CORPORATE ENVIRONMENTALISM AND ENVIRONMENTAL STRATEGIES: THE RELATIONSHIP BETWEEN RESOURCES, CAPABILITIES, STRATEGIES AND PERFORMANCE IN CHINA'S PEARL RIVER DELTA

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CERTIFICATE OF ORIGINALITY

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ABSTRACT

Early literatures about corporate environmentalism are criticized to be exploratory and lack rigor. We had developed a comprehensive model that included both the internal and external factors to explain corporate environmentalism of firms with the complement of three distinct perspectives, i.e. literatures of corporate environmentalism, natural-resource-based view of the firm (NRBV) and institutional theory. China, the Pearl River Delta region (PRD) was particularly selected as focus in this study because of the significant influence of her environmental conditions on the entire world due to her fast pace of economic growth, unique institutional structure and her early stage of environmentalism.

A combination of qualitative and quantitative research methods had been employed. Qualitatively, 17 manufacturing companies with factories in the PRD were interviewed. The results of the qualitative research were exploratory and provided direction for the survey design in the later stage. Quantitatively, this study empirically tested and validated the proposed model by using the survey data collected from 238 manufacturing firms operated in the PRD by both face-to-face and online questionnaire survey.

From the interviews, we obtained an overall picture that the Chinese

manufacturers adopted environmental management in operations. The survey results indicated that firms with intangible resources were more likely to build up capabilities, in turn, develop proactive environmental strategies. Eventually, proactive environmental strategies would lead to positive financial and environmental benefits.

Theoretically, this study can tackle the problem of lack of cohesion in the research about corporate environmentalism from an interdisciplinary perspective. Besides, by studying the nature of environmental capabilities, we can fill the vacuum with regard to the internal mechanism of applying the NRBV perspective to investigate the environmental management of firms. We also believe that this study can provide more insights for future researchers who include stakeholder influence as a moderator to study green issues. Practically, these findings provide the Chinese corporate executives and their trading partners useful insights into the critical issue of corporate sustainability. Moreover, the Chinese government is advised to spend more rigorous efforts on fine-tuning its existing environmental laws and regulations, improving the infrastructural support as well as resolving the enforcement issues.

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CHAPTER 1

INTRODUCTION

1 Introduction

Industrial activities of the past few decades have created serious environmental problems like global warming, ozone depletion, water pollution, soil erosion, etc. which demand immediate attention. Environmental concerns can no longer be ignored by corporations because of changes in the market, regulatory climate, and political environment. Managers nowadays become more eager to pursue corporate environmentalism in their organizations (Hoffman, 2000), and they are aware that sustained competitive advantage may be achieved by practicing environmental strategies (Leszczynska, 2009).

In this Chapter, the background, importance, and theoretical and practical significance of this study are presented. Also, the conceptual framework as well as the methodology of this study is discussed in the later part.

1.1 Statement of the Issues

At the beginning of the twenty-first century, environmental issues are emerging as strategic problems for a growing number of firms. Particularly, corpoate environmental mangement is of major significance to the future of a firm and has the potential to influence virtually all of its activities. Nowadays, researchers try to understand how firms integrate the environmental aspects into their strategic management considerations, and this facet can provide pragmatic discussions for business and management theorists (Quazi, 2001).

The concepts of "corporate environmentalism", or generally "firm greening", were initially developed in the Western countries, from which most of the environmental literatures were originated (Branzei, Vertinsky, Takahashi, & Zhang, 2001). Lockett, Moon and Visser (2006) remark that the most popular topic in corporate social responsibility (CSR) research reported and discussed in the management journals is "environmental concerns and ethics". However, fragmented academic theories on this topic are grounded on different theoretical disciplines with few coherent theories on corporate environmentalism. Hence, it is essential to set up a

comprehensive framework that includes both internal and external conditions to study corporate environmentalism.

