These factors will be discussed respectively in terms of their proposed impact on development of construction SMEs.

The role of entrepreneurs in Chinese construction SMEs The success of construction SMEs is largely attributed to top managers' ability to develop effective strategies that are compatible with environmental conditions. Most construction SMEs were started by rural entrepreneurs. It is these individuals who have led the SMEs into fairly modern business entities. In the continuous evolution toward a free market, SMEs entrepreneurs have demonstrated a unique role that includes the fundamental entrepreneurial values of high adaptability to change and proactiveness in terms of dynamic market demand. Also Chinese SMEs entrepreneurship is exhibited in an eagerness on the part of top managers to seek unexploited market opportunities as well as a willingness to take risks. With relationship (Guanxi) as an important element in Chinese culture, the entrepreneurs exhibit a strong orientation towards relationship in their behavior and background. Top managers in construction SMEs are concerned for employees and getting along well with people. They also establish good networks with different parties like the suppliers, trade association and other professions, and seek advice, assistance, resources and business opportunities through such networks. It is important to note that such relationships are considered to be long-term and built upon trust, rather than short-term or contractual relationships.

Internal conditions Construction SMEs have to rely on markets for sourcing supplies and selling products. The start-up and growth capital for the construction SMEs was usually provided by the owner, with family or friends often helping out. As there is quite an efficient market for the supply of machinery and raw materials with no discernible intervention by governmental agencies, construction SMEs are free to choose their suppliers and set prices. Moreover, the market for technological know-how has broadened considerably during the economic reforms and information now flows more freely to more people through more channels. Many construction SMEs position their business in areas where SOEs are uncompetitive. Most are small and autonomous compared with SOEs, and thus have flexibility to respond to market changes quickly. Their management is also more market oriented.

Communication channels between construction SMEs managers tend to be both shorter and simpler compared to those for the SOEs, thus engendering greater efficiency. Furthermore, the greater flexibility and autonomy in management has meant that inter-firm alliances have produced a 'networked' approach to industrial

production. The locally initiated transformation of SMEs into ‘shareholding cooperatives’ in recent years is a case in point. This feature has enabled construction SMEs to move closer to improved practices in corporate governance. Many construction SMEs have put special emphasis on human resources and product quality. With their autonomous and flexible systems, it is common for them to recruit highly competent engineers and technicians from construction SOEs, pay them attractive salaries and actively pursue technology improvement and innovation. From the 1980s, they mainly targeted and sought retired technicians and engineers from urban areas. Since 1990s, their attention has shifted to technicians working in research institutes and SOEs, who were discontented with their working conditions.

In order to maintain and improve SME competitiveness, it is necessary to enhance the management system by expanding the operations of the business and strengthening the marketing function. Construction SMEs in China put much effort into establishing close and good relationship with the buyers and government officials. Construction SMEs have to ensure that projects meet the specific requirements of the government, their immediate customers and they perceive marketing as a sales function and an order-getting activity. Though the Chinese economy is now becoming more market-oriented, traditional influences still prevail. Also, when small firms practise marketing by themselves, they have nobody to learn from, except the large state-owned enterprises, which are production-oriented (Siu, 2001). Nevertheless, this specific politico-economic structure also makes construction SMEs aware of the importance of good relationships with customers, government officials and other business practitioners.

External environment The outstanding performance and development of construction SMEs can be attributed to many economic, political and socio-economic factors. The construction industry is very sensitive to the national economy and the huge investment on infrastructure and building construction provides great opportunities for the development of construction SMEs. The demand on the construction industry is closely related to the national fixed capital construction investment scale, which has been increasing rapidly along with the country’s economic growth. China’s fixed capital investment in 1981 was RMB 96.1 billion, 65.2% of which was in the field of construction and installation. In 2000, RMB 1,811

billion was used in construction and installation. The Tenth Five-Year Plan (2001-2005) invested more than RMB 29,000 billion worth of national fixed capital investment over the plan period. The Tenth Five-Year Plan, therefore, projected a major boost in the construction industry with residential housing and infrastructure becoming the two key elements of this large construction activity.

During the planned period, China lacked institutional framework and the incentives rather than the capacity to develop a proper industrial sector. Once the reforms took effect in 1980s, enterprises were provided with the opportunity to retain profits, thus providing the first stage of an incentive structure. Some specific policies for SMEs have also been implemented. For example, the Chinese government published the SMEs Promotion Law in 2002, which strengthened the role of SMEs. With the introduction of the SMEs Promotion Law, construction SMEs could broaden their financing approach and get favorable taxation policies to support their development. Therefore, these incentives were later enhanced when SMEs assumed responsibility for their own profits and losses, and when profit retention was replaced by taxation (Liu, 1993).

Actions by local governments play an important role, especially for collective SMEs in the initial development phase. One of the main reasons for this has been the gradual decentralization of the fiscal system, which has allowed local governments' revenues to be used, in part, to facilitate local socio-economic growth. Once in control of their own revenues, local authorities have a greater incentive to develop their administrative areas, to increase their tax income, and to invest in new infrastructure, and in new SMEs (Chang and Wang, 1994). The role of local government is also important in promoting rural enterprises when there are social benefits, in terms of local governments. Under such circumstances the risk is then shared throughout the community and the long-term prospects for development are more secure. Moreover, construction SMEs have access to credit, productive inputs, and information, and possess an advantage when applying for legal permits and arranging market linkages. However, this can produce distortions, often damaging "private" enterprises in investments and markets.

2.3.3.4 Problems and Difficulties Faced by Construction SMEs in China

Being the major force in Chinese construction, SMEs have played an important role in promoting industry growth, expanding and creating job opportunities. Despite their rapid development, many construction SMEs still suffer from a number of problems and difficulties, as highlighted in the following aspects:

- **Limited funds.** Although the Chinese government implements favorable loan and taxation policies to support SMEs, it is not directly investing in SMEs as it does with SOEs. Therefore, construction SMEs find it difficult to access bank finance, and they have never benefited from low-cost supplies through the central plan.
- **Low level of employees' education.** One of the major problems in construction SMEs is the employees' low level of education. The average profile of employees of construction SMEs is made up of mainly unskilled workers who are previously farmers with no proper training in construction.
- **Low competitiveness in obtaining large projects.** Most construction SMEs are made up of small groups of people in house building and other small, simple projects for the local community using limited plant and equipment. Sometimes they act as sub-contractors on major projects. Due to limited funds, poor equipment and lack of highly skilled manpower, most construction SMEs could not compete with large SOEs in bidding for large projects.

Given the competitive pressures in the construction market, the fundamental problem that must be resolved by construction SMEs pertains to the decision on what capability and strategy to be deployed and developed in order to survive and remain their competitiveness.

2.3.4 Summary

Since 1979, China has been slowly reforming the construction industry, and pushing at adopting an open-door policy directed at overseas investors. The construction reforms were designed to improve efficiency in the state-owned construction enterprises, to establish a construction market, encourage non-state enterprises and to make the Chinese construction firms more competitive with international firms. The

basic components of the current reform programs include reducing central control over state-owned enterprises, incentives, bonuses for individuals, and expanding competition in construction market.

In the Chinese construction industry, construction SMEs has enjoyed rapid development since the adoption of the policy of reform and opening-up. The SMEs grew to be an important force in promoting the development of the Chinese construction. In addition, they played an indispensable role in facilitating the reform of the construction industry system, promoting market orientation, improving industry structure, and creating job opportunities. The development of construction SMEs was a process of both within-firm decision-making and external environment. While the former was guided by internal operation mechanism and by motives of efficiency, effectiveness and profitability, the latter was affected by strategic industry factors that impact the firm, such as buyer and supplier power, intensity of competition, and industry and product/service market structure. Hence, this discussion suggested that construction SMEs should devote the necessary resources to strategic activities that would result in the development of competitive advantage.

2.4 Theoretical Framework and Hypotheses

Working within the context of economic theory, strategy researchers have investigated the relationships between business environment, industry structure, and managerial strategies. The idea that the rigor of competition shapes firms' capability and strategy is well established within the economics and strategy traditions (Henderson and Mitchell, 1997). The present study attempts to balance the unique capability and competitive strategy of construction SMEs. In this section, the research will propose a framework integrating internal capability and external environmental factors which may increase the understanding of the attainment of sustainable competitive advantage.

2.4.1 Theoretical Framework

In the quest of finding answers to the research problem of “how to create and sustain competitive advantage for Chinese construction SMEs”, the two approaches discussed in the previous sections will constitute the foundations of conceptual model proposed here. In the Chinese construction industry, constructions SMEs possess some kinds of specific resources and capabilities on which they are differentiated from larger firms. The special resources and capabilities are the sources of their competitive advantage. On the other hand, the shifting to the market mechanism increases the importance of market exchange and construction SMEs are required to use suitable competitive strategy to survive and prosper in the market. Thus, the development of construction SMEs is affected by and realized through the interactions between internal capability and external environment.

The conceptual model presented here integrates the two dominant perspectives based on earlier frameworks that were proposed or adopted in previous studies (Chandler and Hanks, 1994; Kale, 1999; Rangone, 1999). The conceptual framework in this study proposes that Chinese construction SMEs’ performance is critically dependent on three key constructs: core capability, competitive strategy and industry structure. Figure 2.9 describes the theoretical framework for this research. As indicated in this framework, core capability has direct impacts on construction SMEs’ performance. This is consistent with the resource-based view. Competitive strategy determines the relative competitive position and performance of construction SMEs. This is consistent with the industry organization approach that the firm’s performance is proposed to be determined by firm conduct and industry structure (Porter, 1985; Bharadwaj *et al.*, 1993). The effectiveness of competitive strategy is further affected by environmental factors, which are represented by the industry structure in this research.

The integration of these two different perspectives for building a conceptual model of competitive advantage necessitates defining not only the factors and their potential impacts on creating and gaining competitive advantage, but also the relationship among these different perspectives. Core capability develops from construction SMEs’ specific actions to generate such resources that cannot be easily deployed or

Figure 2.9 Theoretical framework of competitive advantage for construction SMEs in China

acquired by rivals. It could be characterized by three variables: entrepreneur capability, marketing capability, and innovation capability. Core capability significantly contributes to construction SMEs' performance. The construction SMEs' competitive strategy includes four types of variables: cost, quality, delivery, and partnering. These variables present significant potentials for gaining and sustaining competitive advantage. Competitive strategy determines construction SMEs' competitive advantage, and achieves superior performance. Industry structure is not just about competition, but also in a fundamental way, about strategic group identities, which involves both competition and support. Construction SMEs' industry structure, which includes market entry barriers and competitive pressure, drives strategy and performance. Moreover, the key dimensions at the firm have reciprocal relationships, so that development of core capability can shape the competitive strategy which, in turn, further shapes capability. Thus, there is the fit among core capability, competitive strategy and performance of construction SMEs.

Having laid down the conceptual framework for exploring competitive advantage, the remaining sections of the chapter is to apply this integrated conceptual framework to the construction SMEs: to delineate the conceptual domain by specifying the factors to be explored; to justify the choices regarding the factors to be explored; and to formulate research hypotheses for each factor.

2.4.2 Research Hypothesis

2.4.2.1 Core Capability and Performance

In the resource-based view, resources in a firm can be classified into financial, physical, human, organizational and technological resources (Man, 2001). However, resources themselves cannot become competitive advantage unless they are organized into capabilities. Core capability represents the potential dimension of competitiveness from the firm's performance. Hall (1993) argued that sustainable competitive advantage is resulted from the possession of relevant capability differentials, which are further linked to intangible resources, including property rights, trade secret, networks and reputation. Rangone (1999) developed a model in which superior performance in SMEs is based on innovation capability, market

management capability and production capability. Thus, it expects construction SMEs with a wide variety of capabilities to have a broader range of possible actions and to be able to exploit numerous resources, thus enhancing organizational performance. Thus, the first hypothesis is:

Hypothesis 1: Core capability significantly contributes to construction SMEs' performance.

Core capability includes three variables: entrepreneur capability, marketing capability, and innovation capability, which significantly contribute to construction SMEs' performance. In addition to this research hypothesis, three sub hypotheses can also be formulated and discussed in detail.

Entrepreneur capability Entrepreneurs have been playing a significant role in the development of construction SMEs. According to Horne et al. (1992), entrepreneurs represent the ones who provide ideas, intuitive and operational grasps, and attitudes for the development of the SMEs. SME owner/managers who show a high level of entrepreneurship shall make the firms more competitive. Similarly, competitive advantage arises from the management process, and this management process cannot be separated from the personality set and experience of the key role player as he or his is very often directly responsible for the entrepreneurial and managerial functions of the firm.

The success of construction SMEs is largely attributed to entrepreneurs' ability to develop effective strategies that are compatible with environmental conditions (Wright et al., 1995; Luo, 1999). Entrepreneurship has been considered an integral part of market orientation and organizational learning (Hurley and Hult, 1998). Entrepreneurial values support the creation of construction SMEs from existing businesses and the revival of ongoing ones that have become stagnant or in need of reformation (Schendel, 1990). Chaganti and Chaganti (1983) found that innovativeness, know-how, creativity and managerial competence are important for success in small businesses. Similarly, more related research findings have been achieved in different context of cultures and the crucial role of entrepreneurial

behavior and managerial skills, entrepreneurs' competences in management, planning, budgeting and marketing related factors are recognized and emphasized in the superior performance of SMEs (Davidsson, 1991, Storey, 1994; Yusuf, 1995). Therefore, the first sub-hypothesis is:

Hypothesis 1.a: Entrepreneur capability significantly contributes to construction SMEs' performance.

Marketing capability The business risk is higher in the construction industry when compared with other types of businesses (Thorpe and McCaffer, 1991; Kangary, 1988). With the higher number of small and medium-sized firms in the construction industry, Carter and Dunne (1992) found that the development of small firms places a reliance on the marketing effort. Gronroos (1995) argued that marketing is to manage the firm's market relationship where markets are customers, distributors and suppliers' networks, etc. According to Duncan and Mariorly (1998), stakeholders should be viewed as potential customers. They are also involved in marketing programs and can affect the company's performance. Thorpe and McCaffer (1991) emphasized that contractors must have a strategic outlook, which includes proper marketing capability in finding opportunities that are advantageous to the company. The related strategic area can be a choice of type of work, client, size of contract, type of contract that can provide opportunities to reduce competition and risk.

Marketing capability is the most common and effective form of business promotion for Chinese construction SMEs. In the transition economy of China, the principal means of securing contract and sales for small and medium contracting firms are through personal contacts and repeated business. Large amount of resources and information flows through Guanxi (personal relationships) due to institutional and environmental uncertainties. Such flows can reduce transaction costs and improve efficiency of resource allocation. Therefore, it seems that marketing capability is more likely to help construction SMEs acquire critical resources and contract when they face intensive competition for limited resources. As such, construction SMEs should rely heavily on developing suitable and appropriate capabilities in marketing in order to be sustainable in the industry. The discussion above suggests that:

Hypothesis 1.b: Marketing capability significantly contributes to construction SMEs' performance.

Innovation capability Innovation capability can be considered as a subset of dynamic organizational capabilities. They are defined as 'the comprehensive set of characteristics of an organization that facilitate and support innovation strategies' (Burgelman *et al.*, 1996). Innovative small firms are those which can sense and develop unique resources or configurations of resources that serve as the foundations for successful streams of innovation. According to Badjimanolis (2000), the innovation capability depends on the characteristics of owner/manager and firm-specific assets. Sexton and Barrett (2003) suggested that new technology and operation style, long-life learning are the main determinants influencing the innovation capability of small firms. Gann and Salter (2000) mentioned the use of new forms of organization to cope with increasing complexity of production, communications and technology. Wang *et al.* (2003) proposed that construction SMEs should emphasize the institution mechanism, use of new technology and process to improve their competitiveness. Jin *et al.* (2004) discussed how to implement technology innovation for construction SMEs to achieve competitive advantage in the construction market. Innovation offers the potential benefits for construction SMEs to reduce the cost of production, increase the technical feasibility of construction undertakings, and further improve market growth (Slaughter, 1998). Thus, innovation ability is widely regarded as the key ingredient for construction SMEs to improve their competitive advantage and achieve business success.

Hypothesis 1.c: Innovation capability significantly contributes to construction SMEs' performance.

2.4.2.2 Competitive Strategy and Performance

The competition strategy is the strategic choice that can influence construction SMEs' performance. In analyzing the strategies of firms, the Porter framework has been the dominant tool for the past two decades. Porter's (1985) model of the five relevant forces in an industry and his generic strategies are still popular concepts. Sandberg (1986) found that business strategies and industry structure have direct influence on

growth performance of SMEs. In addition, such factors as strategic types, the adoption of new technologies, quality products and services, customer relations and other organizational strategy related factors are also revealed to have important influence on superior performance of SMEs. Given the limited resources in terms of finances, human expertise and production process, construction SMEs' can address the scope of competition by adopting a broad or narrow product/service and market approach. Also construction SMEs can address the mode of competition in an infinite number of ways, but literature points out that the most important ones include: competing on quality of products/services, competing on product/service, and competing on time and cost. Thus, the second hypothesis is:

Hypothesis 2: Competitive strategy significantly contributes to construction SMEs' performance.

Competitive strategy includes four variables: cost, quality, delivery and partnering, which determine construction SMEs' competitive advantage, and achieve their superior performance. In addition to this research hypothesis, four sub-hypotheses can also be formulated and discussed in detail.

Cost The generic strategy calls for being the low cost producer in an industry for a given quality (Porter, 1985). The firm sells its products either at average industry prices to earn a profit higher than that of rivals, or below the average industry prices to gain market share. Competing on the basis of cost is related to how sensitive the clientele served is to price. One of the most important determinants of the clients that are more sensitive to price emerges from the lack of significant differences among the offerings of rivals firms. Close similarities among offerings heighten the intensity of the competition and hence the price sensitivity of the clients. These differences coupled with other unique features of the construction industry particularly the method of price determination, fuel the intensity of the competition particularly on the basis of price.

Cost advantage leads to superior performance if the firm provides an acceptable level of value to the client so that its cost advantage is not nullified by the need to charge a lower price than competitors (Porter, 1985). Cost advantage will result in

above-average performance only if the firms can sustain it. Improving relative cost position in unsustainable ways may allow a firm to maintain cost parity or proximity, but a firm attempting to achieve low cost strategy must also develop sustainable sources of cost advantage. Some of the ways that firms acquire cost advantages are by improving process efficiencies, gaining unique access to a large source of lower cost materials, making optimal outsourcing and vertical integration decisions, or avoiding some costs altogether. If competing firms are unable to lower their costs by a similar amount, the firm may be able to sustain a competitive advantage based on low cost. Therefore:

Hypothesis 2.a: Cost significantly contributes to construction SMEs' performance.

Quality Competing on the basis of quality is a function of the organization potential for improving and enhancing the quality of the product/service (Kale, 1999). A strategy of superior quality might lower customer sensitivity to price, thereby making it possible to charge higher prices without harming sales. Superior product quality could also protect the business from competitive forces that reduce price-cost margins, and superior product and service quality could lower product cost, such as reducing rework and wasted materials, and reduce service costs. Collectively, these factors may mean profits for the business.

In a highly competitive marketplace, a firm can stay competitive by satisfying its clients' needs and requirements for high quality (Low and Omar, 1997). The high quality of the constructed facility and of the contracting service in construction presents some potential for competitive advantage, but these potentials can be better exploited by signaling through advertisement to potential clients that the company's primary concern is providing a high quality of finished product and of contracting service. More importantly, a project client largely relies on quality reputation in contractor selection in competitive bidding. The intense competition market in China forces firms to build up a good quality reputation to distinguish their products from those of their competitors. Improving quality of construction work is a long-term strategy for the development of construction firms (Wang, 2001). On one hand, it can strengthen a firm's competitive advantage in bidding by better quality and reputation. The discussion above indicates that:

Hypothesis 2.b: Quality significantly contributes to construction SMEs' performance.

Delivery Project delivery is another aspect that can differentiate construction SMEs from their competitors. Some researchers argue that superior use of time is a potentially powerful competitive weapon that can lead to competitive advantage (Wanger and Digman, 1997, Kale and Arditi, 2003). Superior use of time enables the firm to cater its target market in a timely and speedy manner. In practice, a firm's ability to complete a project before or on schedule is very important in non-price competition, especially for projects in which clients pay special attention to the schedule.

As for contractors, there is an important relationship between project delivery and construction cost; and project delivery indicates to them both the construction speed and economic effect. The total construction costs include direct costs and indirect costs. Direct costs decline with the extension of the project completion time, while indirect costs, mainly including the costs of management, increase with the time increase. Therefore, there is an optimum schedule where the total construction costs are the lowest. Practically, the client often requires his schedule to be shorter than the firm's optimum schedule. With the development of the market economy in China, the client has become stricter on project delivery. As a means for competition, improving the capability of successful control of time within a reasonable range of cost will strengthen a firm's competitive advantage. Generally, the rate of completing projects on delivery is an important factor for a client in evaluating a firm. The discussion suggests that:

Hypothesis 2.c: Delivery significantly contributes to construction SMEs' performance.

Partnering Studies indicate that there is little doubt about the positive aspects of partnering arrangements. Partnering aims to achieve specific business objectives by maximizing the effectiveness of each participant's resources and establish ongoing business relationships (Bennett and Jayes, 1998). Bennett and Jayes (1998) illustrated how to create win-win relationships which involved a sophisticated strategy and require a willingness to improve the joint performance. Similarly, other research is similarly optimistic in claiming that there is a desire to move beyond narrow

self-interest towards a spirit of co-operation and trust (Wood and McDermott, 1999) and that partnering can indeed lead to benefits for all parties (Hamza *et al.*, 1999). As another form of partnering, Lambe and Spekman (1998) stated that strategic alliances, which was built on trust and committed to a share vision between partners, enabled firms to develop competitive advantage by allowing them to improve the end result of the value-chain and achieve greater economic success.

In a transitional economy with a dual mechanism, market transactions will be completed via administrative channels when the market mechanism fails (Peng and Heath, 1996). Thus relationship management is very important to Chinese construction SMEs. The cultivation of relationship and development of partnership with various levels of government, clients and research institutes are often used to mitigate unfavorable conditions for construction SMEs (Sun, 2001). Partnering can help construction SMEs reduce environmental uncertainty by exchanging resources for mutual benefit. Moreover, it may allow an entrepreneur greater dependence and control (Davis and Rawwas, 1994). This view is consistent with the resource dependence theory, which suggests that external exchange may increase the legitimacy of new ventures, thus improving their chances for survival (Pfeffer and Salancik, 1978). Thus:

Hypothesis 2.d: Partnering significantly contributes to construction SMEs' performance.

2.4.2.3 Core Capability, Competitive Strategy and Performance

Although resources impact performance and are vital building blocks in the development of strategy, researchers suggest that resources alone are not sufficient to achieve competitive advantage and above-average performance (Chandler and Hanks, 1994). For this to occur, organization leadership must transform resources into rent-achieving capabilities. Mahoney and Pandian (1992), building upon the work of Penrose (1959), noted that a firm achieves rents not because it has more or better resources, but because the firm's distinctive competence allows it to make better use of the resources that are available. Strategy, from a resource-based view, involves an ongoing search for rent, or above-normal rates of return. Rent is achieved through the

effective utilization of a firm's resources to achieve competitive advantage. Researchers have suggested that specific resources should be related to tactical and strategic decisions and actions; firms should select their strategies to generate rents based upon resource capabilities (Mahoney and Pandian, 1992).

Therefore, firms can shape their strategies in response to the demands of competitive environments and, in the process develop capabilities that suit the competitive environment (Mahoney and Pandian 1992). When there is a fit between the available resources and the firm's competitive strategy, performance should be enhanced. Thus, performance of construction SMEs is a function not only of the attractiveness of the core capability, but also of the fit between core capability and chosen competitive strategy. This leads to the third hypothesis:

Hypothesis 3: There will be positive relationships between the “fit” of core capability and competitive strategy, and the performance of construction SMEs.

The preceding section outlined the predicted associations between individual core capability and competitive strategy on performance. Such a perspective on relationships between associated constructs can facilitate an understanding of specific linkages. This is arguably a meaningful endeavor because of the dearth of information on how core capability is associated with competitive strategy. In the context of the current study, there is a need involving examination of the competitive strategy and performance of construction SMEs with different core capability patterns. Given the anticipated relationships between the individual competitive strategy and core capability dimensions discussed above, it is reasonable to extend the underlying logic and expect variations in core capability patterns across firms with different strategy configurations. Thus, the following sub-hypotheses are offered:

Hypothesis 3.a: The four competitive strategy dimensions will significantly vary across construction SMEs in different core capability clusters.

Hypothesis 3.b: The range of correlations between competitive strategy dimensions and construction SMEs' performance will significantly vary across construction SMEs in different core capability clusters.