Furthermore, by incorporating the institutional factor into consideration, it is believed that this study provides important implications for the policy makers and regulators as they face a dilemma in policy making between the needs for rapid economic growth and environmental protection (Ho, 2001).

1.2 Background of the Study

There is an increasing worldwide attention and concern for environmental issues. An international climate change conference was held in Copenhagen, Denmark in December 2009, where the governments of different nations met to tackle the global environmental problems (Donovan & Simonian, 2009). Environmental issues should be the greatest concern for business leaders, scientists and politicians in both developed and developing countries.

China is a country which has been known as a “world factory”, and her environmental conditions will influence the entire world (Liu &

Diamond, 2005). However, China has paid a high price in environmental terms for her rapid economic development over the last two decades. In 2006, China overtook the United States as the world's biggest producer of greenhouse gases (Landsberg, 2007). It is reported that 16 out of the 20 most polluted cities in the world are located in China (Bergsten, Gill, Lardy, & Mitchell, 2006). Also, China's industries dump an overwhelming 40-60 billion tons of untreated wastewater into rivers and lakes every year, leaving little more than 40% of precious water clean enough for drinking.

In China, the Pearl River Delta region (PRD) is a major manufacturing base for products such as electronics, toys, garments, textiles, plastic products, etc. The PRD accounts for about one third of China's trade volume (Hong Kong Trade Development Council, 2008b). This region has rapidly become one of the world's most important centers of industrial output and is continuing to grow. Since the beginning of China's reform in 1979, the PRD has been regarded as the most economically dynamic region (Sit & Yang, 1997). The per capital Gross Domesic Product (GDP) in the region reached around 10,000 US dollars in 2009 (Xin, 2010). However, the PRD is heavily polluted. HKTDC (2007) reports that the economic growth

of the PRD relies on the extensive expansion of production and high consumption of energy and natural resources, which result in serious pollution. For instance, the Pearl River Delta is suffering increased air pollution with more than 100 days of haze in 2008 (Zhu, 2009). Xin (2008) reports that 70 percent of the industrial parks in the PRD fail to meet the green standards required by the provincial government. Around 2 million tons of pollutants and 6.1 million tons of sewage are discharged into the rivers in the PRD (Liang, 2009). Furthermore, over 40-60% of the farmland in the region near the pulp and paper mills has been contaminated by heavy metals (Liu, 2009). The continuous environmental deterioration has accordingly forced the Chinese governmental bodies to implement various legislative and administrative measures in the PRD region. For instance, from the beginning of the 12th Five Year Plan (2011-2015), there will be administrative measures to closely monitor the air quality in the PRD region due to serious air pollution in the region (Zhu, 2009). The increased commitment from the central government, together with the corresponding tightening of national environmental policy, has posed new challenges to the enterprises that conduct business in China (Zheng, 2007). Providing the

public with easier access to environmental-related information is highly expected to attract environmental concern from more social actors, and hence to exert more pressure on laggard enterprises. Chinese enterprises nowadays have to take due care of the environmental during their production activities.

At the same time, China is still at "an early stage of environmentalism" (Child & Tsai, 2005). Child and Tsai (2005) recorded that the first court case for environmental pollution arose only in the late 1990s. It is believed that the distinctive nature of Chinese institutional context vis-à-vis the West, from which most of the corporate environmentalism literatures are originated, will provide valuable insights for researchers.

1.3 Conceptual Framework

1.3.1. Literatures of Corporate environmentalism

Examining corporate environmental management, assessing actual environmental impact of all activities of business firms and evaluating different firms in different industries are a complex task. Early research

analyzing the relationship between environmental management and strategic management discusses some of the implications of environmental issues for competitive advantage. However, there are criticisms on the early literatures about corporate environmentalism. Firstly, Roberts (1992) comments that most of the early literatures are “exploratory” and “lacked rigor”. Starik and Marcus (2000) also state that the scholarly research focusing on the organizational management in the context of physical environment is exploratory and in an introductory stage. Such research is often in the format of case studies, dissertation-based articles and text supplements rather than systematic empirical investigations.

Besides, the theoretical aspects of studying corporate environmentalism are to some extent problematic. Sharma and Aragon-Correa (2005) claim that one of the main problems facing researchers studying the business-natural environmental interface is that “in early 1990s, there is a lack of theoretical guidelines to help integrate research on the natural environment and organizational theories” (p.6). Barrow (2006) shares a similar view that previous studies relating to corporate environmental management pay insufficient attention to the

interactions among theories. He suggests that emphasis should be put on the fact that environmental management is currently evolving and is far from being fixed in form. Furthermore, there are diverse interpretations of corporate environmentalism among researchers (Banerjee, 2001). As mentioned before, various terms have been used to describe the relationship between physical environment and business corporations, but very few of them are dedicated to clarify, refine or measure the concept of corporate environmentalism. It is not until Banerjee (2002) who proposes the two themes for corporate environmentalism (i.e. environmental orientation and environmental strategy) that the contentious and ambiguous nature of this term is clarified.

According to Banerjee (2002), corporate environmentalism is defined as "the organization-wide recognition of the legitimacy and importance of the biophysical environment in the formulation of organization strategy, and the integration of environmental issues into the strategic planning process" (p.181). He derives the above definition from the interviews with senior managers (Banerjee, 2001) and the results of an empirical study (Banerjee, 2002). Banerjee further identifies two

dimensions of corporate environmentalism - “environmental orientation” and “environmental strategy”. Environmental orientation is “the recognition by managers of the importance of environmental issues facing their firms”, and environmental strategy is “the extent to which environmental issues are integrated with the firms’ strategic plans”. Banerjee, Iyer and Kashyap (2003) conduct a validation study to further divide the environmental orientation into “internal” and “external”. Internal environmental orientation (IEO) is defined as “a company’s internal values, standards of ethical behavior, and commitment to environmental protection” (Banerjee, 2003, p. 106), whereas external environmental orientation (EEO) is defined as “the aspects of a firm’s environmental orientation that affect its relationships with external stakeholders” (Banerjee, 2003, p. 107). López-Gamero, Claver-Cortés & Molina-Azorín (2009) consider that Banerjee is one of the pioneer researchers who provide the formal constructs of corporate environmentalism by examining the managerial perceptions.

Despite the development of specific constructs to measure the managerial perceptions of corporate environmentalism, Banerjee (2002) fails to examine the consequences of corporate environmentalism which can

be measured in terms of performance criteria like market share change, sales growth, earnings growth, , return on investment, etc. Studies examining the relationship between corporate environmentalism and the outcomes are crucial, since the primary pursuit of business is to create and maintain value (Conner, 1991). Robins and Wiersema (1995) argue that the link between environmental management and business outcomes has been a strong motivator and driver for firms to incorporate environmental considerations into their strategies. To ignore their business performance will adversely affect the practicality of the study. Among the various strategic management perspectives, the NRBV perspective has a strong focus on business performance as the key outcome variable (Russo & Fouts, 1997), which can complement the weakness of Banerjee's definition of corporate environmentalism.

1.3.2 The Natural Resource-based View of the Firm (NRBV)

Another strategic management perspective to study corporate environmentalism is the natural-resource-based view of firm (NRBV). The resource-based view of the firm (RBV) considers the firm's internal

mechanism of production from the beginning to the end, including the performance of the organization (Wernerfelt, 1984). In other words, it can be regarded as an input-output framework for examining business operations. By advancing the RBV perspective to include the firm's relationship with the natural environment, Hart (1995) proposes the natural-resource-based view of the firm (NRBV) and argues that organizations can utilize their resources to develop capabilities that will help them not only develop environmental strategies but also achieve competitive advantage. In the NRBV perspective, resources have the characteristics of being "rare, valuable, indispensable and difficult to imitate that yield competitive advantage" (Hart, 1995). In fact, resources are the factors owned and controlled by businesses, while capabilities are the skills that firms have to use in a coordinated way to achieve goals (Amit & Schoemaker, 1993, p.35). Resources can be tangible (e.g. buildings, computers, money) or intangible (e.g. information, patents, reputation). Hall (1993) argues that capabilities are intangible and can be related to several skills such as the organization's abilities to innovate, learn and absorb knowledge. In other words, the fundamental principle of the NRBV