2.4.2.4 Moderating Role of Industry Structure

Industry dynamics provides a window to market opportunities and threats, and construction SMEs are a deliberate response to those dynamics. During economic transition, industry structure in Chinese construction has revealed several characteristics. First, growth in sales and profitability varies markedly due to the industrial policy that allows only some sectors to be privatized and also to the deep-rooted imperfections in industry structure. Second, government regulations frequently changed due to idiosyncratic paths of decentralization and government needs for controlling strategically vital industries. Third, competitive pressure varies by the level of equilibrium between market demand and market supply. These three characteristics individually represent different attributes of an industry's structure and yet collectively reveal this industry's profile about opportunities and threats. These characteristics of the industry have a direct impact on the nature of competition and the competitive strategy available to construction SMEs in construction industry. Drawing on the literature, two industry structure factors- market entry barriers and competitive pressure, would appear to have a strong moderating effect on the construction SMEs' performance.

Market entry barriers and competitive strategy

Ease of entry is important in determining market structure and the subsequent performance of firms (Carton and Pertoff, 1994). Subjective judgments of the height of the entry barrier are often used to predict how difficult it would be for a new firm to enter an industry based on how frequently entry has occurred in the past. Mann (1966) suggested that the very high barriers group was found to have a substantially higher average of return than the substantial barriers group. Porter (1985) further proposed that the seriousness of threat entry depend on the barriers present, and on the reaction from existing competitors that can be expected. If barriers to entry are high and a newcomer can expect sharp retaliation from the entrenched competitors, obviously it will not pose a serious threat.

In an emerging market, the market entry barriers imply an important market challenge for construction SMEs. Potential competitors for construction SMEs in China are those firms outside the market. As the Chinese construction industry as a whole is labor intense, entry at the lower end for the company is relatively easy. Under low entry barriers, cost savings are often achieved by tactics such as minimizing expenditures on innovation, and offering no-frills products to customers seeking cost savings rather than brand image and quality. Similarly, construction SMEs need to spend more resources to improve relations with their stakeholders to create a more favorable environment. Thus, the entry of new firms may produce competition that acts quickly to reduce price and profits. Therefore, it is hypothesized that:

Hypothesis 4.a: Market entry barriers will moderate the relationship between cost and performance: among firms with a strong emphasis on low cost, greater market entry barriers will be associated with higher performance.

Hypothesis 4.b: Market entry barriers will moderate the relationship between quality and performance: among firms with a strong emphasis on quality, greater market entry barriers will be associated with higher performance.

Hypothesis 4.c: Market entry barriers will moderate the relationship between delivery and performance: among firms with a strong emphasis on delivery, greater market entry barriers will be associated with higher performance.

Hypothesis 4.d: Market entry barriers will moderate the relationship between partnering and performance: among firms with a strong emphasis on partnering, greater market entry barriers will be associated with higher performance.

Competitive pressure and competitive strategy

Competitive pressure increases as a function of the number of firms entering an industry (Scherer and Ross, 1990). Prior to the transition, China's economy was dominated by

redistributive power and administrative control. Products were distributed through central planning rather than market mechanism. With the advent of reform, firms have adopted such competitive strategies as marketing differentiation and low cost. Since competitive strategy is rooted in competitive market environments, their effectiveness is likely to blunt when the market mechanism is underdeveloped and constrained by the traditional administrative mechanism.

Competitive pressure challenges the competitive positions achieved by incumbent firms and reinforces dependence on other firms. Because construction industry in China resides in growing stage, the growth in the number of firms in an industry exacerbates existing as well as incoming competition. To maintain positioning, construction SMEs need to not only better develop building blocks of competitive advantage, but also solidify managerial ties with members of the business community.

In the environment with highly competitive pressure, the relationship between competitive strategy and construction SMEs' performance may be weaker or even negative. The advantage of quality and delivery is accrued when constructions SMEs spend more efforts on marketing and differentiate their products from others. The underlying assumption is that firm's competitive behaviors in the market are regulated by market mechanism. However, in a transitional economy, firms function within two mechanisms: the market and the redistributive (Nee, 1989). The involvement of redistributive power into economic activities stifles the power of the market mechanism to regulate firm's behaviors effectively. For example, a firm may base its competitive advantage on the power of its connections with higher administrative agencies. Moreover, high competitive pressure may create more chaos in the market including the appearance of extensive pseudo- and inferior projects and escalating prices. The chaos may lower customers' loyalty to products and thus increase the costs for using marketing differentiation strategies. Therefore, the discussion suggests:

Hypothesis 5.a: The positive relationship between cost and performance is weaker when competitive pressure is high rather than low.

Hypothesis 5.b: The positive relationship between quality and performance is weaker when competitive pressure is high rather than low.

Hypothesis 5.c: The positive relationship between delivery and performance is weaker when competitive pressure is high rather than low.

Hypothesis 5.d: The positive relationship between partnering and performance is weaker when competitive pressure is high rather than low.

2.5 Conclusion

This chapter reviewed the two theoretical approaches which have emerged in the literature related to the concept of competitive advantage. Both approaches offered value to SMEs in their attempts to improve their competitiveness. First, the industry organization approach emphasized the importance of the power of the members of an industry, which allowed for the creative use of niche strategies. Second, the resource-based view stressed the importance of the development of the unique internal strengths of a firm. Following that, the development of construction SMEs was set out. The reform and current characteristics of the construction industry in China were discussed, and the development of construction SMEs in China was presented.

The conceptual model presented herein was a generic framework that allows industry practitioners and academic researchers to understand, sustain and extend the competitive advantage of construction SMEs. The conceptual model implied that construction SMEs' competitive advantage depends upon the identification of appropriate strategy and industry structure as well as developing and creating core capability in order to exploit opportunities and neutralize the threats presented by competition. Based on the conceptual model, hypotheses were built up to test patterns of core capability, competitive strategy and industry structure on performance of construction SMEs in China.

Table 2.9 Summary of research hypotheses

Research hypotheses
Core capability and performance
H ₁ : Core capability significantly contributes to construction SMEs' performance.
H _{1.a} : Entrepreneur capability significantly contributes to construction SMEs' performance.
H _{1.b} : Marketing capability significantly contributes to construction SMEs' performance.
H _{1.c} : Innovation capability significantly contributes to construction SMEs' performance.
Competitive strategy and performance
H ₂ : Competitive strategy significantly contributes to construction SMEs' performance.
H _{2.a} : Cost significantly contributes to construction SMEs' performance.
H _{2.b} : Quality significantly contributes to construction SMEs' performance.
H _{2.c} : Delivery significantly contributes to construction SMEs' performance.
H _{2.d} : Partnering significantly contributes to construction SMEs' performance.
Core capability, competitive strategy, and firm performance
H ₃ : There will be positive relationships between the "fit" of core capability and competitive strategy, and the performance of construction SMEs.
H _{3.a} : The four competitive strategy dimensions will significantly vary across construction SMEs in different core capability clusters.
H _{3.b} : The range of correlations between competitive strategy dimensions and construction SMEs' performance will significantly vary across construction SMEs in different core capability clusters.

Table 2.9 Summary of research hypotheses (Cont'd)

Research hypotheses
Moderating role of industry structure
H _{4.a} : Market entry barriers will moderate the relationship between cost and performance: among firms with a strong emphasis on low cost, greater market entry barriers will be associated with higher performance.
H _{4.b} : Market entry barriers will moderate the relationship between quality and performance: among firms with a strong emphasis on quality, greater market entry barriers will be associated with higher performance.
H _{4.c} : Market entry barriers will moderate the relationship between delivery and performance: among firms with a strong emphasis on delivery, greater market entry barriers will be associated with higher performance.
H _{4.d} : Market entry barriers will moderate the relationship between partnering and performance: among firms with a strong emphasis on partnering, greater market entry barriers will be associated with higher performance.
H _{5.a} : The positive relationship between cost and performance is weaker when competitive pressure is high rather than low.
H _{5.b} : The positive relationship between quality and performance is weaker when competitive pressure is high rather than low.
H _{5.c} : The positive relationship between delivery and performance is weaker when competitive pressure is high rather than low.
H _{5.d} : The positive relationship between partnering and performance is weaker when competitive pressure is high rather than low.

Chapter 3 RESEARCH METHODOLOGY

3.1 Introduction

In chapter 2, the literature was reviewed and research objectives relevant to competitive advantage of construction SMEs in the Chinese construction were identified. Chapter 2 also presented the theoretical framework and research hypotheses. This chapter aims to describe the methodology to provide data to investigate relationships among core capability, competitive strategy, and industry structure within construction SMEs. As shown in Figure 3.1, the chapter starts with a discussion of using research design for this research (section 3.2). Following that, the quantitative stage and qualitative stage are discussed respectively in section 3.3 and section 3.4. Finally conclusion is given (section 3.5).

Figure 3.1 Outline of chapter 3

3.2 Research Design

The study can be seen as an equivalent status design as both quantitative and qualitative methods are used to understand the competitive advantage of construction SMEs in China. The alternative designs for mixed method studies between quantitative and qualitative methods include equivalent status designs, dominant-less dominant designs and designs with multilevel uses of approaches (Tashakkori and Teddie, 1998). According to Tashakkori and Teddie (1998), in equivalent status designs, both the quantitative and qualitative approaches are equally important in understanding the phenomenon under study, while dominant-less dominant designs mean that one approach is dominant with a small component of the overall study drawn from an alternative design. Studies with multilevel approach use data from more than one level of organizations or groups to reach better understanding of behaviors and/or events, where both quantitative and qualitative methods can be used at different levels of studies. Taking the above methodological, theoretical, and contextual considerations, the current study can be seen as an equivalent status design as both quantitative and qualitative methods are used with equal importance in understanding the competitive advantage of construction SMEs in China.

The quantitative stage explores mainly the development of instrument and the testing of the hypotheses. The underlying approach for the design and development of this survey instrument is to modify and update the existing instruments for core capability, competitive strategy, and industry structure. With the instrument developed, a large sample mail survey is conducted on construction SMEs in China. The data collected are then analyzed statistically, where multiple regression analyses are used in the hypothesis testing of the relationships within the variables proposed in the study.

The qualitative stage of the research includes case study analyses conducted to illustrate the findings from the survey. Qualitative methods, through the use of a scientific instrument, allow for the interpretation of this constructed meaning. It involves the use and collection of a variety of empirical materials, for example interview, personal experience, life story and visual texts (Denzin and Lincoln, 2000). The qualitative stage

in this research involves the patterns among core capability, competitive strategy and industry structure with reference to three construction companies. It is used mainly to address the research concerning what capability and strategy are required by construction SMEs to create and sustain their competitive advantage within the Chinese domestic market.

3.3 Quantitative Stage

The quantitative stage involves the development of a survey instrument to measure core capability, competitive strategy, industry structure, and construction SMEs' performance applicable to the research context. Building on the theoretical model, this section provides assurance that appropriate procedures are followed. The quantitative stage is organized into four major topics: (1) sample selection, (2) data collection, (3) variables and measurement, and (4) data analysis methods.

3.3.1 Sample Selection

Research methods should be selected on the basis of the research purpose. The goal of the empirical component of the research is to test the proposed model of a sample of construction SMEs. It aims to analyze the relationship among core capability, competitive strategy, industry structure, and construction SMEs' performance. The sample selection in this research involves sample method and sample frame.

3.3.1.1 Sample Method

There are several alternative ways of taking a sample in social science research. The major alternative sampling approaches can be grouped into probability sampling techniques and nonprobability sampling techniques (Zikmund, 1997). With probability sampling, all elements in the population have some opportunity of being included in the sample, and the mathematical probability that any one of them will be selected can be calculated. In contrast, in nonprobability sampling, population elements are selected on the basis of their availability or the researcher's personal judgment. The consequence is

that the probability of any particular member of the population being chosen is unknown.

The random sampling, a probability sampling technique, is used for the research. The obvious advantage of the random sampling is that the method is easy to use. Generally, it allows a researcher speed in obtaining a large number of completed questionnaires (Zikmund, 1997). It can deliver accurate results when the population is homogeneous. In the case of a survey that targets CEOs, senior managers of construction SMEs, random sampling may be the best alternative.

3.3.1.2 Sample Frame

The unit of analysis is the companies which made individual strategy based on their unique capability in the Chinese domestic markets. The sample used for bridging the conceptual and operational domains is drawn from the population of construction SMEs. In the literature, construction SMEs loosely refers to small and medium-sized companies which operate within the construction industry. Such an approach encompasses a large variety of companies which involve distinctive functions and operations.

The sampling frame consists of SMEs which were selected from the listing in the Directory of Chinese Construction Industry Association. The selected construction SMEs met the criterion with annual revenue below RMB 300 million and employees less than 3,000. To enhance the inferential value of the study, assistance was sought from local government agencies and authorities in requesting data from a representative sample of construction SMEs. Using this method, data was collected from the construction SMEs that were willing to participate in the research.

3.3.2 Data Collection

The questionnaire survey is chosen for data collection to explore the complex nature of the research problem, which is central to the research presented here. This may also be valuable when used in conjunction with other methods, for example, to provide an initial screening to see which particular informant could most beneficially be interviewed (Easterby-Smith *et al.*, 1994). Survey research is useful when a study seeks

to answer questions about the distribution and relationship among characteristics of members of a population. Burns and Bush (1998) point out that survey allows a researcher to obtain information about motives, circumstances and sequence of event or mental deliberations. It also facilitates the division of respondents into subgroups for comparisons. Furthermore, much of the information needed for the study is unobserved and involved the perceptions of key personnel familiar with operation activities of their firms. Hence, direct questioning of managers who participated in their firm's decision making is the way to secure this kind of information.

3.3.2.1 Survey Instrument

The survey instrument was a self-administered mail questionnaire. This is one of the most frequently used methods for collecting data in research studies. The questionnaire was divided into five sections. Section 1 gathered data about the characteristics of the reported firm. Section 2 obtained information about the industry structure factors of the firm. Section 3 was concerned with core capability that might have influenced the competitive advantage of construction SMEs. Section 4 gathered data about competitive strategy used by construction SMEs to compete in the market and Section 5 dealt with the performance index. The survey items used the 5-point scale format. Cox (1980) suggests that five to nine response alternatives are appropriate in most circumstances. They allow the researcher to tap into more information from the respondent. Many studies that examined strategic management of firms used the 5-point scale. Details of the survey questionnaire are given in Appendix A.

3.3.2.2 Development of Questionnaire

The questionnaire survey is the principal means of data collection. The advantage of a questionnaire survey is that it can efficiently generate large amounts of data that can be subjected to statistical analysis (Snow and Thomas, 1994). The questionnaire was developed and refined on the basis of several procedures.

First, previous studies on strategic management and construction SMEs in China formed the basis for developing the questionnaire. Industry organization approach and resource-based view have emerged in the literature related to the concept of competitive

advantage. Both approaches offered value to SMEs in their attempts to improve their competitiveness. Previous research was also reviewed to locate questionnaire instruments appropriate for this study.

Second, preliminary structured interviews were carried out with three entrepreneurs and six managers from two SOE contractors, four SME contractors, and two SME design institutes from May 2003 to June 2003 in China. The respondents consisted of consultants, designers, project managers and senior managers. The questions for interview focused on the major issues concerning capability, strategy and firms' performance, which were derived from the literature review. The preliminary interviews elicited information about the choices of firm-specific capabilities and strategy affecting the growth and success of construction SMEs in China's transitional economy. Subsequent analysis was undertaken by transcribing and summarizing each interview and tabulating each subject's answer to each issue identified from the literature. From this, the questionnaire was developed and each question was adapted to the Chinese context.

Third, for those variables that have been employed in previous research, measures were adopted if they satisfied acceptable measurement quality. For those without extant measures, new measures were developed for the study according to the procedures suggested by Churchill (1979) and Nunnally (1978). A pool of variables was generated for each construct based on constitutive definitions of the constructs, relevant literature, and field interviews conducted with the managers of construction SMEs as detailed previously. A panel of two expert judges experienced in construction firms' research and instrument development then selected items from each of the pools of variables. In order to enhance the content validity of each variable, three managers from the participating firms evaluated the instrument for problems with the content and wording of individual items prior to the administration of the questionnaire. If one judge or manager objected to an item, the item was either removed to meet the objection or deleted from the final measuring instrument.

Fourth, the original English questionnaire was first reviewed and revised by two professors (one in marketing and another in strategic management) with substantial

research experience in the subject area in China and then translated into Chinese. To achieve “conceptual equivalence” (Lincoln and Kalleberg, 1990) and ensure validity in a cross-cultural setting, the Chinese version was then back-translated into English. Two translators were involved and both of them were researchers competent in both languages. The translators were also knowledgeable about the practices of Chinese businesses. Different versions of the questionnaire in English and Chinese were further reviewed and revised by a Chinese marketing professor who holds a Ph.D degree awarded by a U.S. university. The translations were compared to detect any significant misunderstanding due to translations.

3.3.2.3 Conducting the Survey

To increase response rate and help ensure that it was not lower than 10 percent, the procedure developed by Dillman (1978) for increasing response rate was followed. This approach involved carefully timed follow-up mailings to addressees, as noted in the development of questionnaire survey.

The initial mailing included a cover letter that explained the purpose of the study (Appendix A). The cover letter advised respondents that their participation was voluntary, and that the information they provided would be held in strictest confidence. The cover letter also promised to make a summary of the result available to those who would like to receive it. As suggested by Dillman (1978), there were follow-ups in the form of letters and telephone calls to remind respondents to complete and return the questionnaire. Contacts to clarify questions and concerns of respondents were made by e-mail with those who preferred this medium. A follow-up letter was mailed to the entire sample approximately 10 days after the initial mailing to thank those who had completed and returned the questionnaire and to remind those who had not responded. Those who did not receive the initial mailing or who misplaced the questionnaire were given a telephone number to call for a replacement packet. Also, an e-mail address was provided for those who would prefer this method of communication.

3.3.3 Variables and their Measurement

This section presents the measures of the dependent and independent variables in the model shown in Figure 2.9. As discussed in Section 3.3.2.2 and consistent with Venkatraman (1989) in the study, operationalization and measurement of the variables were achieved in two ways: (1) for those variables that had been previously employed in research setting, measures was adopted as long as they satisfied acceptable measurement quality; and (2) for those variables that were unique to the conceptual model developed here, operational measures were developed and assessed for content validity through interviews and discussions with managers in Chinese construction SMEs. All key variables in the study were assessed using multiple measures. Such measures are necessary to capture the domain of the constructs adequately and accurately (Churchill, 1979; Nunnally, 1978). In addition, this approach is believed to reduce measurement error and increase the reliability and validity of the measures (Churchill, 1979; Peter, 1979).

3.3.3.1 Measurement of Core Capability

The core capability variables were measured using 5-point Likert scales ranging from 1 “not at all important” to 5 “extremely important”. The respondents were asked to consider the importance of entrepreneur, marketing, and innovation capability, and indicate the extent to which the construction SMEs engaged in those factors. Three capabilities that made up this broad concept- entrepreneur capability, marketing capability, and innovation capability, were measured using multiple-item scales. Both existing and newly developed measures were utilized for measuring these variables.

Entrepreneur capability The core competences for entrepreneurship are a capacity for changing business process, and launching new products and services and a capacity for planning (Georgelli *et al.*, 1995). Utilizing conceptual research on resource-based view from the strategy literature (Barney, 1991) and entrepreneurial resources (Mosakowski, 1998), the items making up this variable capture specific entrepreneurial aspects of decision-making styles, methods, and practices (Lumpkin and Dess, 1996). The items were partly adopted from Cao (2003) and Sadler-Smith *et al.* (2003), and measured on a five point scale as follows:

- Entrepreneur's value and norms
- Managing change
- Entrepreneur's vision
- People-orientation

Marketing capability The items that make up this variable attempt to capture a company's ability to market and sell products effectively and efficiently, and achieve marketing performance (Hann *et al.*, 2002). The measures of marketing capability were drawn from Rangone (1999) and included seven items:

- Market knowledge
- Customer relationship networks
- Government relationship
- Supplier relationship networks
- Design institute relationship
- Company reputation
- Brand

Innovation capability The variable describes a company's ability to develop new products and processes and achieve superior technological and/or management performance (Hann *et al.*, 2002). The measures of innovation capability were drawn from Lei and Feng (2004) and Wang *et al.* (2003). Five items were identified for innovation capability as follows:

- Technical and managerial expertise
- Competence in technology and process
- IT technology
- Innovation in finance
- Innovation in operation mechanism

3.3.3.2 Measurement of Competitive Strategy

The selection of variables to represent competitive strategy was based on several criteria. First, the variables used in this study should represent fundamental strategic choices that have been shown to impact on performance in other settings. Second, the variables should be well established, having demonstrated reliability and validity and

outside Western settings and in the Chinese context. Third, the set of variables should be compact in order to reduce the burden on respondents. In the light of those criteria, four dimensions of strategy were included, as used by Ward *et al.* (1995) and in Chinese by Davies and Ma (2000). These were cost, quality, delivery and partnering. Each of these dimensions has been shown to be meaningful in a wide variety of environmental settings (Buzzell and Gale, 1987; Oster, 1990) and they cover the main dimensions along which the influential Porter (1980) and Miles and Snow (1978) typologies are distributed. The four competitive strategies were each multidimensional. Consistent with the literature, this study used the “degree of emphasis” that construction SMEs placed on activities to remain competitive as a measure of competitive strategy.

Cost The variable used a four-item scale that is a modified version of the scale used by Chandler and Hanks (1994) and Kale (1999). The four items included:

- Access to low cost labor
- Access to low cost raw materials
- Reducing cost in construction operation
- Reducing cost in administration activities

Quality The variable describes the competitive strategy of having high-quality products and customer service (Chandler and Hanks, 1994). A five-item scale was adopted from Chandler and Hanks (1994) and Ward *et al.* (1995) as follows:

- Reducing defective rates
- Emphasizing strict quality control
- Total quality management in the construction process
- Improving the quality of contracting service
- Improving quality in the construction facility

Delivery The variable measures the activities intended to increase either delivery reliability or delivery speed. It was measured by a four-item scale that was a modified version of the scale used by Ward *et al.* (1995).

- Increasing delivery reliability
- Improving delivery speed
- Enhancing service and technical support
- Meeting on customer' needs and requirements

Partnering The variable presents as an important way of improving construction project performance through the direct benefits accruing to both parties involved (Bresnen and Marshall, 2000). Partnering was measured by four items partly adopted from Aragón-Sánchez and Sánchez-Marín (2005) as follows:

- Subcontractor of a large construction corporation
- Partnering with customer on a long-term basis
- Cooperation with reliable suppliers
- Cooperation with research institutes and universities

3.3.3.3 Measurement of Industry Structure

The complex industry environment is seen as multidimensional, with numerous and differentiated effects on various organizational characteristics and processes (Keats and Hitt, 1988). Two variables were used to capture industry structure, namely the market entry barriers and competitive pressure.

Market entry barriers The variable assesses the degree for a new firm to enter construction industry. The measure of market entry barriers was based on a five-item scale developed by Porter (1980) and Langford and Male (2001). The scale was a 5-point Likert-type ranging from 1 “not at all important” to 5 “extremely important”, and included five items as follows:

- Entry into new construction market
- Access new clients
- Capital requirement
- Access to distribution channel
- Adaptability to local government policy

Competitive pressure The variable describes the degree for rivalry among construction firms in the construction industry. The measure was adopted from a modified version of the scale used by Luo (2003) and Chew *et al.* (2005). The scale was a 5-point Likert-type ranging from 1 “not at all important” to 5 “extremely important” and included five items:

- Government intervention
- The impact of suppliers
- The rivalry for competitor
- The loyalty of customers
- The threats of new entrants

3.3.3.4 Measurement of Performance

Performance is the ultimate criterion in the theoretical model that exemplifies the competitiveness of the firm. However, determining the performance is not straightforward as discussed in the literature review in Chapter 2. As shown in Table 3.1, the competitive performance for small businesses was often measured by the business volume (including sales, profit) (Bartb, 2003), market share and position (Brooksbank *et al.*, 2001; Luo, 1999), and business growth and sustainable growth (Chandler and Hanks, 1994).

While market share is often used for measuring competitiveness performance of large companies, it is not appropriate for measuring performance of construction SMEs. Since construction SMEs often occupy a small fraction of the market, and they tend to switch quickly from one product/service market to another, using market share may not be able to accurately reflect how competitive these SMEs are. In addition, business volume measures the performance at a particular moment of time only and hence it cannot reflect the long-term orientation and dynamic nature of competitiveness. Hence, it is not used in measuring performance. In this research, sales growth and profit growth were used to measure construction SMEs' competitiveness.

All the above variables and their measures, which capture the constructs of core capability, competitive strategy, industry structure and performance, are given in the survey questionnaire enclosed in Appendix A.

Table 3.1 Performance measures for SMEs' competitiveness

Author	Target	Suggested/ applied measurement
Buckley <i>et al.</i> (1988)	Export firms	<ul style="list-style-type: none"> ● Market share ● Growth ● Profitability
Chaganti <i>et al.</i> (1989)	Small manufacturing firms	<ul style="list-style-type: none"> ● Profitability
Chandler and Hanks (1994)	Small manufacturing firms	<ul style="list-style-type: none"> ● Perceived growth in market share growth ● Perceived change in cash flow ● Sales growth
Luo (1999)	Small businesses in China	<ul style="list-style-type: none"> ● Profitability ● Market position
Brooksbank <i>et al.</i> (2001)	Medium-sized manufacturing firms	<ul style="list-style-type: none"> ● Sale volume ● Profit ● Market share ● Return on investment
Premaratne (2001)	SMEs in Sri Lanka	<ul style="list-style-type: none"> ● Sales growth ● Profit
Lerner and Almor (2002)	Women-owned small firms	<ul style="list-style-type: none"> ● Volume of sale ● Income of the owner ● Number of employees
Wang <i>et al.</i> (2002)	Chinese SMEs	<ul style="list-style-type: none"> ● Sales growth
Bartb (2003)	SMEs	<ul style="list-style-type: none"> ● Sales growth
Wiklund and Shepherd (2003)	SMEs	<ul style="list-style-type: none"> ● Sales growth ● Profit
Hsueh and Tu (2004)	SMEs in Taiwan	<ul style="list-style-type: none"> ● Sale growth rate ● Operating profit rate
Jaafar and Abdul Aziz (2005)	Construction SMEs in Malaysia	<ul style="list-style-type: none"> ● Profitability
Aragón-Sánchez and Sánchez-Marín (2005)	Spanish SMEs	<ul style="list-style-type: none"> ● Return on investment

Source: Developed by author

3.3.4 Data Analysis Methods

Data analysis is a process through which meaning is given to the data. More specifically, data analysis consists of examining, categorizing, tabulating, or otherwise recombining the evidence to address the initial propositions of the study (Yin, 1994). The data analysis methods in this research involved assessing reliability and validity of measurements, data analysis techniques and dealing with multicollinearity problem. Statistical analysis software packages, SPSS 11 and LISREL 8, were used to conduct data analysis in this study.

3.3.4.1 Reliability and Validity Assessment Method

While reliability of variables is determined by assessing the extent to which there is low measurement error on each scale, validity refers to the extent to which a variable instrument accurately measures what it purports to measure (Lewis-Beck, 1994). In this research, factor analysis was conducted to assess the factor structure of core capabilities, competitive strategy and industry structure. According to Hair *et al.* (1995), this technique is useful in analyzing the interrelationship among a large number of variables and in explaining these variables in terms of their common underlying dimensions or factors. Based on the factor analysis results, the reliability and validity of these variables were checked.

3.3.4.2 Data Analysis Techniques

First, multiple regression analysis was adopted to test the main effects of the core capability and competitive strategy. Regression analysis was used to determine the degree to which selected independent variables were able to impact construction SMEs' performance.

Second, path analysis was used to capture the fit among core capability, competitive strategy and performance. Path analysis is an appropriate methodology for capturing the relationship among the three variables because it provides information about underlying causal processes. Core capability patterns and competitive strategy choice was further tested by cluster analysis.

Finally, moderated regression analysis was adopted to test the impacts of industry structure factors on competitive strategy and performance. According to Amold (1982), moderated regression analysis provides the most straightforward and the most general method for testing such relationship. By using this analytic technique, interaction terms are tested for significance only after other independent variables are entered into the regression. Interaction effects are found to be significant only if they explain a significantly greater portion of the variance in the dependent variable than that portion already explained by the other independent variables. Thus, moderated regression analysis is taken as a conservative method for testing interaction effects (Dowling and McGee, 1994).

3.3.4.3 Multicollinearity Problem

In this study, research hypotheses were tested using multiple regression analysis. When multiple regression analysis is performed, multicollinearity should be diagnosed. Multicollinearity represents a problem with the presence of significant correlations among independent variables in a regression model. The problem of multicollinearity is more likely to occur when moderated regression analysis is employed because multicollinearity effect in creating cross-product terms may result in high levels of multicollinearity.

According to Neter *et al.* (1990), a formal method of detecting the presence of multicollinearity that is widely used is by means of variance inflation factors (VIFs). These factors measure how much the variances of the estimated regression coefficients can be inflated as compared to when the independent variables are not linearly related. As a rule of thumb, a VIF value over 10 is often considered as an indication of multicollinearity, which may unduly influence the estimates (Neter *et al.*, 1990). To deal with this problem, following the suggestion by Cronbach (1987), the predictors were mean-centered (by subtracting the corresponding variables mean from each value) prior to forming the multiplicative term.

3.4 Qualitative Stage

The qualitative stage involves the case study analyses conducted to illustrate the findings from the quantitative phase. This section presents a detailed description of the activities involved in this stage, which includes the justification of the case study methodology and the selection of multiple-case studies.

3.4.1 Justification of the Case Study

According to Yin (1994), the research strategy that should be chosen to study a particular problem depends upon three conditions. These include the type of research question proposed, the amount of control that the researcher has over actual behavioral events, and the time period under study. In the qualitative stage, the use of this research methodology is justified on the following criteria.

First, the main purpose of case study is to obtain information from, or about, a defined set of people, or ‘population’ (Easterby-Smith *et al.*, 1991). Since it was not until 2003 that China established unified standards for the classification of SMEs, there is a lack of official data on SMEs’ status. Thus, to obtain an accurate picture of Chinese construction SMEs, case studies are effective and useful approaches.

Second, case studies are commonly used to answer “how” and “why” questions (Yin, 1994) in a contemporary setting in which the researcher has little prior theory and empirical research. The case study method of research is appropriate for the present study because the research questions ask “how”, and the researcher has no control over the behavioral events that occur in the chosen setting, and the problem under study is a contemporary phenomenon (Sherry, 2001).

Finally, this research investigates contemporary phenomena as the researcher focuses on the ways competitive advantage is practised by managers of construction SMEs operating in a complex and dynamic environment. Combined with the earlier criteria, the case study methodology is seen as a suitable approach for this research (Chew, 2001).

3.4.2 Selecting Multiple Case Studies

A primary distinction in designing case studies is between single- and multiple-case designs (Yin, 1994). Although either the culture-sharing group or specific individuals within it might be considered a “case”, the case study approach to qualitative inquiry is focused less on discerning patterns of the group and more on an in-depth description of a process, a program, an event, or an activity (Miller, 2002).

A multiple-case studies approach instead of a single case will be used for this research as the multiple-case design has many advantages as follows (Chew, 2001):

- Provide a full variety of evidence
- Involve a methodologically rigorous approach on replication logic
- Provide triangulation of evidence, data sources and research methods for more rigorous research
- Handle complex phenomena under study
- Use for theory testing and generalization

Perry (1998) advises several case studies should usually be used because they allow cross-case analysis to be conducted for richer theory building. The evidence from multiple cases is often more compelling and the overall study is therefore more robust (Yin, 1994).

3.5 Conclusion

The chapter has described the research design and methodology that was used in this research. The purpose of this chapter was to describe the tools that were implemented in this study to support the objective of this research. The current research has outlined the overall research and the methods taken to gather the quantitative and qualitative data necessary to test hypotheses that drive the research. The methodological issues relevant to investigating the relationship among core capability, competitive strategy, and industry structure were presented and discussed. Next, Chapter 4 will describe in detail the survey results. It involves the statistical analyses which are conducted to test the research hypotheses and the results of such analysis.

Chapter 4 RESEARCH FINDINGS AND DISCUSSION

4.1 Introduction

The preceding chapter outlined the research methodology, operationalization of the dependent and independent variables, and the major analytical techniques employed in this study. This chapter focuses on reporting the findings of the study. It is organized into six sections. It starts with a description of the content and structure of the chapter, followed by descriptive statistics relevant to the characteristics of the company profile. Next, the reliability and validity of the constructs are ascertained. The results of the hypotheses testing and discussion of the findings are then presented. Finally the conclusion is given.

4.2 Company Profile

The questionnaire survey was undertaken from May 2004 to October 2004. The mailing and collection of the questionnaire and wherever necessary, arrangements for discussions and interviews for the survey, were facilitated by local government agencies and authorities.

The questionnaire survey was conducted in major cities and provinces in China. The questionnaire, together with a cover letter explaining the methodology and objective of the study, was distributed to 1,000 construction SMEs in those areas by mail. A total of 133 responses were received, out of which 121 were deemed effective for analysis. Thus the actual response rate is 12.1 percent. This response rate compares reasonably well with the majority of SMEs studies that explore capability, strategy and firm performance (e.g., Sommers and Sommers, 1986; Siu's, 1996; Man, 2001; Aragón-Sánchez and Sánchez-Marin, 2005). However, a somewhat larger sample would obviously permit firmer conclusions to be drawn from the results of the

statistical analysis.

Table 4.1 summarizes the respondent's location, which provides the information of respondent's location and number of companies in each location. As indicated, the respondents were from cities of Beijing, Shanghai, Tianjin, and provinces of Fujian, Guangdong, Hebei, Hubei, Jiangsu, Jiangxi, Shandong, Sichuan, and Zhejiang. These twelve locations selected in this study were generally consistent with that shown in the annual report published by National Bureau of Statistics of China (2005) where SMEs were found to be active. In that report, the construction industry of these regions employed 13.21 million workers and contributed 66.92 per cent of the total construction industry output. Moreover, of the responding companies, 78.51 percent were from Beijing, Shanghai, provinces of Zhejiang, Jiangsu, Guangdong, and Shandong. Construction SMEs in these six locations were the most developed and constituted the major driving force in the regional construction industry (Cao, 2003). Thus the sample of the research allowed for an adequate representation across the national context.

Table 4.1 Respondent's location

Respondent's location	Number of respondents	Percentage (%)
Beijing	10	8.26%
Fujian	5	4.13%
Guangdong	23	19.01%
Hebei	4	3.31%
Hubei	3	2.48%
Jiangsu	22	18.18%
Jiangxi	3	2.48%
Shandong	9	7.44%
Shanghai	11	9.09%
Sichuan	5	4.13%
Tianjin	6	4.96%
Zhejiang	20	16.53%
Total	121	100%

This study seeks to investigate the relationship among core capability, competitive strategy, industry structure and construction SMEs' performance. Table 4.2 summarizes the respondent's position. As indicated, with respect to respondent's position, 47.11 percent of the respondents were general manager or department manager, 25.62 percent were general or senior engineers. Since these key informants were all at the senior and middle level of management, they were deemed to be able to provide an accurate account on their firm-specific capability and competitive strategy.

Table 4.2 Respondent's position

Respondent's position	Number of respondents	Percentage (%)
General manager	25	20.66%
Department manager	32	26.45%
General or senior engineer	31	25.62%
Others (engineer, economist, etc)	33	27.27%
Total	121	100%

Table 4.3 presents the age, size, and ownership of the respondent firms. In terms of the number of employees, 82.64 percent of the respondents represented enterprises with less than 1,000 employees, 11.57 percent had between 1,000 and 2,000 employees, indicating that the majority of these construction SMEs tended to be small in size. Moreover, the responding companies in the survey included four types of ownership as discussed in Chapter 2, providing the evidence that the sample of this study was representative of all the types of construction SMEs in China.

Table 4.3 Age, size, and ownership of the respondent firms

Age		Size by employment		Ownership	
1-10	46	1-100	31	SOEs	23
10-20	40	100-500	44	Collective	36
20-30	17	500-1,000	25	Private	42
30-40	14	1,000-2,000	14	Joint venture	10
40-50	4	2,000-3,000	7	Foreign-funded	10
Total	121	Total	121	Total	121

4.3 Analyses of Variables

The analyses on the characteristics of variables were carried out for three main purposes: (1) give an understanding on the core capability, competitive strategy and industry structure variables, (2) prepare for further analysis in hypothesis testing, and (3) provide further evidence of reliability and validity on the instrument developed throughout the study.

4.3.1 Reliability Assessment

Reliability refers to the “the degree to which measures are free from error and therefore yield consistent results” (Peter, 1979). According to Bagozzi (1980), there are four traditional methods used to estimate reliability: test-retest, split-halves, alternative forms, and internal consistency. Since all the constructs in the study adopted multi-item scales, as Green *et al.* (1988) suggested, the coefficient alpha should be used as a measurement of the internal consistency because the alpha measures the degree of covariation that exists among the scale items. Therefore, reliability was operationalized as internal consistency, and was calculated using Cronbach’s coefficient alpha in this study.

In the study, Cronbach’s coefficient alpha was used to measure the degree of covariation among core capability, competitive strategy, and industry structure variables. Table 4.4 shows the number of items included and the values of coefficient alpha for each variable. In early stages of basic research, it has been suggested that reliabilities of 0.50 and 0.60 should suffice (Churchill, 1979; Nunnally, 1978). Thus, 0.60 was set as the minimum acceptable value for this study. As indicated, Cronbach’s alpha of the variables ranged from 0.65 (partnering variable) to 0.83 (cost variable). Thus the measures used in the research have shown a satisfactory level of internal consistency and they can be used for further analysis. Details of the reliability analysis are given in Appendix C.

Table 4.4 Variables and their reliability

Variables	Retained number of items	Reliability (Cronbach's Alpha)
Market entry barriers	5	0.77
Competitive pressure	4	0.70
Entrepreneur capability	4	0.66
Marketing capability	5	0.79
Innovation capability	5	0.78
Cost	4	0.83
Quality	4	0.80
Delivery	4	0.77
Partnering	4	0.65

4.3.2 Validity of the Constructs

For theory development and testing, a necessary requirement is to validate the constructs. Validity refers to the extent to which a measurement instrument accurately measures what it purports to measure (Lewis-Beck, 1994).

Two types of validity were considered in this research: (1) content validity, and (2) construct validity. Content validity of the survey instrument is established through the adoption of validated instruments by other researchers in the literature and the preliminary in-depth survey with entrepreneurs and general managers of construction enterprises. Construct validity refers to the fit between the measure of a construct and the underlying concept it is intended to measure (Davies and Walters, 2004; Kelloway, 1998).

Generally there are two ways to assess construct validity, namely convergent validity and discriminant validity. While convergent validity means that alternative measures of the same construct will relate strongly with one another, the discriminant validity shows that measures of different constructs have modest relationships with each

other (Venkatraman, 1989). In this section, the two aspects of validity were addressed because each of the components provides necessary information for inferring construct validation (Bagozzi *et al.*, 1979; Peter, 1981).

The exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were adopted to assess the convergent and discriminant validity. In the study, each variable represents an independent attempt to measure a particular construct. Accordingly, all items of a variable should load strongly on one factor if they are to satisfy the requirements of convergent validity and load weakly on all other factors in order to meet the requirements of discriminant validity. EFA was used to perform factor analysis, and the resulting factors were rotated using the varimax transformation. Furthermore, following Hair *et al.* (1995), the following criteria were used throughout the thesis for factor solution: (1) factor interpretability, i.e., whether or not the variables matched the intuitive conceptualization of hypothesized concept; (2) the amount or variance explained by each factor. The rule of thumb was that each factor should explain as much as variance as an “average variable” (Aaker and Day, 1980); (3) eigenvalue of the factor; and (4) inspection of the communalities associated with each variables.

CFA using LISREL 8 was attempted to verify a priori specification of constructs. Using CFA in line with the recommendations of Gerbing and Anderson (1988) and Kelloway (1998), the fit indices and normalized residuals were examined and conducted to verify the expectation. The most important issue associated with the analysis of LISREL is the assessment of model fit. Several factors are taken into account in assessing the model fit. They are: (1) adequacy of the measurement model. The squared multiple correlation (R^2) is used to measure this index; (2) Goodness-of-fit of the overall model. LISREL provides five indices of fit for the model including: χ^2 with its associated degrees of freedom and probability level, goodness-of-fit index (GFI), the adjusted goodness-of-fit index (AGFI), comparative fit index (CFI), and the root mean square error of approximation (RMSEA); (3) subjective goodness-of-fit indices of overall model. Two of the more commonly used

subjective indices are the χ^2/df ratio and Bentler and Bonett (1980) normed index (BBI). In this study, the measurement of model fit used RMSEA, χ^2 , GFI, CFI, and χ^2/df .

4.3.2.1 Validity of Core Capability Variables

Exploratory factor analysis was performed on the full set of core capability variables in order to identify patterns in construction SMEs' conceptualizations of core capability. Table 4.5 presents the factor solution for the variables. Only factor loading of 0.40 or above are shown to aid the interpretability of the factors.

As shown in Table 4.5, three factors were initially identified. These factors each had an eigenvalue greater than 1.0, and together they explained 55% percent of the total variance. Of the factors identified, the first factor was related to entrepreneur capability, which had an eigenvalue of 4.69 and accounted for 20.19% percent of the explained variance. The four items to measure this variable all loaded heavily on the first factor. The second factor was marketing capability, which had an eigenvalue of 1.61 and accounted for 19.95% percent of the variance. Two items were deleted from the original scale for measuring marketing capability, for they did not load heavily on marketing capability. The third factor was related to innovation capability and accounted for 14.83% percent of the variance. Details of the factor analysis are given in Appendix D.

The result of the exploratory factor analysis showed that the number of factors that emerged was identical in number and nature to those expected a priori. For each factor, the measures used a priori all loaded heavily on the factor, indicating high convergent validity. Furthermore, these variables did not load more highly on other factors than they did on the factor they intended to measure, indicating discriminant validity.

Confirmatory factor analysis via LISREL 8 was further used to assess inidimensionality of core capability. Results in Table 4.5 suggest that the model fit well. In the model encompassing entrepreneur capability, marketing capability, and

innovation capability, the following fit indices were produced: RMSEA= 0.065, $\chi^2=112$, d.f.=74, GFI=0.88, CFI=0.91. A χ^2 / d.f. ratio between 1 and 2 has been advocated as an acceptable level of fit for confirmatory factor models (Hair *et al.*, 1998). In the model, the χ^2 / d.f. ratio was 1.58. The GFI was near 0.90, and CFI was over 0.90, indicating that data fit the model.

Table 4.5 Factor analysis results of core capability

Core capability variables	Factor loading
Entrepreneur capability	
● Entrepreneur's value and norms	0.79
● Manage change	0.64
● Entrepreneur's vision	0.62
● People-orientation	0.65
Eigenvalue	4.69
Percentage of variance explained	20.19%
Marketing capability	
● Market knowledge	0.82
● Customer relationship networks	0.75
● Government relationship	0.60
● Company reputation	0.67
● Brand	0.62
Eigenvalue	1.61
Percentage of variance explained	19.95%
Innovation capability	
● Technical and managerial expertise	0.65
● Competence in technology and process	0.80
● IT technology	0.86
● Innovation in Finance	0.57
● Innovation in operation mechanism	0.57
Eigenvalue	1.40
Percentage of variance explained	14.83%
Model fit: RMSEA= 0.065, GFI=0.88, CFI=0.91, χ^2 / d.f.= 1.58	

4.3.2.2 Validity of Competitive Strategy Variables

Exploratory factor analysis was performed on the full set of competitive strategy variables. As shown in Table 4.6, four factors were initially identified. These factors each had an eigenvalue greater than 1.0, and together they explained 61.12% percent of the total variance. Of these factors identified, the first factor was related to cost, which had an eigenvalue of 4.95 and accounted for 16.67 percent of the explained variance. The four items to measure this construct all loaded heavily on the first factor. The second factor was quality, which had an eigenvalue of 2.12 and accounted for 16.13 percent of the variance. One item was deleted from the original scale for measuring quality, for it did not load heavily on quality. The third factor was related to delivery and accounted for 14.88 percent of the variance. The fourth was related to partnering and accounted for 13.44 percent of the variance. Details of the factor analysis are given in Appendix D. For each factor, the measures used a priori all loaded heavily on the factor, indicating high convergent validity. Furthermore, these variables did not load more highly on other factors than they did on the factor they intended to measure, indicating discriminant validity.

Confirmatory factor analysis via LISREL 8 was further used to assess inidimensionality of competitive strategy. Results in Table 4.6 suggest that the model fit well. In the model including cost, quality, delivery and partnering, the following fit indices were produced: RMSEA= 0.071, $\chi^2=161$, d.f.=100, GFI=0.90, CFI=0.92. In the model, the χ^2 / d.f. ratio was 1.61, and the GFI and CFI were over 0.90, indicating that data fit the model.

Table 4.6 Factor analysis results of competitive strategy

Competitive strategy variables	Factor loading
Cost	
● Access to low cost labor	0.78
● Access to low cost raw materials	0.80
● Reducing cost in construction operations	0.81
● Reducing cost in administration activities	0.69
Eigenvalue	4.95
Percentage of variance explained	16.67%
Quality	
● Reducing defective rates	0.76
● Emphasizing strict quality control	0.69
● Total quality management in the construction process	0.73
● Improving the quality of contracting service	0.82
Eigenvalue	2.12
Percentage of variance explained	16.13%
Delivery	
● Increasing delivery reliability	0.75
● Improving delivery speed	0.77
● Enhancing service and technical support	0.57
● Meeting on customer' needs and requirements	0.74
Eigenvalue	1.56
Percentage of variance explained	14.88%
Partnering	
● Subcontractor of a large construction corporation	0.60
● Partnering with customer on a long-term basis	0.72
● Cooperation with reliable suppliers	0.64
● Cooperation with research institutes and university	0.73
Eigenvalue	1.15
Percentage of variance explained	13.44%
Model fit: RMSEA= 0.071, GFI=0.90, CFI=0.92, $\chi^2/\text{d.f.}$ =1.61	

4.3.2.3 Validity of Industry Structure Variables

The results of the factor analysis pertaining to industry structure variables are presented in Table 4.7. There are two factors appearing in the results, an identical number as expected a priori. The first factor was market entry barriers, which had an eigenvalue of 2.91 and accounted for 29.96 percent of the variance. The second factor was identified as competitive pressure with an eigenvalue of 2.03, explaining 24.92 percent of the variance. One item from the measures of competitive pressure was deleted from further analysis because it had high cross-loading. Details of the factor analysis are given in Appendix D. As indicated, all items loaded strongly on the corresponding variable as expected. No item loaded more highly on another variable than it did on the variable it was intended to measure. Thus, the items satisfied the requirements of convergent and discriminant validity.

Table 4.7 Factor analysis results of industry structure

Industry structure variables	Factor loading
Market entry barriers	
● Entry new construction market	0.70
● Access new clients	0.82
● Capital requirement	0.82
● Access to distribution channel	0.73
● Adaptability to local government policy	0.53
Eigenvalue	2.91
Percentage of variance explained	29.96%
Competitive pressure	
● Government intervention	0.70
● The rivalry for competitor	0.72
● The loyalty of customers	0.70
● The threats of new entrants	0.74
Eigenvalue	2.03
Percentage of variance explained	24.92%
Model fit: RMSEA= 0.076, GFI=0.89, CFI=0.93, χ^2 /d.f.=1.85	

Confirmatory factor analysis via LISREL 8 was further used to assess industry structure factors. Results in Table 4.7 suggest that the model fit well. The following fit indices were produced: RMSEA= 0.076, $\chi^2=103$, d.f.=56, GFI=0.89, CFI=0.93. the χ^2 / d.f. ratio was 1.85, indicating that data fit the model.

4.3.3 Correlation Analysis

Correlation analysis is the statistical method that can be used to describe the degree to which one variable is linearly related to another. Correlation analysis in the study was used in conjunction with regression analysis to measure how well the least squares line fits the data. Table 4.8 summarizes the mean, standard deviation and correlation of variables. Descriptive statistics of survey data is given in Appendix B. As indicated, the correlation analysis had shown that there was significant and substantial level of correlations among variables of the same construct. For example, a medium to high level of correlations from 0.25 to 0.56 was found among the competitive strategy areas. This could be explained by the fact that they were all sub-constructs of similar behavioral characteristics reflecting a higher level construct.

For variables in different constructs, the correlations were moderate. Such a pattern could be seen as an evidence for construct validity for convergent validity for items within a variable and divergent validity for items outside a variable. Moreover, the significant correlations between the core capability and competitive strategy with construction SMEs' performance provided some indications on the relationships between these sets of variables.