perspective is that the basis for competitive strategies and performance lies primarily in the application of a bundle of valuable resources and capabilities (Christmann, 2000; Majumdar & Marcus, 2001; Sharma & Vredenburg, 1998).

Research from the NRBV perspective helps distinguish between resources and capabilities, and gain a full understanding of competitive advantage by adopting environmental management. Besides, various researchers claim that the understanding of the relationship between environmental management and performance outcomes remains limited and controversial (Aragon-Correa & Sharma, 2003; Klassen & Whybark, 1999; Throop, Starik, & Rands, 1993). Since the implications of environmental management to business performance continue to be hotly debated in the research literature, applying the NRBV perspective to investigate this relationship can help researchers further understand this controversial issue (Klassen & Whybark, 1999).

Recently, Rueda-Manzanares, Aragon-Correa and Sharma (2008) propose that the empirical examination of external influences in the general business environment on corporate strategy is very limited in the NRBV

literature. Researchers such as Oliver (1991) and Hoffman (2001a) suggest that corporate behavior is often shaped by the strategic interplay between internal and external constraints. While the NRBV perspective considers the internal factors shaping corporate environmental responsiveness, institutional theory helps address the common criticism concerning the internal focus of environmental strategies adopting the NRBV perspective.

1.3.3 Institutional Theory

In simple terms, the institutional theory investigates how the external forces influence an organization (Scott, 1995). By addressing the claims of multiple institutions, managers can increase the competence of their companies to adapt to the external environment (Orlitzky, Schmidt, & Rynes, 2003). "Institution" is defined as "a collective and regulatory complex consisting of political and social agencies that dominate other organizations through the enforcement of laws, rules and norms" (North, 1990; DiMaggio & Powell, 1991; Scott, 1995). Institutional pressures for corporate environmentalism increase the complexity of business environment. Although firms can make their own decisions to operate

within the institutional constraints, failure to conform to critical, institutionalized norms of acceptability can threaten the firm's legitimacy, resources and, ultimately, its survival (DiMaggio & Powell, 1991; Oliver, 1991; Scott, 1995). Firms may also respond strategically to institutional norms by recognizing that conformity will result in improved access to resources (Oliver, 1991).

The institutional theory is relevant to corporate environmentalism because institutions can judge a firm's commitment to environmental issues. This affects the perceptions of the firm's legitimacy (Bansal & Roth, 2000). The concept of "legitimacy", which is the central principle of institutional theory, is defined as the "generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions" (Suchman, 1995, p.574).

Threats to firms' legitimacy are believed to undermine the firms' license to operate. In other words, firms that have been subjected to fines and penalties will also become more sensitive to acceptable sustainable

development practices and be more informed of what they need to do to avoid losing the legitimacy to operate (Meyer & Rowan, 1977).

Jennings and Zandbergen (1995) are among the earliest researchers to apply the institutional perspective to explain the firms' adoption of environmental strategies. They argue that coercive forces have been the major impetus of environmental management practices. Failure to comply with these forces, particularly those imposed by salient and powerful institutions, can result in loss of earnings, damaged reputation or even loss of the license to operate (Oliver, 1991). Besides, Delmas (2002) proposes an institutional perspective to examine the drivers for the adoption of Environmental Management System (EMS) in Europe and the United States.