Table 4.8 Mean, standard deviation and correlation of variables

Variables	Mean	S.D.	Market entry barriers	Competitive pressure	Entrepreneur capability	Marketing capability	Innovation capability	Cost	Quality	Delivery	Partnering	Sales growth	Profit growth
1. Market entry barriers	2.64	0.66	---										
2. Competitive pressure	3.39	0.67	-0.19 ^a	---									
3. Entrepreneur capability	4.11	0.65	0.49 ^b	-0.02	---								
4. Marketing capability	3.48	0.69	0.34 ^b	-0.02	0.35 ^b	---							
5. Innovation capability	3.59	0.69	0.91 ^a	-0.12 ^a	0.52 ^b	0.37 ^b	---						
6. Cost	3.82	0.64	0.29 ^b	-0.12 ^a	0.31 ^b	0.12 ^a	0.25 ^b	---					
7. Quality	3.67	0.68	0.24 ^b	0.06	0.39 ^b	0.03	0.19 ^b	0.28 ^b	---				
8. Delivery	3.59	0.74	0.48 ^b	-0.07	0.53 ^b	0.12 ^a	0.45 ^b	0.37 ^b	0.26 ^b	---			
9. Partnering	3.26	0.85	0.55 ^b	0.03	0.39 ^b	0.36 ^b	0.54 ^b	0.34 ^b	0.28 ^b	0.56 ^b	---		
10. Sales growth	3.39	0.71	0.42 ^b	-0.08	0.49 ^b	0.31 ^b	0.38 ^b	0.33 ^b	0.37 ^b	0.41 ^b	0.50 ^b	---	
11. Profit growth	3.04	0.79	0.34 ^b	-0.12 ^a	0.32 ^b	0.22 ^b	0.29 ^b	0.17 ^b	0.32 ^b	0.24 ^b	0.29 ^b	0.73 ^b	---

Note. ^a P<0.05; ^b P<0.01.

4.4 Research Findings

Section 4.3 provided empirical evidence of reliability and validity on the instrument developed throughout the study. This section focuses on the description of statistical methods used to test hypotheses, research findings and interpretation. The section is organized into four major topics: (1) core capability and performance, (2) competitive strategy and performance, (3) core capability, competitive strategy and performance, and (4) moderating role of industry structure. The four major topics will be discussed in detail next.

4.4.1 Core Capability and Performance

The testing of the Hypotheses 1.a- 1.c concerning the effects of core capability on construction SMEs' performance was conducted by using multiple regression analysis. The general purpose of multiple regressions is to learn more about the relationship between several independent or predictor variables and a dependent variable. It allows the researcher to examine the effect of many different factors on the outcome at the same time. The dependent variable performance included two dimensions: sales growth and profit growth. Thus, the impacts of core capability on these two dimensions were tested separately.

In the regression equations, Model 1 analyzed the impact of core capability on sales growth, and Model 2 referred to the impact of core capability on profit growth. The regression equations for core capability took the following forms:

Model 1:

$$\text{Sales growth performance} = \beta_0 + \beta_1 \text{EC} + \beta_2 \text{MC} + \beta_3 \text{IC} + \text{Error}$$

Model 2:

$$\text{Profit growth performance} = \beta_0 + \beta_1 \text{EC} + \beta_2 \text{MC} + \beta_3 \text{IC} + \text{Error}$$

Where: EC= Entrepreneur capability

MC= Marketing capability

IC= Innovation capability

The results are presented as standardized regression coefficients in Table 4.9. As indicated, both Models were significant at the level of $p < 0.001$. For Model 1, the independent variables explained 30 percent of variance in the construction SMEs' sales growth ($R^2 = 0.30$, Adjusted $R^2 = 0.26$, F value = 9.62, d/f = 3/120). For Model 2, the independent variables explained 13 percent of variance in the construction SMEs' profit growth ($R^2 = 0.13$, Adjusted $R^2 = 0.11$, F value = 5.70, d/f = 3/120). These adjusted R^2 are consistent with studies of SMEs by Chandler and Hanks (1994) and Sadler-Smith *et al.* (2003). Chandler and Hanks (1994) regressed growth and business volume on 11 fundamental measures and reported adjusted R^2 are between 8 and 22 percent. The adjusted R^2 reported by Sadler-Smith *et al.* (2003) is 12 percent. Thus, the values of adjusted R^2 in this case could be deemed acceptable for evaluating Model 1 and 2. Next, the results concerning each of the hypotheses ($H_{1.a}$ to $H_{1.c}$) were presented.

Table 4.9 The impact of core capability on construction SMEs' performance

Independent variable	Dependent variable	
	Model 1 Sales growth	Model 2 Profit growth
<u>Core capability variables</u>		
Entrepreneur capability	0.30 ^d	0.21 ^c
Marketing capability	0.18 ^b	0.15 ^b
Innovation capability	0.14 ^b	0.11 ^a
R^2	0.30	0.13
Adjusted R^2	0.26	0.11
F value	9.62	5.70
d/f	3	3

Note. ^a $P < 0.10$; ^b $P < 0.05$; ^c $P < 0.01$; ^d $P < 0.001$

H_{1.a} states that entrepreneur capability is positively related to construction SMEs' performance. In the two Models, the results showed that regression coefficients of entrepreneur capability had a significantly positive relationship with both sales growth ($\beta = 0.30$, $p < 0.001$) and profit growth ($\beta = 0.21$, $p < 0.01$). Thus, H_{1.a} was supported.

H_{1.b} proposes that marketing capability is positively related to construction SMEs' performance. The results showed that regression coefficients of marketing capability had a significantly positive relationship with both sales growth ($\beta = 0.18$, $p < 0.05$) and profit growth ($\beta = 0.15$, $p < 0.05$). Thus H_{1.b} was supported.

H_{1.c} predicts that innovation capability is positively related to construction SMEs' performance. As shown in Table 4.9, the regression coefficients of innovation capability had a significantly positive relationship with both sales growth ($\beta = 0.14$, $p < 0.05$) and profit growth ($\beta = 0.11$, $p < 0.10$). Thus H_{1.c} was supported.

4.4.2 Competitive Strategy and Performance

The testing of the Hypotheses 2.a- 2.d concerning competitive strategy and performance was conducted by using multiple regression analysis. The impacts of competitive strategy on the sales growth and profit growth were tested separately. In the regression equations, Model 1 analyzed the impact of competitive strategy on sales growth, while Model 2 referred to the impact of competitive strategy on profit growth. The equations for competitive strategy took the following forms:

Model 1:

$$\text{Sales growth performance} = \beta_0 + \beta_1 \text{CS} + \beta_2 \text{QS} + \beta_3 \text{DS} + \beta_4 \text{PS} + \text{Error}$$

Model 2:

$$\text{Profit growth performance} = \beta_0 + \beta_1 \text{CS} + \beta_2 \text{QS} + \beta_3 \text{DS} + \beta_4 \text{PS} + \text{Error}$$

Where: CS= Cost strategy

QS= Quality strategy

DS= Delivery strategy

PS= Partnering strategy

As shown in Table 4.10, both Models were significant at the level of $p=0.001$. For Model 1, the independent variables explained 33 percent of variance in the construction SMEs' sales growth ($R^2=0.33$, Adjusted $R^2=0.30$, F value=14.14, $d/f=4/120$). For Model 2, the independent variables explained 16 percent of variance in the construction SMEs' profit growth ($R^2=0.16$, Adjusted $R^2=0.13$, F value=5.44, $d/f=4/120$). Next, the results concerning each of the hypotheses ($H_{2.a}$ - $H_{2.d}$) are presented.

$H_{2.a}$ posits that cost is positively related to construction SMEs' performance. As shown in Table 4.10, the regression coefficients of cost had a significantly positive relationship with both sales growth ($\beta=0.19$, $p<0.001$) and profit growth ($\beta=0.23$, $p<0.001$). Thus $H_{2.a}$ was supported.

$H_{2.b}$ states that quality is positively related to construction SMEs' performance. In the two Models, the results showed that regression coefficients of quality had a significantly positive relationship with both sales growth ($\beta=0.29$, $p<0.001$) and profit growth ($\beta=0.17$, $p<0.05$). Thus $H_{2.b}$ was supported.

$H_{2.c}$ proposes that delivery is positively related to construction SMEs' performance. The results showed that regression coefficients of delivery had a significantly positive relationship with both sales growth ($\beta=0.16$, $p<0.01$) and profit growth ($\beta=0.11$, $p<0.1$). Thus $H_{2.c}$ was supported.

$H_{2.d}$ predicts that partnering is positively related to construction SMEs' performance. As shown in Table 4.10, the regression coefficients of partnering had a significantly positive relationship with sales growth ($\beta=0.13$, $p<0.05$), but not positively related to profit growth ($\beta=0.05$, $p>0.1$). Thus $H_{2.d}$ was partially supported.

Table 4.10 The impact of competitive strategy on construction SMEs' performance

Independent variable	Dependent variable	
	Model 1 Sales growth	Model 2 Profit growth
<u>Competitive strategy variables</u>		
Cost	0.19 ^d	0.23 ^d
Quality	0.29 ^d	0.17 ^c
Delivery	0.16 ^c	0.11 ^a
Partnering	0.13 ^c	0.05
R ²	0.33	0.16
Adjusted R ²	0.30	0.13
F value	14.14	5.44
d/f	4	4

Note. ^a P<0.10; ^b P<0.05; ^c P<0.01; ^d P<0.001

4.4.3 Core Capability, Competitive Strategy and Performance

The relationship of core capability, competitive strategy and performance involved two perspectives: (1) fit among core capability, competitive strategy and performance (H3), and (2) core capability patterns and competitive strategy choice (H_{3.a}- H_{3.b}). Hypothesis 3 was tested by the path coefficients among the three variables, where competitive strategy acted as a mediating mechanism between core capability and performance. The testing Hypotheses 3.a and 3.b involved the derivation of empirically-valid clusters of construction SMEs with similar core capability. MANOVA and Duncan's range test were used to examine variations among competitive strategy and performance across core capability clusters.

4.4.3.1 Fit among Core Capability, Competitive Strategy and Performance

The fit among core capability and competitive strategy was tested by using mediation model. Path analysis is an appropriate methodology for capturing such a relationship because it is concerned with estimating the magnitude of the linkages between variables and using these estimates to provide information about underlying causal processes (Asher, 1983).

In this study, the mediation model assumes a three-variable system including core capability, competitive strategy and performance. Figure 4.1 is a schematic representation of fit as mediation involving three variables, where competitive strategy acts as a mediating mechanism (fit) between core capability and performance. In the model, there are two causal paths feeding into the outcome variable: the direct impact of the independent variable (core capability) and the impact of the mediator (competitive strategy). There is also a path from the independent variable to the mediator. LISREL 8 is used to conduct path analysis and results of mediation model are presented in Figure 4.1. Fit indices were produced: RMSEA= 0.078, $\chi^2= 57.69$, d.f.= 24, GFI=0.90, CFI=0.91, indicating that data fit the model. Next, the results concerning each of the hypotheses (H1- H3) are presented.

H1 posits that core capability significantly contributes to construction SMEs' competitive advantage and in turn achieves superior performance. As shown in Figure 4.1, core capability had a significantly positive relationship with performance with path coefficient of 0.25. Thus H1 was supported.

H2 states that competitive strategy significantly contributes to construction SMEs' competitive advantage and in turn achieves superior performance. The path coefficient between competitive strategy and performance was 0.37, Thus H2 was supported.

H3 proposes that there will be positive relationships between the "fit" of core capability and competitive strategy and the performance of construction SMEs. The results showed that core capability had a positive relationship with competitive strategy with path coefficient of 0.82. Thus H3 was supported.

RMSEA= 0.078, GFI=0.90, CFI=0.91, $\chi^2 = 57.69$, d.f.= 24,

Figure 4.1 Fit among core capability, competitive strategy and performance

4.4.3.2 Core Capability Patterns and Competitive Strategy Choice

The testing of Hypotheses 3.a- 3.b proceeded in two steps. The first involved the derivation of empirically-valid clusters of construction SMEs with similar core capability. The second step involved the examination of variations in the competitive strategy and performance across the core capability clusters. Both steps are described below.

The cluster analysis used is the k-means clustering analysis procedure and the algorithm used in the k-means clustering analysis is based on the “nearest centroid sorting” method. This procedure is based on an examination of changes in the squared Euclidean distance between various cluster solutions as well as an examination of the denfrogram which depicts the cluster separation points. Ward’ method of cluster analysis was used for the purpose (Everitt, 1983). Ward’s method minimizes intracluster differences and maximizes intercluster differences on the clustering variables- in this case the three core capability clusters. One-way analysis of variance (ANOVA) and contrast tests were then used to determine whether the competitive strategy and performance measures differed across the result clusters.

The results of the cluster analysis of the core capability produced three clusters. Table 4.11 presents the means and standard deviations of the core capability in each cluster. As indicated, Cluster 1 consisted of 37 construction companies. These construction companies adopted a high core capability and placed strong emphasis on all kinds of capabilities. Cluster 2 consisted of 62 companies. These construction companies adopted a moderate scope of core capability. Cluster 3 consisted of 22 construction companies, which adopted a low scale in core capability. Cluster analysis revealed that construction SMEs developed themselves in the industry by developing a strong core capability. The one-way ANOVA F-ratios for each capability were also displayed to verify that that capabilities were overall intercluster differences in this regard. In addition, Duncan’s range test was used to aid in interpreting cluster differences through pairwise comparisons of cluster means.

Table 4.11 Means and standard deviations of the core capability in each cluster

Variables	Groups derived from cluster analysis ^a			Duncan results ^b	F-values ^c
	Cluster 1 (n=37)	Cluster 2 (n=62)	Cluster 3 (n=22)		
Entrepreneur capability	4.64 (0.36)	4.13 (0.35)	3.14 (0.60)	1 > 2,3 2 > 3	93.597 ^d
Marketing capability	4.07 (0.56)	3.29 (0.52)	3.01 (0.64)	1 > 2,3 2 > 3	32.183 ^d
Innovation capability	4.17 (0.49)	3.54 (0.46)	2.75 (0.59)	1 > 2,3 2 > 3	57.465 ^d

^aMeans and standard deviations are reported

^bp < 0.05

^cF-values and two-tailed p-values from a one-way ANOVA

^dF-values are significant at p < 0.001

The second stage in testing Hypothesis 3.a required the use of multivariate analysis of variance (MANOVA). In this analysis, the three core capability clusters served as the independent variables and the four competitive strategy measures as the dependent variables. The MANOVA was significant ($F = 15.59$, $p < 0.001$), suggesting that competitive strategy measures positively associated with variations in the core capability variables. Two analyses followed MANOVA, namely ANOVA and Duncan's range test. Both tests helped in determining variations in each competitive strategy dimensions as a correlation of core capability cluster membership.

Table 4.12 displays cluster means, standard deviations, F-values, and Duncan's tests. As indicated, each competitive strategy variable exhibited an overall difference across the three clusters of construction SMEs with $p < 0.001$. The ANOVA results were corroborated by Duncan's of comparisons that pinpointed significant different group means ($p < 0.05$). Thus Hypothesis 3.a, which suggested the four competitive strategy dimensions will significantly vary across construction SMEs in different core capability clusters, is strongly supported by the data.

To test Hypothesis 3.b, one-way ANOVA was used where sales growth and profit growth were treated as the dependent variables and the core capability clusters were treated as the independent variables. Table 4.12 shows the ANOVA results, in which construction SMEs in Cluster 1 have significantly higher sales growth and profit growth than firms in the other two clusters. Construction SMEs in Cluster 2 have significantly higher sales growth and profit growth than firms in Clusters 3. These differences in sales growth and profit growth suggested that the core capability clusters achieved different levels of performance. Thus, the results strongly support Hypothesis 3.b, the range of correlations between competitive strategy dimensions and construction SMEs' performance varied significantly across construction SMEs in different core capability clusters.

Table 4.12 Means and standard deviations of the competitive strategy and performance in each cluster

Variables	Groups derived from cluster analysis ^a			Duncan results ^b	F-values ^c
	Cluster 1 (n=37)	Cluster 2 (n=62)	Cluster 3 (n=22)		
Cost	4.09 (0.58)	3.79 (0.63)	3.46 (0.64)	1> 2,3 2> 3	7.15 ^d
Quality	3.97 (0.59)	3.65 (0.69)	3.26 (0.60)	1> 2,3 2> 3	8.29 ^d
Delivery	3.96 (0.66)	3.58 (0.67)	3.00 (0.57)	1> 2,3 2> 3	14.39 ^d
Partnering	3.80 (0.64)	3.21 (0.75)	2.50 (0.77)	1> 2,3 2> 3	22.52 ^d
Sales growth	3.91 (0.56)	3.31 (0.58)	2.79 (0.72)	1> 2,3 2> 3	9.926 ^d
Profit growth	3.46 (0.65)	2.93 (0.76)	2.64 (0.79)	1> 2,3 2> 3	24.78 ^d

^aMeans and standard deviations are reported

^bp< 0.05

^cF-values and two-tailed p-values from a one-way ANOVA

^dF-values are significant at p<0.001

4.4.4 Moderating Role of Industry Structure

The testing of the Hypotheses 4.a- 4.d and Hypotheses 5.a- 5.d concerning the effect of industry structure factors on competitive strategy and performance was conducted by moderated regression analysis. In the study, the effect between each of the competitive strategy (cost, quality, delivery and partnering) and construction SMEs' performance is tested separately. There are three reasons for doing so. First, because of the small sample size, it is not realistic to test the prediction by entering all of the predictors, proposed moderators, and interaction terms in a single equation. Second, the intent of the Hypotheses 4.a- 4.d and Hypotheses 5.a- 5.d developed in the research is to study whether the use of competitive strategy will be contingent on such factors as industry structure variables. Thus, there is no desire to examine the effectiveness of the combined use of these strategies. Third, the measure results in Section 4.3 showed that the cost, quality, delivery and partnering were conceptually and empirically independent. Thus, it is feasible to test the relationships between competitive strategy and construction SMEs' performance separately.

4.4.4.1 Market Entry Barriers and Competitive Strategy

The effects of market entry barriers and competitive strategy on the construction SMEs' performance involve four hypotheses: H_{4.a}, H_{4.b}, H_{4.c}, and H_{4.d}. The impacts of market entry barriers factors on the sales growth and profit growth were tested separately. In step 1, the competitive strategy, and the market entry barriers were entered. Next, the interaction terms for each strategy and the market entry barriers were entered in step 2. For each of the competitive strategy, the following equations were used:

Equation 1: Main Effects

$$\text{Performance}_j = \beta_0 + \beta_1 \text{CS} + \beta_2 \text{QS} + \beta_3 \text{DS} + \beta_4 \text{PS} + \beta_5 \text{MB} + \text{Error}$$

Equation 2: Main Effects+ Interaction Effects

$$\begin{aligned} \text{Performance}_j = & \beta_0 + \beta_1 \text{CS} + \beta_2 \text{QS} + \beta_3 \text{DS} + \beta_4 \text{PS} + \beta_5 \text{MB} + \\ & \beta_6 \text{CS} * \text{MB} + \beta_7 \text{QS} * \text{MB} + \beta_8 \text{DS} * \text{MB} + \beta_9 \text{PS} * \text{MB} + \text{Error} \end{aligned}$$

Where: CS= Cost strategy

QS= Quality strategy

DS= Delivery strategy

PS = Partnering strategy

MB= Market entry barriers

The results related to these hypotheses are presented in Table 4.13. As indicated, with respect of sales growth, Model 1 was significant at the level of $p < 0.001$, the independent variables explained 36 percent of variance in the construction SMEs' sales performance ($R^2 = 0.36$, Adjusted $R^2 = 0.32$, F value = 6.81, d/f = 9/120). Model 2 was significant at the level of $p < 0.05$, where the independent variables explained 19 percent of variance in the construction SMEs' profit performance ($R^2 = 0.19$, Adjusted $R^2 = 0.14$, F value = 2.82, d/f = 9/120). The variance inflation factor (VIF) for each of the regression coefficients was calculated to assess the degree to which relations among the independent variables inflate the standard error. The VIFs in Models 1 and 2 ranged from 1.03 to 1.55, suggesting that multicollinearity was unlikely to affect the parameter estimates (Neter *et al.*, 1990). Next, the results concerning each of the hypotheses ($H_{4,a}$ to $H_{4,d}$) are presented.

$H_{4,a}$ states that market entry barriers will moderate the relationship between cost and performance: among firms with a strong emphasis on low cost, greater market entry barriers will be associated with higher performance. In the two Models, the results showed that regression coefficients of market entry barriers on cost had a positive relationship with both sales growth ($\beta = 0.10$, $p < 0.1$) and profit growth ($\beta = 0.09$, $p < 0.1$). Thus $H_{4,a}$ was supported.

$H_{4,b}$ proposes that market entry barriers will moderate the relationship between quality and performance: among firms with a strong emphasis on quality, greater market entry barriers will be associated with higher performance. The results showed that regression coefficients of market entry barriers on quality had a positive relationship with sales growth ($\beta = 0.08$, $p < 0.1$), but not with profit growth ($\beta = 0.06$, $p > 0.1$). Thus $H_{4,b}$ was partially supported.

H_{4,c} predicts that among firms with a strong emphasis on delivery, greater market entry barriers will be associated with higher performance. As shown in Table 4.13, the regression coefficients between market entry barriers and delivery had not a significant relationship with both sales growth ($\beta = 0.04$, $p > 0.1$) and profit growth ($\beta = 0.02$, $p > 0.1$). Thus H_{4,c} was not supported.

H_{4,d} states that market entry barriers will moderate the relationship between partnering and performance. As shown in Table 4.13, the regression coefficients between market entry barriers and partnering had not a significant relationship with both sales growth ($\beta = 0.01$, $p > 0.1$) and profit growth ($\beta = 0.01$, $p > 0.1$). Thus H_{4,d} was not supported.

4.4.4.2 Competitive Pressure and Competitive Strategy

The moderating effects of competitive pressure on competitive strategy and construction SMEs' performance involve four hypotheses: H_{5,a}, H_{5,b}, H_{5,c}, and H_{5,d}. The impacts of industry structure factors on the sales growth and profit growth were tested separately. In step 1, the competitive strategy, and the competitive pressure variables were entered. Next, the interaction terms for each strategy and the competitive pressure variables were entered in step 2. For each of the competitive strategy, the following equations were used:

Equation 1: Main Effects

$$\text{Performance}_j = \beta_0 + \beta_1 \text{CS} + \beta_2 \text{QS} + \beta_3 \text{DS} + \beta_4 \text{PS} + \beta_5 \text{CP} + \text{Error}$$

Equation 2: Main Effects+ Interaction Effects

$$\text{Performance}_j = \beta_0 + \beta_1 \text{CS} + \beta_2 \text{QS} + \beta_3 \text{DS} + \beta_4 \text{PS} + \beta_5 \text{CP} + \beta_6 \text{CS} * \text{CP} + \beta_7 \text{QS} * \text{CP} + \beta_8 \text{DS} * \text{CP} + \beta_9 \text{PS} * \text{CP} + \text{Error}$$

Where: CS= Cost strategy

QS= Quality strategy

DS= Delivery strategy

PS = Partnering strategy

CP = Competitive pressure

The results related to these hypotheses are presented in Table 4.14. As indicated, both Models were significant at the level of $p < 0.001$. For Model 1, the independent variables explained 35 percent of variance in the construction SMEs' sales growth ($R^2 = 0.35$, Adjusted $R^2 = 0.30$, F value = 6.54, $d/f = 9/120$). For Model 2, the independent variables explained 21 percent of variance in the construction SMEs' profit growth ($R^2 = 0.21$, Adjusted $R^2 = 0.15$, F value = 3.31, $d/f = 9/120$). The VIFs in the both Models ranged from 1.03 to 1.22, suggesting that multicollinearity is unlikely to affect the parameter estimates. Next, the results concerning each of the hypotheses ($H_{5.a}$ to $H_{5.d}$) are presented.

$H_{5.a}$ states that the positive relationship between cost and performance is weaker when competitive pressure is high rather than low. In the two Models, the results showed that regression coefficients of competitive pressure on cost had a significantly negative relationship with both sales growth ($\beta = -0.10$, $p < 0.1$) and profit growth ($\beta = -0.14$, $p < 0.1$). Thus $H_{5.a}$ was supported.

$H_{5.b}$ proposes that the positive relationship between quality and performance is weaker when competitive pressure is high rather than low. As shown in Table 4.14, the results showed that regression coefficients of competitive pressure on quality had a significantly negative relationship with both sales growth ($\beta = -0.12$, $p < 0.1$) and profit growth ($\beta = -0.07$, $p < 0.1$). Thus $H_{5.b}$ was supported.

$H_{5.c}$ and $H_{5.d}$ predict that the positive relationship between delivery and partnering and performance is weaker when competitive pressure is high rather than low. As shown in Table 4.14, the regression coefficients of competitive pressure on delivery had not a significant relationship with both sales growth ($\beta = 0.02$, $p > 0.1$) and profit growth ($\beta = 0.03$, $p > 0.1$). The regression coefficients of competitive pressure on partnering had not a significant relationship with both sales growth ($\beta = -0.05$, $p > 0.1$) and profit growth ($\beta = -0.02$, $p > 0.1$). Thus $H_{5.c}$ and $H_{5.d}$ were not supported.

Table 4.13 The moderating effects of market entry barriers on the effectiveness of competitive strategy

Independent variable	Dependent variables				
	Model 1 (Sales growth)		Model 2 (Profit growth)		
	Step 1	Step2	Step 1	Step 2	
Main effects					
Cost (CS)	0.19 ^c	0.17 ^c	0.21 ^c	0.19 ^c	
Quality (QS)	0.26 ^d	0.25 ^d	0.12 ^b	0.11 ^a	
Delivery (DS)	0.14 ^b	0.12 ^a	0.07 ^a	0.06	
Partnering (PS)	0.12 ^b	0.13 ^b	0.03	0.03	
Market entry barriers (MB)	0.07 ^a	0.08 ^a	0.13 ^b	0.15 ^a	
Moderating effects					
CS × MB		0.10 ^a		0.09 ^a	
QS × MB		0.08 ^a		0.06	
DS × MB		0.04		0.02	
PS × MB		0.01		0.01	
R ²	0.34	0.36	0.18	0.19	
Adjusted R ²	0.30	0.32	0.12	0.14	
F value	11.59	6.81	4.90	2.82	
d/f	5	9	5	9	

Note. ^a P<0.10; ^b P<0.05; ^c P<0.01; ^d P<0.001

Table 4.14 The moderating effects of competitive pressure on the effectiveness of competitive strategy

Independent variable	Dependent variables			
	Model 1 (Sales growth)		Model 2 (Profit growth)	
	Step 1	Step 2	Step 1	Step 2
Main effects				
Cost (CS)	0.20 ^d	0.21 ^d	0.24 ^b	0.21 ^c
Quality (QS)	0.29 ^d	0.27 ^d	0.18 ^c	0.15 ^b
Delivery (DS)	0.17 ^c	0.15 ^c	0.11 ^a	0.12 ^a
Partnering (PS)	0.13 ^c	0.11 ^a	0.04	0.03
Competitive pressure (CP)	-0.06 ^a	-0.07 ^a	-0.11 ^a	-0.09 ^a
Moderating effects				
CS × CP		-0.10 ^a		-0.14 ^b
QS × CP		-0.12 ^b		-0.07 ^a
DS × CP		0.02		0.03
PS × CP		-0.05		-0.02
R ²	0.32	0.35	0.18	0.21
Adjusted R ²	0.28	0.30	0.13	0.15
F value	11.60	6.54	4.99	3.31
d/f	5	9	5	9

Note. ^a P<0.10; ^b P<0.05; ^c P<0.01; ^d P<0.001

4.5 Discussion of the Findings

As a study of the development of construction SMEs' competitive advantage in China, the research indicated that core capability, competitive strategy and industry structure and related factors have significant influence on construction SMEs' performance. Results of the study indicated that: (1) core capability significantly contributes to construction SMEs' performance; (2) competitive strategy significantly contributes to construction SMEs' performance; (3) there are positive relationships between the fit" of core capability and competitive strategy, and the performance of construction SMEs, and the four competitive strategy and performance dimensions significantly vary in different core capability clusters; (4) the moderating role of industry structure on construction SMEs is partially supported.

The following discussion is based on the results of the analyses presented in Table 4.9 to Table 4.14, where these results will be discussed in detail.

4.5.1 Dimensions of Core Capability

As indicated in Chapter 1, little research has been done on conceptualizing construction SMEs' core capability in either the marketing or the strategic management literature. This study has taken a first step toward delineating the dimensions of core capability adopted by construction SMEs in a transitional economy. Through comprehensive literature and preliminary interviews, the construction SMEs' core capability could be characterized by three dimensions: entrepreneur capability, marketing capability, and innovation capability.

The present study provided strong support for this hypothesis of core capability. The hypothesis was tested in Section 4.4. Results of exploratory factor analysis on core capability variables were found to be consistent with the three underlying dimensions of core capability. Such a factor structure was further validated by confirmatory factor analysis. Moreover, results of multiple regression analysis (see Table 4.9) for dimensions of core capability showed that entrepreneur, marketing, and innovation capability significantly influenced construction SMEs' performance.

The dimensions of core capability identified in this study reflect the work on strategic management by Prahalad and Hamel (1990), Stalk *et al.* (1992), Hall (1993), Chandler and Hanks (1994), Mosakowski (1998), and Hann *et al.* (2002). For example, Hall (1993) identified the sources of sustainable competitive advantage as being capability differential. Hamel (1994) distinguished between a competitive advantage and a core competence (capability) of a firm. He stated that a core capability is always a competitive advantage.

Similarly, the three core capability dimensions used here are also consistent with the dimensions used in the studies on SMEs' competitive advantage. Lerner and Almor (2002) found that the success of small firms is based on the business owner's skill (capability). Rangone (1999) presented that superior performance of SMEs is based on innovation capability, marketing capability, and production capability. Jaafar and Abdul Azizi (2005) confirmed that the firm-specific capability, including entrepreneur, managerial and relationship capability, are crucial to the construction SMEs' development. Furthermore, this research extends previous work by demonstrating that entrepreneur and innovation capability are important dimensions of core capability adopted by construction SMEs. The significance of entrepreneur and innovation capability has been emphasized in the transitional economy of China (Wang and Yang, 2002). Yet, there has been a lack of empirical studies to investigate these dimensions to create competitive advantage for construction SMEs. From resource-base view, this research had revealed some elements and gave a new perspective on entrepreneur and innovation capability for construction SMEs.

4.5.2 Dimensions of Competitive Strategy

The construction SMEs' competitive strategy included four dimensions: cost, quality, delivery, and partnering. The present study provided strong support for the hypothesis of competitive strategy. Results of exploratory factor analyses on competitive strategy variables presented in Table 4.6 were found to be consistent with the four underlying dimensions of competitive strategy. Such a factor structure was further validated by confirmatory factor analysis.

Results of multiple regression analysis (Table 4.10) for dimensions of competitive strategy showed that cost, quality, and delivery significantly influenced construction SMEs' performance. Partnering significantly contributed to the construction SMEs' sales growth, but not to the profit growth. A plausible explanation is that, for construction SMEs, the use of partnering attempts to satisfy the needs of market expansion through covering multiple market segments. On the positive side, partnering results in improved client focus and satisfaction as well as better responsiveness to changing market conditions. Thus construction SMEs may expand its market position and lead to output growth. On the negative side, pursuing partnering involves high costs on resources to develop and sustain such a strategy. Given the limited resources of construction SMEs, gains in market position are likely to be at the expense of profitability erosion.

The dimensions of competitive strategy identified in this study reflect the work on strategic management by Miles and Snow (1978), Porter (1980), Miller (1986), Sandberg (1986). Sandberg (1986) found that business strategies have direct influence on growth performance of SMEs. The study's findings mesh with generic strategy research which suggests that low cost and quality are appropriate strategies in dynamic environments (Miller, 1988; Porter, 1980). The competitive strategies dimensions used here are also consistent with the dimensions used in the studies on SMEs' competitive advantage. For example, Luo (1999) implied that a set of strategies is particularly valued in a dynamic environment. The findings are also in agreement with the notion that quality and delivery are appropriate operation strategy responses to environmental dynamism (Ward *et al.*, 2002).

4.5.3 Dimensions of Core Capability and Competitive Strategy

Dimensions of core capability and competitive strategy involved two perspectives: (1) fit among core capability, competitive strategy and performance (H3), and (2) core capability patterns and competitive strategy choice (H_{3.a}- H_{3.b}). Two observations emerged from this study's results. First, there were positive relationships between the "fit" of core capability and competitive strategy. Second, not only were the individual

competitive strategy dimensions correlated, as expected with the core capability dimensions, but the construction SMEs' performances were also associated with core capability.

Path analysis was used to capture the fit among core capability, competitive strategy and performance. Core capability patterns and competitive strategy choice was tested by cluster analysis. The result of path analysis suggested there were positive relationships between the "fit" of core capability and competitive strategy. The results of the cluster analysis of the core capability produced three clusters, and revealed that construction SMEs developed a strong core capability to achieve superior performance. Further, the findings (see Table 4.11 and 4.12) suggested that the range of correlations between competitive strategy dimensions and construction SMEs' performance varied significantly in different core capability clusters.

A firm can shape their strategies in the process to develop capabilities that suit the competitive environment (Henderson and Mitchell, 1997). The findings are consistent with Chandler and Hanks' conclusion that there are fit among the relationships of resource-based capabilities, strategy and firm performance (Chandler and Hank, 1994). As such, consistent with the premise of this research, core capability's fit with competitive strategy is a significant predictor of construction SMEs' performance. This suggests a need to align core capability and competitive strategy as a precondition for superior performance.

4.5.4 Dimensions of Industry Structure as the Moderator

One of the objectives of the study is to investigate the conditions under which competitive strategies are more or less effective. In the study, significant relationship was found among cost and quality with industry structure factors, but the results suggested there were no significant relationships between delivery, partnering and industry structure factors. Thus, the findings of the study demonstrated that the effectiveness of competitive strategy was partially contingent on industry structure factors (see Table 4.13 and Table 4.14).

Effectiveness of industry structure on cost and quality The result showed that market entry barriers would moderate the relationship between cost, quality and performance: among firms with a strong emphasis on low cost and quality, greater market entry barriers would be associated with higher performance. Similarly, the positive relationship between cost, quality and performance would be weaker when competitive pressure was high rather than low.

The nature of the construction industry is such that, each time a construction project is executed, it acquires resources (machinery, personnel and other physical assets) that may not be used in subsequent projects. Under higher competitive pressure, construction SMEs have to minimize expenditures on innovation, and offer no-frills products to customers seeking to keep the firms alive and profitable. Similarly when market entry barrier decreases, the growth of new firms in an industry will exacerbate existing competition as well as incoming ones. Thus, the findings support the notion that the industry structure factors moderate the cost, quality strategy with construction SMEs.

Effectiveness of industry structure on delivery and partnering The findings showed that there were no significant relationships between delivery, partnering and industry structure factors. There are two plausible explanations for this finding. The delivery management includes the processes required to ensure timely completion of the project (Duncan, 1996). The delivery can be measured by schedule overrun as a percentage of the initial plan. Thus delivery is a project-based function, and is not affected by industry structure factors. Second, implementing partnering effectively would require more than project team building or a strong commitment from top management. It would require also sensitivity to and appreciation of elements necessary for an effective implementation process in a dynamic environment. However, construction SMEs tends to lack such managerial skills in dealing with partnering issues in the current transitional economy in China. Moreover, as mentioned previously, the lack of a legal framework in China presently may lead the partners to behave opportunistically. Thus the effectiveness of partnering from industry structure factors is detrimental.

In summary, the research findings partially supported the notion that industry structure factors moderate the effectiveness of competitive strategy on construction SMEs' performance. Industry structure factors, including market entry barriers and competitive pressure, were shown to impact the effectiveness of cost and quality strategy. Thus the findings indicated that industry structure factors had a limited role in explaining variances in construction SMEs' performance. These results are consistent with the findings reported in research that industry structure or environmental factors are not important predictors of variance in performance (Hansen and Wernerfelt, 1989; Rumelt, 1991).

4.6 Conclusion

This chapter presented the results concerning the hypotheses developed in Chapter 2. Descriptions were provided on the manner in which each of the hypotheses was tested. With respect to main effects, the results of the study showed that core capability and competitive strategy were significantly related to construction SMEs' performance. The study also examined the variations in the competitive strategy and performance across the core capability clusters. Moreover the study suggested that industry structure factors partially moderate the effects of competitive strategy on construction SMEs' performance. The findings were further discussed to compare the extant literature and the results. A summary of the results for each of the hypotheses is provided in Table 4.15. The next chapter will provide detailed case studies by using renowned Chinese construction firms as the subject, and illustrate the use of the conceptual model for construction SMEs to improve their competitive advantage in the construction market.

Table 4.15 Summary assessment of research hypotheses

Research hypotheses	Empirical conclusion	
	Sales growth	Profit growth
Core capability and performance		
H1: Core capability significantly contributes to construction SMEs' performance.(Supported)		
H _{1.a} : Entrepreneur capability significantly contributes to construction SMEs' performance	Supported	Supported
H _{1.b} : Marketing capability significantly contributes to construction SMEs' performance.	Supported	Supported
H _{1.c} : Innovation capability significantly contributes to construction SMEs' performance.	Supported	Supported
Competitive strategy and performance		
H2: Competitive strategy significantly contributes to construction SMEs' performance. (Supported)		
H _{2.a} : Cost significantly contributes to construction SMEs' performance.	Supported	Supported
H _{2.b} : Quality significantly contributes to construction SMEs' performance.	Supported	Supported
H _{2.c} : Delivery significantly contributes to construction SMEs' performance.	Supported	Supported
H _{2.d} : Partnering significantly contributes to construction SMEs' performance.	Supported	Not supported
Core capability, competitive strategy, and firm performance		
H3: There will be positive relationships between the fit" of core capability and competitive strategy, and the performance of construction SMEs. (Supported)		
H _{3.a} : The four competitive strategy dimensions will significant vary across construction SMEs in different core capability clusters. Supported: For each of the competitive strategy variables, there is significant variation ($p < 0.001$) it its score across the core capability clusters.		
H _{3.b} : The range of correlations between competitive strategy dimensions and construction SMEs' performance will significant vary across construction SMEs in different core capability clusters. Supported: For each of the competitive strategy variables, there is significant variation in the range of its correlation with performance across the core capability clusters.		

Table 4.15 Summary assessment of research hypotheses (cont'd)

Research hypotheses	Empirical conclusion	
	Sales growth	Profit growth
Moderating role of industry structure		
H _{4.a} : Market entry barriers will moderate the relationship between cost and performance: among firms with a strong emphasis on low cost, greater market entry barriers will be associated with higher performance.	Supported	Supported
H _{4.b} : Market entry barriers will moderate the relationship between quality and performance: among firms with a strong emphasis on quality, greater market entry barriers will be associated with higher performance.	Supported	Not supported
H _{4.c} : Market entry barriers will moderate the relationship between delivery and performance: among firms with a strong emphasis on delivery, greater market entry barriers will be associated with higher performance.	Not supported	Not supported
H _{4.d} : Market entry barriers will moderate the relationship between partnering and performance: among firms with a strong emphasis on partnering, greater market entry barriers will be associated with higher performance.	Not supported	Not supported
H _{5.a} : The positive relationship between cost and performance is weaker when competitive pressure is high rather than low.	Supported	Supported
H _{5.b} : The positive relationship between quality and performance is weaker when competitive pressure is high rather than low.	Supported	Supported
H _{5.c} : The positive relationship between delivery and performance is weaker when competitive pressure is high rather than low.	Not supported	Not supported
H _{5.d} : The positive relationship between partnering and performance is weaker when competitive pressure is high rather than low.	Not supported	Not supported

Chapter 5 CASE STUDIES

5.1 Introduction

Chapter 4 has described the empirical findings for the research. This chapter will study three cases and illustrate the findings from survey. It reinforces the use of the conceptual model for construction SMEs to improve competitive advantage in the construction market. This chapter is organized into seven sections. Section 5.1 gives a brief description of the content and structure of the chapter. Section 5.2 states the criteria for selecting the case study companies. Following that, three case studies are carried out in Section 5.3, Section 5.4 and Section 5.5 as illustrative examples for their relevance to the findings of the survey. Section 5.6 summarizes the main elements of the three case companies, and finally the conclusion is given in Section 5.7.

5.2 Selection of Case Companies

Multiple-case studies are adopted as they allow cross-case analysis and provide compelling evidence. In this study, three companies are selected, namely Guangsha, Longyuan and Baoye. The case companies are chosen according to the following criteria:

- They had been well regarded, and
- They had achieved a measure of success as determined by the following: (1) the company has been in business in excess of ten years, and (2) the company has established a successful marketing position in the industry.

Data for the case studies are drawn from interviews, review of documents, journal papers, magazines, and websites. Company documents and archival records such as annual reports, position descriptions, budgeting processes, and mission statements provided useful information on the companies' general organization profile (e.g., size, number of employees), development processes and operation procedure.

5.3 Case Study One: Guangsha

The first case study company is named Guangsha Corporation in Zhejiang province of China. Guangsha was founded in 1980, which started up as a rural contractor with more than one hundred employees. The majority of the employees were unskilled workers. Its project was mainly assigned by the local government and its existing equipment was old and outdated. The President and Founder, Mr. Lou Zhongfu, played a pivotal role for the growth of the company. During the 20 years of Mr. Lou's leadership, Guangsha had grown from a small contractor to a big company. Currently it is a national company with assets of RMB 14 billion and more than 40,000 staff members. The range of construction work undertaken includes the construction and installation of building, foundation work, building decoration, and earthwork.

5.3.1 Challenges facing Guangsha

Guangsha encountered severe internal operational difficulties caused by the former planned system in 1980s. It suffered from operational inefficiencies caused by unskilled labor and outmoded equipment and technology. It was also lacking in management and professional talent. Having analyzed both the internal condition and external environment, Mr. Lou identified four challenges facing the company's development, namely the company's organization, cost management, quality control and access to financing. Mr. Lou and his management team understood clearly that if they wanted to be successful, they had to restructure the company and adopt practical strategies and take decisive actions.

Challenge for company's organization During the transition period from the planned to market system, Guangsha did not have a proper standard to manage its organizational structure, labor force, and marketing. "The biggest problem in Guangsha was inefficiency in the early 1980s", emphasized Mr. Lou in the interview. "The company experienced redundant employment and increasingly heavy social burden. It lacked the motivation to improve and innovate owing to the conventional practice that the state took care of finished products." The company needed to restructure its organization structure so that it could be flexible and adaptive to the market. There was also a need to reform the operational mechanism and improve its employees' efficiency.

Challenge for cost management Traditionally, Guangsha made pricing decisions based on a standard cost established by the government, instead of the demand and supply in market, all of which completely ignored the client's requirements and needs. In line with the implementation of national economic reform towards a market-oriented economic system, a competitive bidding system was introduced into the Chinese construction industry in the early 1980s. This system has changed the project procurement system from traditional government assignments to competition through a bidding process. Pricing to the market resulted in competitive pressure to the company's cost management system. The company wanted to adopt a cost strategy to work as a cost control mechanism for its operation management.

Challenge for quality control The company realized through years of practice and experience that high quality projects were consistently fulfilling the clients' needs. It was important for the company to create the shared value among employees that everyone in the firm was a quality controller. At the same time, the firm needed to know the clients and their changing tastes. "High quality" as noted by Mr. Lou in the interview, "was not only the fundamental basis for the firm's reputation, but also the intangible asset for sustained competitive advantage in the market."

Access to financing Under the planned economy, local government provided the funding and instructed Guangsha to undertake projects. However, government agencies usually controlled the finance and imposed a lot of constraints. Thus the company lacked

sufficient funding to take on the projects. As SMEs were under greater restrictions in terms of direct financing, it was difficult for Guangsha to access finance to undergo technical transformation and equipment upgrading. Therefore, the company needed to broaden its access to financing and lay a strong foundation to its development.

5.3.2 Reform and Development

Mr. Lou became the top manager of Guangsha in 1985. He was an entrepreneur with ambition and foresight. Confronting the difficulties and problems of Guangsha, he took a systematic process of restructuring its organization, enhancing efficiency and improving its competitiveness. In the first stage, Mr. Lou restructured its organization structure, established effective incentive mechanism and improved employees' know-how. Under his leadership, a business development department was set up to improve its marketing capability, and a new salary system was established to enhance its employees' efficiency.

Traditionally, Guangsha was product-oriented rather than market-oriented. With the newly established organization structure and the business development department, the company was effectively linked to its customers. The business development department was tasked to gather market information, and build relationship with local government and clients. To ensure that the business development personnel have the necessary authority, the manager of this department was appointed as the deputy general manager of the company. The business department personnel thus became more aware of the clients' needs and market trends, and such information was disseminated to all the internal departments to facilitate the process of customer service delivery, resulting in higher performance for the company.

Guangsha also focused on a new incentive and training mechanism to enhance its employees' efficiency. In its traditional reward system, the payment was not tied to employees' performance and everyone in the company received a similar payout. To increase employees' efficiency, it set up a new salary system commensurate with the employees' performance, which included a basic wage, bonuses and welfare. For outstanding employees, the company raised their basic wage and bonuses sharply. Guangsha also established its training and educational system to improve its employees'

know-how. It targeted and sought out retired technicians and engineers from construction SOEs, paid them attractive salaries and actively promoted technology improvement. It also encouraged employees to actively involve in its business operations. It set up ‘feedback boxes’ throughout the company for employees to put in their suggestions, comments, and complaints about the company’s daily operations. Such an acknowledgement of employees’ ideas by the management greatly increased employees’ motivation and enthusiasm in their job performance.

At the second stage, Mr. Lou started shareholding reform to transform the corporate management system. Two external investors, Zhejiang Trust and Investment Corporation and Dongyang Credit Cooperative Union, invested RMB 15 million to purchase 15 percent of Guangsha shares in 1992. The investors also provided strategic assistance to Guangsha in a multitude of disciplines including corporate governance, risk management, and capital services. Audit committee and remuneration committee were established to supervise the company’s financial process and internal control systems. By implementing shareholding reform, the company successfully improved the governance structure, enhanced enterprise efficiency and financial discipline, and increased its competitiveness. The introduction of the strategic investor, advanced management and talents development had contributed to the improvement of the professional quality of the company.

With the investment and assistance from its strategic partner, Guangsha also improved on its technology and equipment through a systematic deployment of new methods and techniques for construction. It introduced the ready-mixed concrete equipment and invested in production lines for steel component. It set up a research institute of architecture and construction, which was the first research institute owned by a private enterprise in the Chinese construction industry. The research institute aimed to develop advanced construction technology, high quality building materials and efficient project delivery process. By developing new techniques, materials, and methods, Guangsha achieved all-round benefits, ranging from productivity improvement to increasing project quality and enhancing ability to execute a great diversity of projects.

5.3.3 Competitive Strategy of Guangsha

Guangsha' business strategy aimed to provide excellence in clients' service and achieve a steady growth in the construction market. To compete in the domestic market, it had adopted the three-pronged strategies of low cost, quality and partnering to improve its competitiveness.

Low cost strategy To counter challenge for cost management and to ensure its continued survival, Guangsha established its own cost control mechanism, which targeted to eliminate waste and conserve resources and then reinvested the savings in critical assets such as employees, technology, and R&D. Reducing costs did not imply reducing quality or skimping on service. Instead, it took advantage of every opportunity to better leverage its existing and new assets to add value to customers and shareholders. The company adopted three cost control approaches, which included project planning, a cost budget system, and central procurement mechanism, to improve its cost performance. Table 5.1 summarizes the three cost control approaches of Guangsha.

- **Project planning.** Project planning was instituted to ensure that the company could address risk and allocate resources to maximize the chance for a successful project. It included project risk analysis, evaluation of alternative technology, estimation of the required resources and durations, and team composition. Project planning provided the basis for developing the budget and the schedule for work. It had a significant impact on the outcome of project cost performance. For example, by analyzing the price tendency of construction materials and equipment before the start of project, the company could maintain flexibility on allocating material resources according to the project schedule.
- **A cost budget system.** Guangsha established a budget system showing monthly expenses for supplies and other routine expenses. The system checked the costs each month to see how new expenses were varying. This provided an early alert if some costs were high and helped track the reason. "Doing this at the end of the year may be too late to affect it," as mentioned by Mr. Lou, "Reviewing it every month gives us a chance to react and adjust."

- Central procurement mechanism. The establishment of central material procurement department aimed to purchase in bulk, which allowed the company to benefit from better discounts and competitive terms. Furthermore, through centralised purchasing, the company would be in a much better position to bargain for better terms and conditions of supply from its suppliers. It also achieved cost reduction benefits. For example, the company had reduced materials procurement cost and saved more than RMB10 million from 1990 to 1995.

Table 5.1 The three cost reduction approaches of Guangsha

Cost control approach	Content of each cost control approach	Benefits
Project planning	<ul style="list-style-type: none"> ● Project risk analysis ● Evaluation of alternative technology ● Estimation of the required resources and durations ● Team composition 	<ul style="list-style-type: none"> ● Improve project cost performance ● Provide the basis for budget and schedule
A cost budget system	<ul style="list-style-type: none"> ● Check costs each month ● Check how new expenses vary ● Provide an early alert 	<ul style="list-style-type: none"> ● Timely react and adjust ● Cost management and control
Central procurement mechanism	<ul style="list-style-type: none"> ● Purchase in bulk ● Using bidding mechanisms for material procurement ● Bargain for better terms and conditions from its suppliers 	<ul style="list-style-type: none"> ● Strengthen material procurement control ● Reduce material cost

Quality strategy Product quality was the foundation of existence and development of Guangsha. It adopted the “three-in-one quality management system”, representing quality policy, objective and control system. The quality policy of Guangsha was to “satisfy clients with highest quality product and service.” To satisfy clients’ requirements for high quality, it set up a series of quality objectives in 1990s, as shown in Table 5.2. As indicated, the quality objectives involved quantitative index such as first conformance rate, contract execution rate, and client satisfaction rate, etc. Guangsha established a

quality control team for quality assurance, which was headed by Mr. Lou. Employees' involvement to improve quality was formalized through quality circles in which groups of workers met regularly to promote quality improvement. With the quality management system in operation, the company was able to provide clients with the assurance of delivering construction project on time, to specification and within budget. Guangsha' construction projects had been awarded excellent projects quality by the Zhejiang province and the MOC. For example, it achieved the "National Total Quality Management Golden Award" in 1993 and 1994 and the "Luban Award", the best quality award in Chinese construction, from 1997 to 1999.