1.3.4 Synthesis of Three Perspectives

The lack of cohesion in the research about corporate environmentalism requires studies in this field to draw from different theories and bodies of literature (Bansal & Roth, 2000). In a similar vein, to facilitate the development of a more explanatory framework for the issue of corporate

environmentalism, it will be fruitful to draw upon multiple academic perspectives for a particular issue simultaneously (Tappeiner, Tappeiner, & Walde, 2007). The relatively recent progressive concept of "interdisciplinary research" has become associated with the achievement of significant improvement in research outcomes (Gershon, 2000; Metzger & Zare, 1999; Tress, Tress, Décamps, & Hauteserre, 2001).

As mentioned previously, the conceptualization of corporate environmentalism by Banerjee et al. (2003) adds value to the academic study of green issues. However, he overlooks the relationship between environmental strategies and organizational performance. In order to tackle this deficiency, we apply the NRBV perspective as an overall framework in order to investigate the internal mechanism of firms' corporate environmentalism. By studying the interrelated constructs of the NRBV perspective, i.e. resources, capabilities, strategies and performance, we shall provide new insights into the green practices of firms. Though the NRBV perspective provides a comprehensive framework to study green issues, it is not without flaws. The major weakness of this perspective to examine corporate environmental strategies is that it overlooks the external

institutions affecting business operations. In fact, Lee and Rhee (2005) point out that corporate environmentalism evolves over time because it is easily influenced by external institutions such as government regulations, green consumerism, etc. Theoretically, it is argued that researchers should investigate green issues through the lens of the institutional theory (Clemens & Douglas, 2006). This calls for a greater synthesis of environmental issues with more established branches of management inquiries. In our research, we have developed a model with the complement of three distinct perspectives, i.e. Banerjee's conceptualization of corporate environmentalism, the NRBV and institutional theory. The robustness of this proposed model will be enhanced by investigating corporate environmental issues from an interdisciplinary perspective.

1.4 Importance of the Study

The study of corporate environmentalism can be regarded as a field in a continuing state of emergence (Sharma & Aragon-Correa, 2005). It is expected that in the next 40 years, there will be a significant change in the management field, since the past economic and organizational practices are

simply not environmentally sustainable (Hart, 1995). Murphy, Poist and Braunschweig (1995) claim that "corporate environmentalism has been characterized as perhaps the most significant force shaping the economy, as well as one of the most important issues faced by firms in the future" (p.4). In fact, corporate environmentalism can no longer be treated as a marginal concern, but rather a matter that will remain at the front line of the discipline in future studies. It is believed that the findings from this research can provide theoretical, practical as well as methodological contributions to the understanding of corporate environmentalism.

1.4.1 Theoretical Significance

Regarding the theoretical significance of this research, Banerjee (2002) identifies the presence of two dimensions for the concept of corporate environmentalism, namely "environmental orientation" and "environmental strategy". Nevertheless, his classification of the "environmental strategy" is to a certain extent problematic. His categorization of environmental strategy into only two levels, i.e. the corporate and the functional levels, is inconclusive.

Besides, Banerjee's identification of environmental strategy is criticized as 'ambiguous" and "ambivalent" (Karna, Hansen, & Juslin, 2003). The definition of "environmental functional strategy" covers mainly the marketing functions. Johnson and Scholes (2002) argue that functional strategy includes more than marketing activities. They propose that functional strategy focuses on various areas like accounting, marketing, human resource management, operations, etc. Analyzing only the marketing aspect is, by its very nature, highly contestable. The inclusion of other organizational functions to explore the concept of corporate environmentalism can ensure the completeness of this research. Detailed explanation of Banerjee's conceptualization is given in the next chapter.

Furthermore, this study has theoretical relevance because it extends the current corporate environmentalism literature by adopting the NRBV perspective as the guiding framework. The NRBV perspective opens a whole new area of analysis and suggests many fruitful opportunities for research in the future (Dobers, Strannegard, & Wolff, 2001). By taking environmental orientations as the antecedents of environmental capabilities which can also be considered as the main source of competitive advantage,

this study may help identify the internal mechanism of firms which operate in an environmentally friendly manner.