Table 5.2 Quality objectives of Guangsha in 1990s

	Main Quality Objectives
1	The first conformance rate of final inspection of engineering quality reaches 100%
2	Contract execution rate of 100% (when the contract is revised, the revised contract takes precedence. When the contract execution rate is calculated, it is free from any failure caused by client breach, , accidents, etc)
3	Client satisfaction rate over 95%
4	Province-level excellent projects amount to over 3 annually
5	Every 2-3 years, one state-level excellent project of "Luban Award"
6	Avoid any significant quality accidents

Source: Annual report of Guangsha and the website: www.guangsha.com

Partnering strategy In its regional expansions, Guangsha had partnered with clients and local suppliers. It delivered to clients the best-value-for-money project by harnessing the best of design and construction to create a product of quality, aesthetics and innovation. Guangsha's marketing and information channel had been fully exploited in the partnering process. It utilized the expertise of collaborating parties in areas of key resources and expertise. Table 5.3 summarizes the partnering activity of Guangsha. By combining the resources of its strategic alliance partners, the company was able to overcome its financial resource disadvantage and improve its governance structure. Moreover, it sought a strategic alliance with local suppliers, which possessed complementary

strengths and expertise. In doing so, Guangsha increased its strengths and gained competitive advantages over its bigger rivals. For example, by forming a strategic alliance with a major supplier, Dongyang First Construction Material Factory, Guangsha could gain the backing of its more resourceful partner and access the latter's expertise and construction material resources. This put the company in a better position to defend and outmaneuver its rivals. Partnering had enabled Guangsha to explore complementary strengths, pooling of financial resources, and improve its competitiveness in the construction market.

Table 5.3 Partnering activity of Guangsha

Types of partner	Client	Supplier
Partners	<ul style="list-style-type: none"> ● Zhejiang Trust and Investment Corporation ● Dongyang Credit Cooperative Union 	<ul style="list-style-type: none"> ● Dongyang First Construction Material Factory
Dimensions for cooperation	<ul style="list-style-type: none"> ● Management mechanism ● Financing channel 	<ul style="list-style-type: none"> ● Construction material production ● Distribution cooperation
Benefits	<ul style="list-style-type: none"> ● Overcome financial resource disadvantage ● Improve the governance structure ● Increase its competitiveness 	<ul style="list-style-type: none"> ● Increase strength ● Acquire competitive advantage over bigger firms

5.3.4 Competitive Advantage and Performance

Guangsha had achieved sustainable competitive advantage when it consistently offered products and services which met the requirements of its customers in the target market. It experienced rapid growth and had yet to confront a serious competitive challenge. It continually exploited the opportunity of expansion to provide for its future growth.

Growth in terms of the number of employees, volume of sales, profit and market share could all be cited to support the successful transformation of Guangsha from a small contractor to a large company. Figure 5.1 shows the sales growth versus profit growth of

Guangsha in 1990s. As indicated, its business turnover in 2000 was RMB 1,635.94 million and profit attributable to shareholders was RMB 95.78 million. Compared to 1991, its output and profits had increased 20.4 times and 19.1 times respectively. Guangsha became the first construction company to be listed under the recommendation of the MOC when it went public on the Shanghai Stock Exchange in 1997. The range of business activity of Guangsha now involves all aspects of construction. Currently it has projects in 22 provinces and municipalities in China, and in 12 countries and regions overseas. It has set up subsidiaries in several countries, including Singapore, Kuwait and Qatar, undertaking more than 50 projects in major construction markets overseas.

Source: Annual report of Guangsha and the website: www.guangsha.com

Figure 5.1 Sale growth Vs profit growth of Guangsha in 1990s

5.4 Case Study Two: Longyuan

The second case is Longyuan Construction in Zhejiang province of China. Longyuan was founded in 1981 by the Founder and President, Mr. Lai Zhenyuan. The company started up as a small contractor with several hundred employees. It made its entry into the construction market in Shanghai in 1984. Its headquarters was moved to Shanghai in 1993. The accelerating urbanization and infrastructure investment in Shanghai provided huge opportunities for the development of Longyuan. During the past two decades, Longyuan has grown from a small collective company to a big contractor. With a registered capital of RMB 243 million and total assets of over RMB 3.8 billion in 2000, the company could independently undertake construction projects ranging from industrial to civil, municipal, transportation, water conservancy and other sophisticated projects.

5.4.1 Challenges facing Longyuan

When Longyuan first entered the Shanghai market in 1984 as a small-scale contractor, it had to compete with local contractors in bidding for projects. It faced the challenge to improve client's relationship and strengthen quality management to meet its clients' increased requirement. Since the company had dealt with the open market system for only a short time, it was strategically unsophisticated and competed blindly. Thus it had to develop sound strategies based on its inherent strengths and prevailing market conditions. The main challenges facing Longyuan are summarized as follows:

Challenge for building client-relationship Client relationship had the power to directly influence the company's performance. As a new entrant, Longyuan had not cultivated a close relationship with clients in the local construction market. There was also a lack of communication between the company and its clients, which created obstacles to improve client relationships. The company faced the challenge not only of building proper relationship with local clients, but also changing its products and services to satisfy clients' demand. Thus the company needed to explore tactics to increase its influence and build a relationship of trust with its clients over time.

Challenge for quality management The company was made up of small groups of workers executing projects using limited plant and equipment. Due to poor equipment and shortage of highly skilled employees, there had been increasing quality issues. More importantly, there had been an increasing focus on quality in the construction market. A project client largely relied on quality reputation in contractor selection in competitive bidding. Thus a good quality management became a major challenge for Longyuan to enhance project quality and expand its market.

Challenge for compensation mechanism One of the major reasons leading to the low competitiveness of Longyuan lied in its compensation mechanism. Though employees' salary was transparent in the company, all the employees including the managers were not paid for what they had contributed. Thus there were few managerial and technical talents who were dedicated to their job. It was hard for the company to take a steady growth without an appropriate compensation system.

Challenge for brand management In the recent years, Longyuan has gained competitive edge over its rivals on quality and project services. However, it was possible for other contractors with advanced technology to catch up and imitate it. The intense competition in the local construction market also forced the company to build up a good reputation so that it could distinguish itself from those of their competitors. The goal of Longyuan was to create a famous brand not only in the Shanghai market, but also in the entire Chinese domestic market.

5.4.2 Capability and Development

The success of Longyuan was largely attributed to its top management's ability to manage change and develop effective capabilities that were compatible with environmental conditions. President Lai started as a rural entrepreneur. He had exemplified the characteristics of an entrepreneur by showing great adaptability to change and proactiveness toward the fast changing market. Confronted with the challenges of Longyuan, he adhered to the idea of building close relationship with clients, revitalizing the enterprise with incentive and innovation, and continuous improvement in quality and branding.

Client relationship For a start, Mr. Lai emphasized on building a broadbased clientele. Longyuan set up the “client’s on-site supervision and feedback mechanism”, in which the client had the ability to review the project status, made suggestions and corrections through formal channels and review meetings. The company maintained communication with clients to ensure complete satisfaction with the project. Marketing decisions were made based on feedback from the clients. A number of regulatory practices and management methods were formulated to ensure timely completion within accepted quality and customer compliance, which included project quality feedback and maintenance regulation, and customer satisfaction measurement method. As a result, the company promoted a client-centered service orientation where the employees were imbued with the consciousness of intuitively serving clients.

New incentive mechanism The new incentive mechanism involved the reward system and position allocation. Employees’ salary was transparent in Longyuan since its inception. Traditionally there was little salary gap between major contributors and ordinary employees. The reform aimed to eliminate the “iron rice bowl” mentality and enhanced employees’ efficiency. The new reward system, which included a basic wage, position wage and bonuses, was established and directly linked to employees’ position and performance. The company also specified job positions in detail, including the responsibilities of job positions, the process of work, expected relationships and norms between superiors and subordinates, and the technical content of every position.

Innovation capability Longyuan built up a culture of innovation, instilling spirits of innovation and teamwork through the involvement of all employees. It set up research groups in specialist areas such as verticality control in high-rise construction, foundation excavation, and mass concrete construction. A research center was established to spur technological improvement and innovation in 1995. The research and innovation activity focused on enhancing the project implementation through improvements in technology and construction materials. The research center had become the vehicle to further promote enterprise competitiveness with technology innovation. The company also strongly encouraged employees to participate in innovation and enhanced its technological and innovative capability. Innovation bonuses were given to employees

who made special contribution beyond the job description.

Recruiting, cultivating and promoting talents were a key task of Longyuan. The company provided employees with career planning and development opportunities within a healthy environment. The employees were encouraged to seek work that challenged them. To actively pursue technology improvement and innovation, it recruited competent engineers and technicians regularly and paid them attractive salaries. Thus, the corporate family of Longyuan consisted of various individuals with strong personalities and capabilities.

Company reputation and brand Having achieved operational excellence, Mr. Lai realized that premium projects with quality alone did not spell success in the domestic market. A well-known brand would provide for quick communications to the marketplace through the news media. Thus Longyuan introduced the Corporate Identity System (CIS), the first construction company to do so in China. Through the CIS, Longyuan's brand was well publicized and promoted. The core contents of Longyuan brand included its corporate ideals, external image, and unity of vision in the development of the corporation. As quoted by Mr. Lai:

“An established brand will create a good perception of product in our clients' mind. We imbue good service in our brand. In the eyes of the clients, the ‘Longyuan’ brand is associated with good quality and service. The more we establish our brand, the more market share we acquire.”

5.4.3 Competitive Strategy of Longyuan

Top management of Longyuan identified two specific goals that drove the company decisions and competitive strategy: to penetrate the Shanghai construction market, and to become a large-scale, highly profitable general contractor. The company focused on low cost, product differentiation through quality and delivery strategy to achieve its goals and improve its competitiveness.

Low cost strategy Longyuan focused its attention on cost competitiveness and applied stringent control on project management. In an atmosphere of intense competition, the company adopted a matrix organization to balance the resources and coordinate across

different functional departments. Cost accounting system was instituted to ensure that the project was completed within the approved budget.

Longyuan applied a project management organization which combined the standard vertical hierarchical structure with a superimposed lateral entity of the project coordinator (Figure 5.2). The selection and procurement of project coordinators were regulated by the company's office of management. Project coordinators had access to all three departments of engineering, accounting and operation. They cooperated with project manager in identifying project requirements and developing scope of work for projects. They monitored the procurement and use of labor, materials and equipment. More importantly, they examined the percentage of work expected to be completed at various time periods to which the costs would be charged. With the cooperation of the project coordinator, project manager could allocate manpower, material and equipment according to characteristics of different project stages throughout the construction process. The project organization resolved the conflicts which arose over the relative priorities of multiple projects in the competition for resources. It decreased the internal transaction cost and improved material management efficiency.

Figure 5.2 Project organization structure of Longyuan

Cost accounting system included cost procedures, methods of determining costs, points of cost accountability, cost comparisons, and budgets (operational, project, and capital). The cost accounting obligation was to provide accurate cost information of projects. It supported understanding of the nature and behavior of cost, tracked and gave feedback on value creation and assisted management in proper use of resources. Implementing the cost accounting system in Longyuan aimed at the right targets of analysis, provided accurate cost information and reliably supported management decision-making. The cost system helped the company realign resources when the project priorities changed and promoted project cost control.

Quality strategy Longyuan was a leading provider of quality products and services in Shanghai. The company aimed to be creative and innovative in the process and provide expertise, skills and knowledge at the disposal of its clients. In order to control and maintain a high quality of projects and services, Longyuan established a quality control system built on the principles of total quality management.

As shown in Figure 5.3, top managers acted as leaders to demonstrate responsibility for quality in the implementation of quality control system. The quality goal of Longyuan was to achieve “first class management, high quality products, and fine credible service”. The organization learning was exemplified by company-wide training, continuous self-improvement, and managerial learning among its employees. Moreover, a variety of avenues contributed to reinforce the employees’ commitment to quality, which included frequent discussions about company quality strategies, regular management quality reviews, and communication of good quality control experience.

The quality process management practices contributed in totality to the continuous improvement of products and services. One of the first initiatives that the company carried out had been the introduction of standard processes to projects. The standard process was evaluated at fixed time periods and would provide an important indicator as to the state of the projects’ quality. Quality reward mechanism was developed for construction operations, including rewarding practices on quality accomplishment, incentive practices for model projects. This helped in attaining employee fulfillment, which were requisite for customer satisfaction. The quality control system significantly

improved the project quality. For example, construction execution rate of Longyuan increased to 100%, and excellent projects rate reached 80% by implementing the quality control system. Moreover, the quality system provided the company benefits in reduced rework and cycle time, high customer satisfaction, and profits improvement. It also strengthened its competitive advantage in bidding by better quality and reputation.

Figure 5.3 Quality control system of Longyuan

Delivery strategy To monitor and improve project delivery, Longyuan widely used scheduling techniques, such as bar charts and the critical path method (CPM), to match the resources of equipment, materials and labor with project work tasks over time. The company also adopted a variety of special techniques to solve specific circumstances or problems, such as scheduling in the face of uncertain estimates on activity durations. Training courses were developed for project managers, engineers and technicians on the use of scheduling techniques and tools. The courses taught effective construction and maintenance scheduling for time-sensitive projects. Through application of scheduling techniques, the company could eliminate problems due to production bottlenecks, facilitate the timely procurement of necessary materials, and otherwise insure the completion of a project.

The company also developed its own best practices to improve and assure project delivery, which were team building and project change management. Table 5.4 shows the team building and project change management activities adopted by Longyuan. Team building in Longyuan was the specific project process designed to improve project execution and results in effective relationship among team members. The company set up a conducive environment where team members were comfortable with each other. Cooperation and good communication were encouraged among the team members. Project change management practices emphasized on the proactive approach to managing change and its impact in a timely manner and not simply procedures to handle changes after they occurred. The company advocated the change culture and project changes were classified and evaluated before implementation. While proper coordination among team members avoided delays and costs resulting from fragmentation of services, the effective change management brought the positive effects on project schedule and dealing more promptly with changes.

Table 5.4 Team building and project change management activities adopted by Longyuan

Approach	Activities
Team building	<ul style="list-style-type: none"> ● Establish a safe environment where team members are comfortable with each other ● Allow team members to open up and take risks within this environment ● Provide recognition for each team member of their own value to the team ● Start team members collaborating together ● Plant a seed towards growing team spirit
Project change management	<ul style="list-style-type: none"> ● Promote a balanced change culture ● The defined scope of work is required to recognize and manage change ● Classify the change as required or elective ● Evaluation of changes ● Implement change after approving ● Continuously improve from lesson learned

5.4.4 Competitive Advantage and Performance

Longyuan has grown from a regional construction SMEs to a big contractor in the past two decades. The company developed core competencies in the field of civil engineering and building construction and was able to assure the timely delivery of various types of projects. It improved its technical innovation, developed sound strategies so that it could exclusively meet the need of its clients and eventually grow and develop under the increasingly competitive construction market. Consequently, the company's growth and development witnessed a steady increase in employee number, sales and profit. Longyuan had 19 subsidiary companies with 15,000 employees by 2000. Its turnover was RMB 1,828.6 million and the profit was RMB 70.78 million. Its output increased 11 times compared to that in 1991. Figure 5.4 shows the sales growth of Longyuan in 1990s. It was awarded "National Excellent Building Construction Enterprise" and "National Consumer Satisfaction Enterprise" for its good enterprise management and excellent performance.

Source: www.lycg.com.cn

Figure 5.4 Sales growth of Longyuan in 1990s

5.5 Case Study Three: Baoye

The third case study company is named Baoye Group Company Limited in Zhejiang province of China. Baoye was established as a small collective contractor with 68 employees and RMB 2,000 loaned from the local government in 1975. At the time, the company mainly undertook simple projects assigned by the local government. The President, Mr. Pang Baogen, was responsible for the company. Baoye had been capitalizing on the rapid growth of the Chinese construction market and seizing the opportunity of market-oriented reform. It continuously improved its marketing and innovation ability so that it was capable of responding quickly to the market demand and was equipped with new construction methods and techniques. After 30 years of steady growth, the company has successfully evolved from a pure construction company to an integrated enterprise that includes construction, prefabricated building materials and property development. Currently, it is a nation-wide company with assets of RMB 3.5 billion and more than 42, 000 employees.

5.5.1 Challenges facing Baoye

Under the planned economy, the main objective of Baoye was to meet the planned completion target assigned by local government. As the construction industry transformed toward an open market economy, the company encountered internal management difficulties brought by the former planned system. As the company grew and sought to develop further, it faced the problem of some of managers not able to keep up with the skills needed to operate the firm. The lack of advanced technical and managerial knowledge available to the company became an increasing constraint on its growth and development. The main challenges facing Baoye are summarized as follows:

Government control and intervention Government control and intervention were the major source of problems for Baoye. Under the planned economy, the local government appointed the manager of the company and set the general policy for the company's operation. The government's decision for investments and production was mainly based on political considerations, which might not yield profit. The company experienced

redundant employment and increasingly heavy social burden. It lacked not only the motivation to improve and innovate, but also the right to act independently.

Management mechanism challenge Under the market-oriented economy, the company was no longer assigned construction work by the local government. It had to source for work through market competition. “In the ever increasing market competition, the external constraining factors are, of course, significant consideration in the firm’s decision making,” as mentioned by Mr. Pang, “but for organization itself, appropriate management is the most crucial and decisive determinant for the firm’s performance.” The company needed to restructure its management mechanism so that it could be market-oriented and flexible to respond to market changes.

Challenge of employee quality Due to low capitalization, Baoye mainly hired its employees from the rural area. Without a high level of education and systematic professional training, such a workforce constrained its technical advancement and management efficiency. Another challenge was its weak marketing force. The marketing staff did not understand the concept of marketing. They did not have a clear idea of how the product could be promoted and sold in the marketplace, owing to the conventional mindset under the planned system in which the state took care of all finished products.

5.5.2 Capability and Development

When facing challenges, Mr. Pang and his management team carefully studied and analyzed the way for the company to survive and compete. They realized that if there were no fundamental transformation made to the company, it would not survive any longer in the market. Thus Mr. Pang and his management team started to implement a three-stage reform and capability development efforts to improve its competitiveness.

Three-stage reform Under the leadership of Mr. Pang, the company adopted a three-stage reform to restructure its ownership and management mechanism. The first stage was to change Baoye’s ownership system and management mechanism. In the early 1980s, enterprises’ reform had to be approved by government before they could be put into practice. Mr. Pang prepared a detailed plan and submitted to local government for

reforming the ownership and improving management mechanism. His courage and strong will to turn around the company, and his well-planned strategies convinced those government officials and experts. As a result, they accepted his proposal. With the approval of the local government, the company obtained sufficient autonomy to operate and made strategic decisions. It introduced market-oriented incentives and disciplines to enhance its employees' efficiency and established a flexible management system to improve its competitiveness.

The second stage involved the shareholding reform to transform management mechanism. Baoye adopted the mode of a joint-stock cooperative approach to meet its urgent need for capitalization in 1990s. The type of joint-stock cooperative might be similar to a trust fund for employee pensions. The share was owned by employees as a whole and benefits from the share were distributed mainly according to seniority. The company further developed a monitoring mechanism that helped to avoid high costs of collective decision-making, check insider control, and mobilize internal financial resource. Power and responsibilities of the stockholders, board of director, supervision committee and management were clearly specified so that managers and employees knew their roles in the organization.

The third stage involved asset restructuring and system transformation. The right internal relationship between its headquarters and its subsidiaries was established based on the requirements of modern corporate system, with clear definition of ownership, authority and responsibility.

Marketing capability Baoye relied heavily on developing suitable and appropriate marketing competency in the industry. The development of marketing capability involved building proper relationship to find opportunities that were advantageous to the company. The company adopted two main approaches to develop relationship (Guanxi). The first approach was to employ local government officials so that it could build connections with their previous government departments. As a result it enjoyed the market information and new opportunities provided by this channel. Another approach was to make donations publicly. Donation to regions in which the company was doing

business was one effective way of building good relations with the local government. The company donated RMB 7.8 million in educational facilities and community centers to regions in Hubei province and Jiangxi province in 1990s. Such donations engendered goodwill and reciprocity from the local government. Such relationships helped Baoye not only gain new market information (by actively networking with government officials), but also enter into new markets in a natural, effective and less risky manner.

Baoye introduced management information system (MIS) to enhance its marketing capability. Traditionally, Baoye had not devoted many resources to the marketing function within the firm. Prior to 1990, employees who were assigned marketing responsibilities had little formal marketing training. Marketing efforts were generally undertaken without any overall plan to guide them. In 1991, the company enlisted the assistance of consultants in the areas of marketing, quality control and accounting. Mr. Pang was receptive to the suggestions that were offered by these experts and had made major decisions for the company based on their advices. For example, as a result of the recommendations of a marketing expert, Baoye had created a client control system that tracked data, set goals and reviewed performance on a regular basis. Changes were also made in marketing activities and staffing patterns as a result of the inputs of consultants.

Technical innovation Baoye attributed its success in large measure to the technical innovation it had implemented throughout the company. Because of the construction boom, Baoye had multiple opportunities to apply a new technology to projects. Further, the company had the right to charge subsequent projects for use of the technology it had developed. The potential profits encouraged the company to be innovative because the benefits of innovation would be increased. A prime example of this motivation and its benefits was the high-performance concrete utilization that had become a model to be emulated in Zhejiang province in 1985.

The company had been improving its technical innovation with two approaches. One approach was to develop cost-effective and high-quality building materials, including light steel structures, ready-mixed concrete, large roof sheathings and fireproof materials. The company was the first in Zhejiang province to introduce high-performance concrete

production equipment. It invested in production line facilities for steel components, and carried out application of wooden fireproof materials. Another approach was to make process innovation in construction method and process techniques. The company introduced and creatively used management information system and CAD design system to increase organizational management efficiency and improve the capability of new process development. It established a research and development center to develop new products and advanced construction technology. In 1997, the company conducted residential and industrial research project, which was supported and funded by the MOC. Table 5.5 summarizes the types of innovation of Baoye. By developing high quality construction materials, new construction methods and techniques, the company enhanced productivity, increased project quality and improved its competitiveness.

Table 5.5 The types of innovation of Baoye

Type of innovation	Activities of Baoye	Scope of each activity in Baoye
Product innovation	Construction materials manufacturing	<ul style="list-style-type: none"> ● Strong emphasis on high performance concrete, especially in concrete piles and concrete ducts ● Using waste products for bricks and wood chipboard ● Seeking alternatives using solid brick for residential construction
	Adding flexible modes in exploring new products and new equipments	<ul style="list-style-type: none"> ● Encourage related department and employees to develop new products and new equipments ● Build partnership with both domestic and international partners to develop new products
Process innovation	Construction method	<ul style="list-style-type: none"> ● Advance in pile manufacture and driving ● Advance in soft and expansive soil compaction and construction techniques.
	Improvement on process techniques	<ul style="list-style-type: none"> ● Operational CAD systems for integrated design and construction of high rise buildings
	New technical processes research	<ul style="list-style-type: none"> ● Residential Industrial Research project, supported and funded by MOC

Human resource development Mr. Pang explained that “Human capital is the core of Baoye” since everything in the company was accomplished by its employees. It not only attracted talents from all over China, but also developed and trained them to the fullest. Some senior managers were recruited and selected from Shenzhen, China’s first Special Economic Zone which was a test-bed for the market economy. The company also recruited MBAs and college graduates. Employee development and training played a significant role in the company’s operation. The company kept sending its core technical and marketing managers to acquire advanced knowledge at local and overseas universities. When these employees completed their training, they were required to train other workers to make them well acquainted with market development trends and changing client expectations. By 2000, one third of the company employees received college education by various means, which was not a common practice for a traditional construction firm in China.

5.5.3 Competitive Strategy of Baoye

Baoye made it very clear at the beginning to all the employees that the success of the company depended on competitive strategies of low cost and high quality, and these strategies relied on employees’ loyalty and commitment. Besides its own R&D effort, it also forged close collaboration with research institutes and universities to enhance its technical know-how and promote technology development.

Low cost strategy Baoye adopted two approaches to control its cost, which included simulation of market cost and internal financial accounting. Simulation of market cost was used to introduce the market prices system into the transactions among all the departments of the company. The cost of all the projects were calculated using the market prices as index of materials bought from the market. This method was particularly important for employees who had worked their entire life under the planned system and had no idea of market competition. Detailed calculation and simulated market environments helped the employees understand what was going on in the market. The most important thing was that all the employees came to realize how significant cost saving was to the company’s survival and development. Ever since introducing the

simulation of market cost, employees worked hard to cut costs in labor, administration, and especially in materials.

The major purpose of establishing internal financial accounting for each functional department of Baoye was to set up a company price system, which was similar to the cost center in the western management. Transactions among departments inside the organization were dealt with the same as those among firms in the market. Compensation and rewards were made much easier and employees were highly motivated to exert their best in both cost saving and department growth, as they knew that if they worked towards the department interest, they would bring home more income.

Quality strategy Baoye established an excellent quality assurance system to improve its project quality level. The quality assurance system was consisted of quality policy and assurance procedure. The vice president of operations crafted a quality policy that was ratified by the senior management team and signed by the president. The quality policy articulated the importance of quality to the organization and defined the quality responsibilities of all employees. Poster-sized copies of the quality policy were framed and posted in the company offices. The quality assurance procedure provided the necessary means to capture the ongoing problems and provide for preventive actions. As indicated in Table 5.6, the procedure included quality precautions, source and sequence of activities in preparatory, startup and production phase. The vice president of operations led the implementation of the quality assurance system. He reviewed the quality policy and assurance procedure at a monthly production meeting.

With implementation of quality control management, Baoye could provide its clients with reliable and high quality projects and services. It reduced quality defects and received 100 percent client satisfaction. Moreover, the company has been achieving ISO 9000 certification for its quality management system since 1993. Based on the certification, it had a good quality system, including a quality assurance standard of construction, building and service.

Table 5.6 Quality assurance procedure of Baoye

Each phase of construction	Content of each phase
Preparatory phase	<ul style="list-style-type: none"> ● Review all contract requirements ● Ensure compliance of component material to the contract requirements ● Coordinate all submittals including certifications ● Ensure capability of equipment and personnel to comply with the contract requirements ● Ensure preliminary testing is accomplished ● Coordinate surveying and staking of the work.
Startup phase	<ul style="list-style-type: none"> ● Review the contract requirements with personnel who will perform the work ● Inspect startup of work. ● Establish standards of workmanship ● Provide training as necessary ● Establish detailed testing schedule based on the production schedule
Production phase	<ul style="list-style-type: none"> ● Conduct intermittent or continuous inspection during construction to identify and correct deficiencies ● Inspect completed phases before scheduled clients acceptance ● Provide feedback and system changes to prevent repeated deficiencies

Partnering strategy Baoye formed external collaboration with both domestic and international partners. Driven by increasing competition at domestic market, rising cost of technology development, and the desire to share the risks associated with the generation and commercialization of construction technology, Baoye had adopted collaboration with research institutes and universities in cooperative technology development. Table 5.7 summarizes the partnering activity of Baoye in 1990s. It built up strategic partnerships with Zhejiang Research Institute of Construction Science and Design, Suzhou Concrete Research Institute, and Zhejiang University. It also entered into a cooperation agreement with Japan's Daiwa House Industry Co., Ltd. ("Daiwa House") to form a strategic alliance to develop technology for manufacturing industrialized residential units. The partnership helped the company to reduce risk, obtain enough research capital and enhance its technical know-how. It also paved the way for possible

further co-operation and joint venture between the company and its partners in the future. Partnering had enabled Baoye to explore complementary strengths, pooling of resources and profit sharing. Moreover, it achieved the final innovation objective and also managed to exert control over the whole innovation process.

Table 5.7 Partnering activity of Baoye in 1990s

Types of partner	Research institute and university	Supplier
Partners	<ul style="list-style-type: none"> ● Zhejiang Research Institute of Construction Science and Design ● Suzhou Concrete Research Institute ● Zhejiang University 	<ul style="list-style-type: none"> ● Japan's Daiwa House Industry Co., Ltd
Dimensions for cooperation	<ul style="list-style-type: none"> ● Combined research resources ● Complementary expertise 	<ul style="list-style-type: none"> ● Distribution channel ● Manufacturing resource
Benefits	<ul style="list-style-type: none"> ● Overcome research resource disadvantage ● Technology development ● Advanced construction material production 	<ul style="list-style-type: none"> ● Increase strength ● Improve technical know-how ● Obtain advanced experience

5.5.4 Competitive Advantage and Performance

In the past 30 years, Baoye has developed from a regional construction SMEs into a conglomerate enterprise. At present, it is the largest and most profitable privately owned construction enterprise in China. Baoye's competitive advantage in the industry is in projects with technical entry barriers and high-profit margins, including public works, city and town planning, and transportation projects. It obtained its premium class certificate for general building construction contracting works in 2002, the highest qualification awarded by the MOC, allowing it to undertake construction projects of any scale and complexity. In June 2003, the company issued H shares and listed on the main board of Hong Kong Stock Exchange, which enabled it to have access to international capital market in line with the advanced management mechanism. Its turnover was RMB 4.38 billion and the profit attributable to shareholders was RMB 275 million in 2004. The

company has received “National Excellent Building Construction Enterprise” and “National Science and Innovation Enterprise” awards for its excellent performance.

5.6 Summary of Case Studies

The three case studies included in this research add value by providing a variety of instances of both the theoretical literature and the findings from survey. The case studies illustrate the link between theory and practice as it relates to the relationship among the core capability, competitive strategy and industry structure in the construction SMEs and their success. Table 5.8 summarizes the main elements of three case companies.

During the transition to a market economy, Chinese contractors have been pushed into the market to compete for survival. In internal conditions, the three case companies encountered serious internal operational difficulties caused by the former planned system. They suffered from operating inefficiencies due to poor management skills, outmoded equipment and technology, and old operating mechanisms. In external environment, the reform and rapid development of Chinese construction created a favorable macroeconomic environment. Meanwhile, they also faced intense competition from the new entrants. Facing the challenges from internal conditions and external environment, the three case companies created and sustained their competitive advantage by developing firm-specific capability to overcome internal weaknesses while adopting effective strategies responding to environmental opportunities and external threats.

In the three cases, the companies’ development is the result of entrepreneurial capability. In the case of Guangsha, the entrepreneur identified the importance of market, employees and efficiency. He took a systematic process of reforming its organization and improving its competitiveness. The entrepreneur in Longyuan emphasized on improving construction and service quality and enhancing innovation capability. In the case of Baoye, the entrepreneur identified the major challenges for their development and took actions toward turning the company into a competitive modern enterprise. In the three instances, the entrepreneurs exhibited the characteristics of self-confidence, vision, the ability to manage change and risk-taking.

Table 5.8 Main elements of the three case companies

	Guangsha	Longyuan	Baoye
Main challenges	<ul style="list-style-type: none"> ● Challenge for company's organization ● Challenge for cost management ● Challenge for quality control ● Access to financing 	<ul style="list-style-type: none"> ● Challenge for building client-relationship ● Challenge for quality management ● Challenge of compensation mechanism ● Challenge for brand management 	<ul style="list-style-type: none"> ● Government control and intervention ● Management mechanism challenge ● Challenge of employee quality
Core capability			
Entrepreneur capability	<ul style="list-style-type: none"> ● Manage change ● Vision of development ● People-orientation 	<ul style="list-style-type: none"> ● Great adaptability to change ● Proactiveness ● Risk-taking 	<ul style="list-style-type: none"> ● Manage change ● People-orientation ● Risk-taking
Marketing capability	<ul style="list-style-type: none"> ● Set up business development unit to improve marketing capability 	<ul style="list-style-type: none"> ● Build clients relationship ● Promote reputation and brand through CIS 	<ul style="list-style-type: none"> ● Employ government officials ● Make donations publicly ● Introduce MIS
Innovation capability	<ul style="list-style-type: none"> ● Conduct shareholding reform ● Develop new method and technology ● Establish research institute 	<ul style="list-style-type: none"> ● Improve technology and construction materials ● Competent professionals ● Set up research center 	<ul style="list-style-type: none"> ● Product innovation ● Process innovation ● Human resource development
Competitive strategy			
Cost	<ul style="list-style-type: none"> ● Project planning ● A cost budget system ● Central procurement mechanism 	<ul style="list-style-type: none"> ● A matrix project organization ● Cost accounting system 	<ul style="list-style-type: none"> ● Simulation of market cost ● Internal financial accounting
Quality	<ul style="list-style-type: none"> ● Three-in-one quality management system 	<ul style="list-style-type: none"> ● A quality control system 	<ul style="list-style-type: none"> ● A quality assurance system
Delivery		<ul style="list-style-type: none"> ● Use scheduling techniques ● Team building ● Project change management 	
Partnering	<ul style="list-style-type: none"> ● Build partnerships with clients and suppliers 		<ul style="list-style-type: none"> ● Partnering with research institutes, universities and suppliers

The three case companies also focus on developing their marketing and innovation capability. Guangsha established a business development department to grasp market information and build relationship with local government and clients. Thus it realized the transformation from the product-oriented company to a market-oriented one. Longyuan developed its marketing capability through building good reputation and brand to acquire more market share in the domestic market. Baoye employed government officials and made donations so that it could gain market networking and obtain good reputation. The three case companies have been successful in improving their innovation capability, which is compatible to the findings of the survey. Guangsha started its shareholding reform in 1992 and became the first shareholding firm in Chinese construction industry. It also continuously enhanced the quantity and quality of its know-how. Longyuan set up research groups and introduced professional talents to promote enterprise competitiveness with technology innovation. Baoye focused on innovation activities in production and process. It improved its technology and equipment through systematic deployment of new methods, materials and technique.

Similarly, in the three cases the initial efforts of marketing led to their rapid development. The case studies provide an in-depth look at how these companies have adopted their competitive strategies that are a critical part of their development. To achieve low cost advantage, both Guangsha and Longyan established their own cost control mechanism to reduce cost in operation, administration, material and labor cost. Baoye adopted simulation of market costs and internal financial accounting to control its cost. All the three companies emphasized on project quality. They implemented quality assurance system, such as TQM, and set up practical measures to achieve high quality. For example, Guangsha developed its own quality policy and quality objectives. Longyan established the quality control system. The delivery system aimed to complete project contract on time. Longyuan widely applied scheduling techniques, strengthened team building and project change management to complete projects in a timely and efficient fashion. Partnering also helped the case companies to increase market share and improve new techniques by exchanging resources for mutual benefit. While Guangsha practiced partnering with clients and suppliers, Baoye built partnerships with research institutes and universities and suppliers in

cooperative technology development. Partnering enabled them to explore complementary strengths, resource sharing and profit improving.

The three case companies indeed combined core capability with competitive strategies and dynamic fit. The success of the three case companies was largely attributed to their entrepreneurs' capacity to conduct reform and develop competitive strategies that were compatible with the environment. The diffusion of marketing practices, such as customer relationship networks, government relationship, and company reputation strongly impacted competitive positions. In the case of Longyuan, the broad-based clientele relationship helped the company to improve project quality. Baoye developed relationship with government officials and achieved the opportunities to enter into new markets. The development and adoption of innovations could be important aspects of the case companies' strategic role. This proactive development of innovation capability required careful decision-making as well. For example, the prior development of innovation capability made it easier to acquire competitive positions, such as those related to short production runs, fast turnaround and delivery times. This dynamic element of strategy called for a more collaborative and decentralized process of strategy.

In summary, the three case companies have been successful at identifying their competitive advantage, which supports the findings of the survey. Specifically, the case studies provide examples of how to develop core capability and competitive strategy for construction SMEs to compete in the domestic construction market and succeed in their business.

5.7 Conclusion

This chapter has focused on the findings from the three case studies conducted in this research and their relevance to the theoretical literature and findings of survey. The case studies provide an in-depth look at how the three case companies have maximized their competitive advantage that is a critical part to their development. Just as the case companies exemplify the theoretical literature that is germane to this study, so do they provide examples of some of the general findings from the survey. Next, Chapter 6 will present the conclusions that are accrued as a result of the research.

Chapter 6 CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

6.1 Introduction

The chapter summarizes the main conclusions and contributions made by the research. It aims to present potential implications of the results in lights of the research problem and the theoretical framework presented respectively in Chapter 1 and Chapter 2. It also addresses the limitations of the current study and provides directions for future research. This chapter is divided into six sections. A summary of the research is first presented, followed by research implications for theory development and managerial practices. The limitations of the study and directions for future research are presented next. Finally, a brief summary of this study is given.

6.2 A Summary of the Research

6.2.1 Research Objective

The purpose of this research was to contribute to the literature by integrating the industrial organization approach and the resource-based view, and investigating how construction SMEs in China competed for success via the use of core capability and competitive strategy. To this end, the current research aimed to answer the question “How can construction SMEs create and sustain their competitive advantage in the Chinese construction industry?”

A review of prior research focusing on the determinants of competitive advantage indicates that research has predominantly emphasized either an external analysis or an internal analysis. Research that emphasized an external analysis has argued that it is the structure of the industry or the environment in which a firm operates that

determines performance. At the other end of the continuum, the emerging perspective of the resource-based view and its philosophical roots, have suggested that the internal resources and capability of a firm provide it with the efficiency required to achieve superior performance. The possibility that factors from both ends of the continuum could explain variance in business performance has been rarely discussed. Therefore, an attempt was made to integrate these streams of literature and develop an integration framework of competitive advantage for construction SMEs in China.

The literature on construction SMEs in China also suggests that the development of construction SMEs is a process of both within-firm decision-making and external environment. While the former is guided by internal operation mechanism and by motives of efficiency, effectiveness and profitability, the latter is affected by strategic industry factors that impact the firm. Hence, construction SMEs should devote the necessary resources to strategic activities that could result in the development of competitive advantage.

With respect to the research problem, a theoretical framework for construction SMEs' competitive advantage was developed through organizing the existing theories and findings in studying construction SMEs. The framework proposed that construction SMEs' performance was critically dependent on three key constructs: core capability, competitive strategy and industry structure. Based the conceptual model, hypotheses were built up to test patterns of core capability, competitive strategy and industry structure. The hypotheses were further organized into four major dimensions, which include (1) core capability and performance, (2) competitive strategy and performance, (3) core capability, competitive strategy and performance, and (4) moderating role of industry structure.

6.2.2 Research Method

Research design adopted in this study was to use both quantitative and qualitative methods with equal importance in understanding the competitive advantage of construction SMEs in China. The quantitative stage involved mainly the development

of instrument and the testing of the hypotheses. The design and development of survey instrument was to adapt and update the existing instruments for core capability, competitive strategy, and industry structure. Based on the data collected from construction SMEs in China, the model was empirically tested using statistical method and was determined to be consistent with its theoretical underpinnings. The qualitative stage of the research involved case study analyses conducted to illustrate the findings from the survey. It was used to mainly address the research concerning what capability and strategy were required by construction SMEs to create and sustain their competitive advantage within the domestic market.

6.2.3 Summary of Research Findings

Based on the data collected from construction SMEs, the empirical findings of the study suggested that core capability, competitive strategy and industry structure related factors had their impacts on the construction SMEs' performance. In particular, the research findings indicate that:

First, research findings suggested that core capability, including entrepreneur marketing and innovation capability, exhibited significant impact on the construction SMEs' performance. Thus core capability could be used to create competitive advantage and in turn enable construction SMEs to achieve superior performance. This result was consistent with the resource-based view in that it is the internal capability of a firm providing the efficiency required to achieve superior performance (Prahalad and Hamel, 1990; Hall, 1993).

Second, research findings indicated that competitive strategy, which measured by cost, quality, delivery and partnering, determined construction SMEs' performance. Research findings stated that cost, quality, delivery had significant impacts on the construction SMEs' performance. Partnering was partially related to construction SMEs' performance. Therefore, construction SMEs could adopt competitive strategy to create competitive advantage and in turn outperform their rivals. This was consistent with the industry organization approach that the firm's performance was proposed to be determined by firm conduct and industry structure (Porter, 1985;

Bharadwaj *et al.*, 1993).

Third, research findings showed that there were positive relationships between core capability and competitive strategy. Further, the range of correlations between competitive strategy dimension and construction SMEs' performance varied significantly in different core capability clusters. Thus, core capability's fit with competitive strategy was a significant predictor of construction SMEs' performance. This suggested a need to align core capability and competitive strategy as a precondition for superior performance. These results were consistent with the findings that there were fit among the relationships of resource-based capability, strategy and firm performance (Chandler and Hank, 1994).

Finally, research findings suggested that industry structure, measured by market entry barrier and competitive pressure, had partially impacted as a moderator on the effect of competitive strategy and construction SMEs' performance. These results were consistent with the findings reported in recent research that industry structure factors are not critical predictors of variance in performance (Hansen and Wernerfelt, 1989; Rumelt, 1991). In general, the results also brought into question regarding the importance of industry structure factors.

6.2.4 Summary of Case Studies

The case studies provided three renowned Chinese construction firms as the subject, namely Guangsha, Longyuan and Baoye. Data for the case studies were drawn from interviews, review of documents, journal papers, magazines, and websites. The case studies demonstrated the link between strategic management theory and practice as it related to the relationship among core capability, competitive strategy and industry structure in the construction SMEs and their success. Moreover, they provided an in-depth look at how the three companies developed their core capability and competitive strategy that were critical to their development. The case studies further strengthened the use of the conceptual framework for construction SMEs to improve their competitive advantage in the construction market.

6.3 Implications

The findings of this research have implications for both existing academic theory and research and also for management practice. The implications of this research for theory and practice will be described in detail next.

6.3.1 Theoretical Implications

The major theoretical implication of the research is that it synthesized and integrated the industry organization approach and the resource-based view to build an expanded notion of competitive advantage. It provided a more accurate and less biased picture of the determinants of construction SMEs' performance, than was possible when investigation within each field was constrained by disciplinary boundaries. Such a flexible model captured the dynamic nature of competition that evolved over time. The academics can find value in the identification of statistically reliable measures that will be used in further research designed to develop theoretical foundations that will explain the success of small firms.

The findings of the study provided an empirical support to the principles of the RBV which suggest the positive relation of firm-specific resources and capabilities connected to the success of small firms. As the discussion of RBV in connection to innovation management within the small firm was relatively rare in the literature (Hadjimanolis, 2000), this research has revealed some elements and gave a new perspective on SMEs' innovation capability. Moreover, it examined and confirmed the positive relationship between innovation capability and construction SMEs' performance. Technical and managerial expertise, internal technological resources (competence in technology and process, IT technology), and innovation on finance and operational mechanism explain to a considerable extent the differences in innovation behavior of small firms.

The findings of the study also have implications on the strategic management theory. Researchers took environmental factors as moderators and attempted to investigate environmental conditions under which a specific strategy is more or less effective

(Covin and Slevin, 1990; Sandberg, 1986). This study generalized these findings to a transitional economy where market power is emerging while planned mechanism still works. This study advanced the literature by incorporating industry structure factors as moderators. The implication is that the interactions between the industry structure factors and competitive strategy have their impacts on construction SMEs' performance. Thus, by focusing on industry structure factors and competitive strategy, it contributes to an understanding of the conditions under which competitive strategy could be implemented effectively.

Finally, the study advances research on SMEs in transitional economy. As most early studies in small business have focused on the context of advanced market economy, small business development in transitional economy remains by and large an unexplored and important agenda (Nee, 1992). Researchers call for the study to examine the critical factors influencing small business's competitive advantage in China (Luo, 1999). Based on a comprehensive literature review in the strategic management areas and field interviews of managers in the construction SMEs in China, this study proposed that construction SMEs' competitive advantage could be affected by core capability, competitive strategy and industry structure. Though not exhaustive, empirical results of the study showed that these dimensions did exist in construction SMEs. The classification of the three dimensions further established the base for investigating the impact of the interactions between these dimensions on construction SMEs' performance.

6.3.2 Managerial Implications

The findings of this study also have implications for management practice. Specifically, the result of this research may be useful for management practitioners who are involved in the development of construction SMEs.

Core capability provides a viable means to promote successful company performance. While the influence of core capability on construction SMEs' performance is not always consistent, small business may gain a great deal from developing and pursuing a well-defined set of core capability. Accordingly, managers in construction SMEs

should carefully design the process through which these core capabilities are developed and implemented. Such a process should ensure the fit between a company's strategic choices. Without coordination between core capability and competitive strategy, investments in marketing activity and production innovation may not lead to superior performance. Conversely, when the fit is achieved, a firm can employ its capability to create a competitive advantage that supports its strategic goals and posture. For managers in construction SMEs, the results support the prescription of thoroughly assessing resources and capabilities before choosing and pursuing a competitive strategy.

The findings that core capability and competitive strategy are prime determinants of business performance should be a source of encouragement to marketing managers in construction SMEs. These findings are especially of interest to marketing managers, in that they play an important role in developing, maintaining and enhancing both business reputation and the equity in the brand owned by the business unit. Furthermore, as indicated from Hall's (1992) survey, core capability has long replacement periods and therefore companies that are well endowed on these counts are likely to enjoy a competitive advantage that would be sustainable.

6.4 Limitations of the Study

Although this research established the existence of important links between core capability, competitive strategy and industry structure dimensions, there are several important limitations which have implications for future research. These limitations occurred as a result of the (1) research design, (2) data collection, and (3) operationalization of variables. These limitations will be described next.

6.4.1 Limitations as a Result of the Research Design

While the study utilized a cross-sectional field study to test the model and the hypotheses proposed in this research, most strategy management situations are dynamic. A longitudinal study that captures the dynamic components is necessary in order to provide greater validity to the results. A longitudinal study would also

enable the researchers to examine the interaction of construction SMEs' competitive strategy in response to specific capability and industry structure. Another limitation involved the case studies. Given the difficulties in data collection in China, there were financial and time constraints on the interviews and survey for case companies. Thus, the case studies may not have been as perfect as desired.

6.4.2 Limitations as a Result of Data Collection

Data collection has continued to be a problem for researchers, especially for those outside China. Detailed company-level data are not easy to access due to large geographical areas, disclosing information to others, etc. Although no significant non-response bias was found in this study, the relatively low response rate had resulted in the smaller than expected sample size, which was less desirable for the statistical precision and confidence of the study. Moreover, given the large number of variables involved, this small sample size had limited the ability to develop a casual model through the structural equation model. Thus, a much larger sample size would have provided stronger tests of all the hypotheses and greater confidence in the results.

6.4.3 Limitations as a Result of the Operationalization of Variables

The research has inherent limitations as a result of operationalization of variables. First, limitations may arise from the measurement of the core capability and competitive strategy. This study attempted to synthesize work from the literature of strategic management, industrial organization economics, and the resource-based view. Each field and each theory suggests a plethora of factors that could explain variance in core capability and competitive strategy. In this research, a limited set of variables were selected from each subset. It is quite likely that there are more factors that do account for the remaining variance in construction SMEs performance. For example, it is well recognized that process variables and organization structure variables also influence the operation of construction SMEs, and play an important part in explaining business performance (Ward *et al.*, 1995). There were only limited efforts undertaken to include them through the measurement of marketing and

innovation capability in this study.

Second, this research has built on the work of others in expanding the dimension of industry structure to be examined in this study. The measurements used in this study were based on managers' perceptions, and valid operational definition of industry structure. However, the industry structure measurements explored in this research are not exhaustive. Most notably, future efforts should include measures which capture industry concentration and growth, which are not explored in the research.

Finally, limitation of this research lies in the operational definition of business performance according to a five point scale, self-reported by the informants. The choice of the instrumentation reflects the sensitivity of performance information and the difficulty of collecting it in China. However, good models exist in the literature for collecting performance data using multiple items and for validating the results which should be used in future research. A more complete, multifaceted measurement of performance would allow better assessments of the reliability and validity of the construct, and therefore, enhance the confidence in the research findings.

6.5 Directions for Future Research

The limitations discussed above provide a basis for the direction of future research in this area. Thus, directions for future research in this section will be related to areas of improvement and extension in (1) research design, (2) data collection, and (3) operationalization of variables.

6.5.1 Direction for Research Design

Since construction SMEs are highly unstable in the transitional economy in China, a longitudinal approach may be adopted in the future. The longitudinal study is difficult to do and is time-consuming, but often it is the best way to assess causality (Frederickson, 1984). Using this approach may provide better understanding of how construction SMEs' core capability and competitive strategy change over time that can impact their performance. In addition, qualitative study, which includes more case companies in the future research, could further explore the manner in which core

capability and competitive strategy of construction SMEs are developed to achieve competitive advantage in the domestic market.

6.5.2 Direction for Data Collection

Future research should seek to overcome the limitation of this study by developing effective measures for data collection. As Internet is spreading quickly and widely in China, more Chinese enterprises go through the Internet to obtain business information and communicate. Thus the e-survey method, which allows secured submission of statistical information via Internet, may offer a potential solution. The e-survey method provides an efficient channel for fast, cheap and reliable collection and processing of business information. It also could decrease error rates and bring time and cost saving benefits. Another effective way is to reinforce the cooperation with institutions and university and utilize their resources to build up relationship with construction SMEs. For example, conducting short courses jointly with local universities for SMEs' benefit may help researchers to access managers and senior engineers of construction SMEs.