Apart from focusing on internal mechanism, the institutional theory posits that the choices of strategies of companies are constrained by external pressures (Hoffman, 1999; Scott, 1994). Claver-Cortes, Molina-Azorin, Tari-Guillo and Lopez-Gamero (2005) point out that the institutional pressure, like regulatory pressure, has forced the firms to adopt green practices. Regulators can impose sanctions and fines on firms for their failure to comply with the environmental regulations. Similarly, Darnall (2006) comments that companies following a stricter legislation will put greater emphasis on the preservation of the environment. To consider the institutional influence in this study can help investigate the issues of corporate environmentalism in a holistic way.

The PRD issue also contributes to the significance of this study. Many of the past studies conducted by the Western strategic management theorists rarely consider the relevant environmental issues emerging from the developing countries (Tan & Litschert, 1994). A number of researchers

(Christmann & Taylor, 2001; Hart, 1995; Sharma & Starik, 2002) have called for further studies on the pursuit of corporate environmentalism in the developing countries, but this issue remains largely unaddressed (Halme, Roome, & Dobers, 2009). This study tries to assess the applicability of western theories in the Chinese context. As mentioned before, China's environmental conditions will influence the entire world (Liu & Diamond, 2005). In the coming decades, environmental issues will play an increasing role in China's economic development, internal politics, international relations and regional development issues. It is beneficial to be aware of the growing importance of environmental problems in China (Zheng, 2007). Since China differs from other developed countries in political, cultural, economic and societal structures, it potentially poses the most critical challenge to the research paradigm. This new issue gives room to refine and verify the current management theories and to develop new ones (Tan, 1996).

In a nutshell, this study may contribute to the organizational and environmental research. Barakat (2006) argues that fragmented academic theory is grounded on various theoretical disciplines with few coherent

theories on corporate environmentalism. By integrating different theoretical perspectives, the NRBV perspective and the institutional theory, we shall understand better both the internal and external mechanisms of corporate environmentalism.

1.4.2 Practical Significance

As to the practical significance, at the micro level, there is an increasing awareness among corporate managers and leaders in the issues of corporate environmentalism, particularly those in the emerging countries such as China. It is mentioned before that the continuous environmental deterioration has prompted the Chinese government to implement a variety of administrative and legislative measures. The increased awareness of the government regarding the environmental issues, as well as the more stringent environmental policy, has imposed new challenges to the companies that operate in China (Zheng, 2001). Given that the manufacturing industry is one of the major economic driving forces of the PRD, this study will offer top managers an overall picture of the level of corporate environmentalism in this region, and provide valuable insights

into how the enterprises can obtain competitive outcomes by pursuing proactive environmental strategies.

At the macro level, the results also have implications for governmental agencies and regulators. There has seen a steady increase in the number of environmental legislations in the last decade and a gradual tightening of their enforcement in both developed and developing countries. From this study, governmental agencies and regulators can gain a thorough understanding of the current situations of corporate environmentalism in the PRD. Also, governmental agencies can think of the ways to alliance with the firms to operate in an environmentally friendly way. Moreover, regulators can obtain insight from this study into how to catalyze the emergence of green initiatives by highlighting the positive performances of green practices.

1.4.3 Methodological Significance

With regard to the methodological issue, the earliest research works on this topic mainly include case studies, dissertation-based articles, textbooks and text supplements (Sroufe, 2003). In order to tackle this deficiency, a

combination of both qualitative and quantitative research methods (qualitative interviews as well as paper-and-pencil and internet-based questionnaire surveys) was employed in this study. By utilizing multiple sources to investigate the situation, it might reasonably be referred to as a mixed (Tashakkori & Teddlie, 2002) or triangulating methodology (Yin, 1994). As all methods of data collection have limitations, the use of multiple methods can neutralize or cancel out some of the disadvantages of certain methods (e.g. the detail of qualitative data can provide insights not available from a general quantitative survey). It is widely accepted that "a combination of different types of data collection methods can strengthen a study" (Tashakkori & Teddlie, 2002). Hence, the multi-method research design is appropriate as it is noteworthy that such a research design is quite infrequent in the study of corporate environmentalism.