6.5.3 Direction for Operationalization of Variables

This finding suggests that the operationalization of variables should be further examined and refined prior to use in extensions of this research. First, future research is needed to incorporate organizational structure factors in the performance model. Researchers have proposed that structure has direct impact on performance (Child, 1988). Organization architecture allows a firm to generate and sustain organizational knowledge and routines that are distinctive to the firm (Langford and Male, 2000). Burn and Stalker (1961) found that successful firms in rapidly changing environment tend to favor a more "organic" structure characterized by decentralization and lateral communication. Other factors, such as formalization, complexity and centralization are used to measure the organization structure (Blackburn, 1982). Future research should address this issue to make the core capability dimension to be extended in the context of construction SMEs.

Second, the industry structure focused on two variables, including market entry barriers and competitive pressure. Other factors such as concentration, growth should be considered in the future research. With the transition of China's economy from the highly centralized planning economy to a market-oriented one, concentration becomes a concern of most construction enterprises (Wang and Yang, 2002). Future research should address this issue in order to better interpret the relationship between industry structure and construction SMEs' performance.

Finally, a good direction for future research would be toward validating the self-assessment performance measures with objective indicators. The construct of performance in the study was measured mainly by subjective data. Though the subjective data used in this study provided empirical support of most of the hypothesized relationships, the findings can be strengthened with more objective data. For example, other antecedents of performance such as return on investment, market position, and efficiency are also critical. These issues should be addressed in future research. Multiple measures of performance would also allow particular aspects of construction SMEs' performance to be explored.

6.6 Conclusion

This chapter summarizes the main conclusions of the thesis and contributions made by this research. The implications of these findings have also led to several imperatives that should be observed by any construction SMEs. This is then followed by recommendations made on possible future research directions, some of which would address the limitations that cannot be fulfilled by this research. Despite the significance of the study, it is worth acknowledging the exploratory nature of this study. It is hoped that the framework developed in this research will provide the theoretical foundation upon which more rigorous research can be undertaken in the future.

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APPENDIX

Appendix A: Questionnaire (Translated Version)

**A survey on the competitiveness of small
and medium-sized enterprises in Chinese
construction industry**

School of Civil & Environmental Engineering

Nanyang Technological University

Dear business owner/manager:

Construction SMEs in China have enjoyed rapid development since the adoption of the policy of economic reform and opening-up in 1980s. The SMEs have grown to be an important force in promoting the development of the Chinese construction. The research program at School of Civil & Environmental engineering, Nanyang Technological University, is committed to investigating how construction SMEs in China competed for success via the use of core capability and competitive strategy.

There are five main parts in this questionnaire. Please try every item in the questionnaire. While it will only take a few minutes to complete this questionnaire, your opinions will be highly valuable for us to evaluate the competitiveness of construction SMEs.

We assure you that your responses are completely confidential and will be used for the purpose of academic research. Your answers will be treated as confidential, and will be reported in a statistical form that does not identify any individual's opinion. In appreciation for your assistance, we will share you the findings of our study once we complete it.

Thank you for your time and cooperation. We wish you every success in your business.

Sincerely

Yan Shigang (PhD Candidate)
School of Civil & Environmental Engineering
Nanyang Technological University

..... Feedback

☐ I want findings of the questionnaire survey

Name: Position:

Company:

Tel No: Fax:

Email:

1. Please answer the following questions to best of your knowledge:

- (1) What is the number of full-time employees in your company?
- (2) How old is your company?
- (3) Where is the location of your company?
- (4) The sales in your company is:
 (a) < RMB 30 million (b) 30-300 RMB million (c) > RMB 300 million
- (5) Your company is:
 (a) Stated-owned (b) Collective (c) Private (d) Joint venture
 (e) Wholly foreign-funded

2. Please indicate the importance of the following environment factors to the best of your knowledge

Industry structure		Not at all important = 1 Extremely important = 5				
		1	2	3	4	5
1	Entry new construction market	☐	☐	☐	☐	☐
2	Access new clients	☐	☐	☐	☐	☐
3	Capital requirement	☐	☐	☐	☐	☐
4	Access to distribution channel	☐	☐	☐	☐	☐
5	Adaptability to local government policy	☐	☐	☐	☐	☐
	Others					
1		☐	☐	☐	☐	☐
The impacts of government, suppliers, competitors and clients		Not at all important = 1 Extremely important = 5				
		1	2	3	4	5
1	Government intervention	☐	☐	☐	☐	☐
2	The impact of suppliers	☐	☐	☐	☐	☐
3	The rivalry for competitor	☐	☐	☐	☐	☐
4	The loyalty of clients	☐	☐	☐	☐	☐
5	The threats of new entrants	☐	☐	☐	☐	☐
	Others					
1		☐	☐	☐	☐	☐

3. Please indicate the roles of the resources in producing core capability.

Entrepreneur capability		Not at all important = 1 Extremely important = 5				
		1	2	3	4	5
1	Entrepreneurs' value and norms	☐	☐	☐	☐	☐
2	Manage change	☐	☐	☐	☐	☐
3	Entrepreneurs' vision	☐	☐	☐	☐	☐
4	People-orientation	☐	☐	☐	☐	☐
	Others:					
1		☐	☐	☐	☐	☐
Marketing capability		Not at all important = 1 Extremely important = 5				
		1	2	3	4	5
1	Market knowledge	☐	☐	☐	☐	☐
2	Customer relationship networks	☐	☐	☐	☐	☐
3	Government relationship	☐	☐	☐	☐	☐
4	Supplier relationship networks	☐	☐	☐	☐	☐
5	Design institute relationship	☐	☐	☐	☐	☐
6	Company Reputation	☐	☐	☐	☐	☐
7	Brand	☐	☐	☐	☐	☐
	Others					
1		☐	☐	☐	☐	☐
Innovation capability		Not at all important = 1 Extremely important = 5				
		1	2	3	4	5
1	Technical and managerial expertise	☐	☐	☐	☐	☐
2	Competence in technology and process	☐	☐	☐	☐	☐
3	IT technology	☐	☐	☐	☐	☐
4	Innovation in finance	☐	☐	☐	☐	☐
5	Innovation in operation mechanism	☐	☐	☐	☐	☐
	Others					
1		☐	☐	☐	☐	☐

4. Firm's strategy

Please indicate the degree of the following competitive dimensions, which have been emphasized by your company, on the average, over the last three years.

Cost and Quality		Least emphasis = 1 Extreme emphasis = 5				
		1	2	3	4	5
1	Access to low cost labor	☐	☐	☐	☐	☐
2	Access to low cost raw materials	☐	☐	☐	☐	☐
3	Reducing cost in construction operation	☐	☐	☐	☐	☐
4	Reducing cost in administration activities	☐	☐	☐	☐	☐
5	Reducing defective rates	☐	☐	☐	☐	☐
6	Emphasizing strict quality control	☐	☐	☐	☐	☐
7	Total quality management in the construction process	☐	☐	☐	☐	☐
8	Improving the quality of contracting service	☐	☐	☐	☐	☐
9	Improving quality in the construction facility	☐	☐	☐	☐	☐
	Others					
1		☐	☐	☐	☐	☐
2		☐	☐	☐	☐	☐
Delivery and Partnering		Least emphasis = 1 Extreme emphasis = 5				
		1	2	3	4	5
1	Increasing delivery reliability	☐	☐	☐	☐	☐
2	Improving delivery speed	☐	☐	☐	☐	☐
3	Enhancing service and technical support	☐	☐	☐	☐	☐
4	Meeting on customer' needs and requirements	☐	☐	☐	☐	☐
5	Subcontractor of a large construction corporation	☐	☐	☐	☐	☐
6	Partnering with clients on a long-term basis	☐	☐	☐	☐	☐
7	Cooperation with reliable suppliers	☐	☐	☐	☐	☐
8	Cooperation with research institutes and university	☐	☐	☐	☐	☐
	Others					
1		☐	☐	☐	☐	☐
2		☐	☐	☐	☐	☐

5. Firm's performance

5.1 How important are the following objectives to your firm		Not at all = 1, Great important = 5				
		1	2	3	4	5
1	Growth in contract awards	☐	☐	☐	☐	☐
2	Profitability	☐	☐	☐	☐	☐
	Others					
1		☐	☐	☐	☐	☐
5.2 Please indicates how well your firm has achieved these objectives competing with your competitors over the last three years?		Very poor = 1, Very good = 5				
		1	2	3	4	5
1	Growth in contract awards	☐	☐	☐	☐	☐
2	Profitability	☐	☐	☐	☐	☐
	Others					
1		☐	☐	☐	☐	☐

Questionnaire Used in the Mailed Survey (Chinese Version)

中国中小建筑企业策略管理与竞争力
调查问卷

新加坡南洋理工大学
土木工程与环境学院

尊敬的中小建筑企业经营者：

改革开放以来，中小建筑企业发展十分迅速，在中国建筑市场中已经占据重要地位。本次问卷调查是新加坡南洋理工大学建筑管理系所进行的“中国中小建筑企业竞争优势”研究课题，旨在从核心能力，竞争策略和行业环境等方面了解优秀中国中小建筑企业可持续竞争力的源泉。本调查问卷共 3 页，5 个问题，请您尽力回答每一个问题，这大致会占用您几分钟的时间。

本次调研所回收的问卷保证绝对保密，且只作学术研究之用。你的个人信息和反馈的意见也视为保密信息，不会出现在调研问卷信息统计中。为感谢贵公司对本次调查的支持，如果您需要，我们会很荣幸将调查的结果反馈给贵公司，并将最后的研究成果与您分享。谢谢！

感谢您对此项调查的支持，在此对您提出的宝贵意见和见解表示衷心的感谢！

闫世刚
土木与环境工程学院
新加坡南洋理工大学

..... 回 执

☐ 本人想要一份调查结果的汇总。

姓名： 职务：

公司：

电话/手机： 传真：

电邮：

下列有些问题可能针对不同公司有不同答案。 请结合贵公司的情况回答。

1. 公司基本信息（仅供数据分类之用）：

(1) 公司的开始运营年份为：

(2) 公司员工的数目是：

(3) 贵公司所在的位置是：

(4) 公司 2003 年的营业为收入：☐ < 3 千万 ☐ 3 千万-3 亿 ☐ > 3 亿

(5) 公司属于：

☐ 国有企业 ☐ 集体企业 ☐ 私营企业 ☐ 合资企业

☐ 外资企业

2. 请指出下列外部环境因素对于企业发展的重要性

建筑行业结构的影响程度		重要性最低= 1, 重要性最高= 5				
		1	2	3	4	5
1	进入新建筑市场的难易程度	☐	☐	☐	☐	☐
2	获得新客户的难易程度	☐	☐	☐	☐	☐
3	融资的难易程度	☐	☐	☐	☐	☐
4	市场开拓渠道的能力	☐	☐	☐	☐	☐
5	地方政府政策的适应性	☐	☐	☐	☐	☐
	其他（请注明）					
1		☐	☐	☐	☐	☐
政府供应商，竞争对手和客户的影响情况		影响程度很低 = 1, 影响程度很高 = 5				
		1	2	3	4	5
1	政府对于企业的干涉程度	☐	☐	☐	☐	☐
2	供应商的影响程度	☐	☐	☐	☐	☐
3	市场竞争对手的竞争程度	☐	☐	☐	☐	☐
4	客户的忠诚度	☐	☐	☐	☐	☐
5	新进入者的威胁程度	☐	☐	☐	☐	☐
	其他（请注明）					
1		☐	☐	☐	☐	☐

3. 面对国内市场的竞争，请指出公司下列能力对于市场竞争的重要程度

企业家能力		重要性最低= 1, 重要性最高= 5				
		1	2	3	4	5
1	企业家个人素质	☐	☐	☐	☐	☐
2	企业家变革精神	☐	☐	☐	☐	☐
3	企业家的远见	☐	☐	☐	☐	☐
4	“以人为本” 理念	☐	☐	☐	☐	☐
	其他（请注明）					
1		☐	☐	☐	☐	☐
市场运作能力		重要性最低= 1, 重要性最高= 5				
		1	2	3	4	5
1	市场知识	☐	☐	☐	☐	☐
2	与客户关系	☐	☐	☐	☐	☐
3	与政府部门关系	☐	☐	☐	☐	☐
4	与供应商关系	☐	☐	☐	☐	☐
5	与设计院的关系	☐	☐	☐	☐	☐
6	公司的声誉	☐	☐	☐	☐	☐
7	公司品牌	☐	☐	☐	☐	☐
	其他（请注明）					
1		☐	☐	☐	☐	☐
创新能力		重要性最低= 1, 重要性最高= 5				
		1	2	3	4	5
1	工程技术与管理专家	☐	☐	☐	☐	☐
2	技术/工艺发展能力	☐	☐	☐	☐	☐
3	计算机技术运用能力	☐	☐	☐	☐	☐
4	融资渠道创新	☐	☐	☐	☐	☐
5	运营机制创新	☐	☐	☐	☐	☐
	其他（请注明）					
1		☐	☐	☐	☐	☐

4. 面对国内市场竞争，请指出在过去三年中，公司为获得竞争力对下列因素的重视程度：

在成本和质量方面，公司重视的程度		重视度最低= 1, 重视度最高= 5				
		1	2	3	4	5
1	降低人工成本	☐	☐	☐	☐	☐
2	降低材料/机械采购成本	☐	☐	☐	☐	☐
3	降低施工过程的成本	☐	☐	☐	☐	☐
4	降低管理费用	☐	☐	☐	☐	☐
5	降低工程缺陷率	☐	☐	☐	☐	☐
6	实施严格质量控制	☐	☐	☐	☐	☐
7	施工过程注重坚持全面质量管理（TQM）	☐	☐	☐	☐	☐
8	提高工程服务质量	☐	☐	☐	☐	☐
9	提高工程设施质量	☐	☐	☐	☐	☐
	其他（请注明）					
1		☐	☐	☐	☐	☐
2		☐	☐	☐	☐	☐
进度控制和对外合作方面，公司重视程度		重视度最低= 1, 重视度最高= 5				
		1	2	3	4	5
1	提高工程进度可靠性	☐	☐	☐	☐	☐
2	提高工程进度的速度	☐	☐	☐	☐	☐
3	提高高效的施工技术和服务	☐	☐	☐	☐	☐
4	能够满足客户不断提高的要求	☐	☐	☐	☐	☐
5	作为大型工程公司的分包商	☐	☐	☐	☐	☐
6	与客户建立固定长期关系	☐	☐	☐	☐	☐
7	与供应商合作	☐	☐	☐	☐	☐
8	与科研院所和高校合作	☐	☐	☐	☐	☐
	其他（请注明）					
1		☐	☐	☐	☐	☐
2		☐	☐	☐	☐	☐

5. 公司的业绩

下列公司目标的重要程度		重要性最低= 1, 重要性最高= 5				
		1	2	3	4	5
1	工程合同额的增长	☐	☐	☐	☐	☐
2	利润增长	☐	☐	☐	☐	☐
	其他（请注明）	☐	☐	☐	☐	☐
1		☐	☐	☐	☐	☐
请指出在过去 3 年内，公司获得以下目标的程度		很差 = 1，很好 = 5				
		1	2	3	4	5
1	工程合同额的增长	☐	☐	☐	☐	☐
2	利润增长	☐	☐	☐	☐	☐
	其他（请注明）	☐	☐	☐	☐	☐
1		☐	☐	☐	☐	☐

Appendix B: Descriptive Statistics of Survey Data**Descriptive statistics of survey data**

	N	Minimum	Maximum	Mean	Std. Deviation
AGE	121	2.00	50.00	17.0826	13.0426
EMPLOYEE	121	16.00	3000.00	598.3719	709.4005
MB1	121	1.00	4.00	2.4050	.8998
MB2	121	1.00	4.00	2.6860	.8759
MB3	121	1.00	4.00	2.8182	.8466
MB4	121	1.00	4.00	2.5372	.9402
MB5	121	1.00	5.00	2.7769	1.0684
CP1	121	1.00	5.00	3.2851	.9764
CP2	121	1.00	5.00	3.5744	.8866
CP3	121	1.00	4.00	3.5579	.7778
CP4	121	1.00	5.00	3.1322	.9657
EC1	121	2.00	5.00	4.3967	.8214
EC2	121	2.00	5.00	4.1240	.8715
EC3	121	2.00	5.00	4.0000	.7853
EC4	121	1.00	5.00	3.9192	.9522
MC1	121	1.00	5.00	3.1902	.9688
MC2	121	1.00	5.00	3.5537	.9215
MC3	121	1.00	5.00	3.8182	.9129
MC4	121	1.00	5.00	3.3636	1.0954
MC5	121	1.00	5.00	3.5743	.9522
IC1	121	1.00	5.00	3.3884	.9253
IC2	121	1.00	5.00	3.6694	.9073
IC3	121	1.00	5.00	3.8017	.8815
IC4	121	2.00	5.00	3.5372	.9402
IC5	121	1.00	5.00	3.5372	1.0958
CS1	121	1.00	5.00	3.6364	1.0567
CS2	121	2.00	5.00	4.0496	.8646
CS3	121	2.00	5.00	4.0248	.7796
CS4	121	1.00	5.00	3.5785	.9811
QS1	121	2.00	5.00	3.8760	.8522
QS2	121	2.00	5.00	3.8182	.8466
QS3	121	1.00	5.00	3.6116	.9253
QS4	121	2.00	5.00	3.4298	.9113
DS1	121	2.00	5.00	3.8678	.9656
DS2	121	1.00	5.00	3.2562	.9533
DS3	121	1.00	5.00	3.3719	.9586

DS4	121	1.00	5.00	3.8595	.9426
PS1	121	1.00	5.00	3.3967	1.0367
PS2	121	1.00	5.00	3.1983	.9800
PS3	121	1.00	5.00	3.3719	1.0656
PS4	121	1.00	5.00	3.0744	1.0814
PI1	121	2.00	5.00	3.3967	.7127
PI2	121	2.00	5.00	3.0413	.7895

Note:

MB1: Entry new construction market, MB2: Access new clients,
 MB3: Capital requirement, MB4: Access to distribution channel,
 MB5: Adaptability to local government policy,
 CP1: Government intervention, CP2: The rivalry for competitor,
 CP3: The loyalty of customers, CP4: The threats of new entrants,
 EC1: Entrepreneur's value and norms, EC2: Manage change,
 EC3: Entrepreneur's vision, EC4: People-orientation,
 MC1: Market knowledge; MC2: Customer relationship networks,
 MC3: Government relationship; MC4: Company reputation, MC5: Brand,
 IC1: Technical and managerial expertise, IC2: Competence in technology and process,
 IC3: IT technology, IC4: Innovation in Finance,
 IC5: Innovation in operation mechanism,
 CS1: Access to low cost labor, CS2: Access to low cost raw materials,
 CS3: Reducing cost in construction operations,
 CS4: Reducing cost in administration activities,
 QS1: Reducing defective rates, QS2: Emphasizing strict quality control,
 QS3: Total quality management in the construction process,
 QS4: Improving the quality of contracting service,
 DS1: Increasing delivery reliability, DS2: Improving delivery speed,
 DS3: Enhancing service and technical support,
 DS4: Meeting on customer' needs and requirements
 PS1: Subcontractor of a large construction corporation,
 PS2: Partnering with customer on a long-term basis,
 PS3: Partnering with customer on a long-term basis,
 PS4: Cooperation with reliable suppliers,
 PI1: Sale performance, PI2: profit performance.

Appendix C: Reliability Analysis

C-1 Reliability Analysis of Core Capability

1. Entrepreneur Capability

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item- Total Correlation	Alpha if Item Deleted
EC1	10.1074	4.7967	.4850	.5657
EC2	10.7355	4.5961	.4898	.5593
EC3	10.3719	5.0189	.4121	.6118
EC4	10.5620	4.5482	.3898	.6356

Reliability Coefficients

N of Cases = 121.0

N of Items = 4

Alpha = .6603

2. Marketing Capability

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item- Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
MC1	16.1405	7.2384	.6232	.4360	.7268
MC2	16.4132	7.2612	.5635	.3934	.7443
MC3	16.5372	7.7674	.5216	.3097	.7582
MC4	16.6198	6.6376	.5832	.3663	.7392
MC5	16.4380	7.0649	.5325	.2857	.7557

Reliability Coefficients

N of Cases = 121.0

N of Items = 5

Alpha = .7851

3. Innovation Capability

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item- Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
IC1	14.5455	8.4000	.5138	.2838	.7484
IC2	14.2645	7.8128	.6657	.4917	.6988
IC3	14.1322	7.7824	.7021	.5173	.6884
IC4	14.3967	8.4247	.4953	.2854	.7546
IC5	14.3967	8.1580	.4239	.2189	.7874

Reliability Coefficients

N of Cases = 121.0 N of items = 5

Alpha = .7775

C-2 Reliability Analysis of Competitive Strategy

1. Cost

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item- Total Correlation	Alpha if Item Deleted
CS1	9.6446	6.7810	.6762	.7777
CS2	9.8430	7.0168	.6798	.7775
CS3	9.6694	6.9565	.6075	.8090
CS4	9.9669	6.5989	.6729	.7793

Reliability Coefficients

N of Cases = 121.0 N of Items = 4

Alpha = .8304

2. Quality

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item- Total Correlation	Alpha if Item Deleted
QS1	10.8595	4.7718	.6084	.7445
QS2	10.9174	4.7931	.6078	.7449
QS3	11.1240	4.3262	.6704	.7118
QS4	11.3058	4.7640	.5451	.7761

Reliability Coefficients

N of Cases = 121.0

N of Items = 4

Alpha = .7958

3. Delivery

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item- Total Correlation	Alpha if Item Deleted
DS1	10.4876	5.0019	.6282	.6855
DS2	11.0992	5.0567	.6256	.6873
DS3	10.9835	5.6331	.4606	.7731
DS4	10.4959	5.2521	.5803	.7117

Reliability Coefficients

N of Cases = 121.0

N of Items = 4

Alpha = .7708

4. Partnering

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item- Total Correlation	Alpha if Item Deleted
PS1	11.6529	3.8952	.4145	.6074
PS2	11.2397	4.3004	.4720	.5628
PS3	11.2645	4.7961	.3915	.6159
PS4	11.7107	3.9240	.4770	.5551

Reliability Coefficients

N of Cases = 121.0

N of Items = 4

Alpha = .6540

C-3 Reliability Analysis of Industry Structure

1. Market Entry Barriers

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item- Total Correlation	Alpha if Item Deleted
MB1	10.8182	7.6167	.5702	.7190
MB2	10.5372	7.5174	.6191	.7034
MB3	10.4050	7.6263	.6235	.7035
MB4	10.6860	7.6506	.5236	.7347
MB5	10.4463	7.6825	.4110	.7819

Reliability Coefficients

N of Cases = 121.0

N of Items = 5

Alpha = .7705

2. Competitive Pressure

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item- Total Correlation	Alpha if Item Deleted
CP1	10.2645	4.0795	.4748	.6457
CP2	9.9752	4.2994	.4951	.6310
CP3	9.9917	4.7166	.4690	.6503
CP4	10.4174	3.9931	.5132	.6193

Reliability Coefficients

N of Cases = 121.0

N of Items = 4

Alpha = .7007

Appendix D: Factor Analysis

D-1 Factor Analysis of Core Capability

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.822
Bartlett's Test of Approx. Sphericity	531.469
Chi-Square	
df	91
Sig.	.000

Rotated Component Matrix (a)

	Component		
	1	2	3
EC1			.792
EC2			.643
EC3			.616
EC4			.647
MC1	.815		
MC2	.754		
MC3	.603		
MC4	.666		
MC5	.623		
IC1		.645	
IC2		.797	
IC3		.858	
IC4		.569	
IC5		.573	

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 5 iterations.

D-2 Factor Analysis of Competitive Strategy

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.804
Bartlett's Test of Approx. Sphericity	672.933
Chi-Square	
df	120
Sig.	.000

Rotated Component Matrix (a)

	Component			
	1	2	3	4
CS1		.783		
CS2		.802		
CS3		.808		
CS4		.688		
QS1	.762			
QS2	.690			
QS3	.731			
QS4	.823			
DS1			.748	
DS2			.771	
DS3			.568	
DS4			.738	
PS1				.601
PS2				.714
PS3				.643
PS4				.729

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 6 iterations.

D-3 Factor Analysis of Industry Structure

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.759
Bartlett's Test of Approx. Sphericity	271.035
Chi-Square	
df	36
Sig.	.000

Rotated Component Matrix(a)

	Component	
	1	2
MB1	.700	
MB2	.821	
MB3	.817	
MB4	.729	
MB5	.529	
CP1		.697
CP2		.721
CP3		.701
CP4		.741

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.