1.5 Research Methodology

This study was completed using mixed methods of in-depth interviews and questionnaire surveys. These two types of research methods served different aims. For the in-depth interviews, the main premises and ideas from

corporate environmentalism literature, NRBV perspective and institutional theory were applied to investigate the current situations of manufacturing industry in the Pearl River Delta Region (PRD), China in implementing corporate environmental strategies. Compared with the quantitative research, the qualitative research is exploratory and provides direction for developing the quantitative survey. In particular, this research has contributed to the survey design, questionnaire development, data collection and data analysis in the later stage. For instance, previous studies by Banerjee (1996) suggested that interviews with managers would help develop a more relevant survey design and allow for greater specificity of the items in the survey.

Besides, quantitative analysis was employed to validate the constructs and test the hypotheses. It was also used to evaluate the proposed model which was developed by obtaining ideas from literature review and interviews. In the following, the details of our qualitative as well as quantitative research are discussed.

1.5.1 The Participants

Firstly, for the in-depth interviews, with the cooperation of the Federation of Hong Kong Industries (FHKI) and the Guangzhou Environmental Protection Bureau (GZEPB), a list of potential respondents was developed.

Secondly, for the face to face survey, the sampling framework was the exhibitors in trade fairs organized both in Guangzhou and Hong Kong by the Ministry of Commerce of the People's Republic of China, the People's Government of Guangdong Province and the Hong Kong Trade Development Council. Furthermore, the sampling framework for the online survey was from "*Database of Industry Business: Business directory of 48 main industries in China, 2006"*.

1.5.2 The Survey Instruments

As mentioned before, the in-depth interviews and the questionnaire survey served different purposes. The qualitative interview phase served as an important stepping stone to establish the focus for the second phase of the research. Questions of the interviews were developed according to the input from the appropriate and relevant literature, e.g. the basic concepts from

Freeman (1984), Hart (1995) and Sharma (2000). Research questions were assessed by a group of academics including 3 professors and 2 Master's students.

Besides, measurement items in the questionnaire survey were developed based on the inputs from both the interviews and the relevant literatures like strategic management, corporate environmental management and institutional theory. Details of the questionnaire items are presented in Chapter 4.

1.6 Summary

This thesis is organized into eight chapters. After introducing the background of this study in Chapter 1, Chapter 2 presents the literature review. Chapter 3 specifies the theoretical development and hypotheses. Chapter 4 discusses the research methodology, and the results of the in-depth interviews as well as the questionnaire survey findings are included in Chapter 5 and Chapter 6 respectively. The overall discussion and implications of the study are covered in Chapter 7 and the final chapter, Chapter 8, gives the concluding remarks.

CHAPTER 2

LITERATURE REVIEW

2. Introduction

The first chapter states that a proposed model has been developed in this study by focusing on the key concepts from three important schools of thought infrequently used in combination: corporate environmentalism (e.g., Banerjee, 2002), natural-resource-based view of the firm (NRBV) (e.g., Hart, 1995); and institutional theory (e.g., Bansal & Roth, 2000; Jennings & Zandbergen, 1995). It is believed that the robustness of the proposed model will be enhanced by investigating corporate environmental issues from an interdisciplinary perspective.

In this chapter, the theories applied in this study are first discussed. Then, a comprehensive review of the antecedents, mediating variables, consequences as well as moderating variables that are derived from the three perspectives is presented. At the end, the research gaps found in the existing literature are fully explained.

2.1 Theories Utilized

2.1.1 Literatures of Corporate Environmentalism

Corporate environmentalism is a relatively recent phenomenon. Baker and Sinkula (2005) argue that in "a newly developed research domain" like the management of relationship between natural environment and firm operations, various definitions of terms and constructs have come up (Gladwin, Kennelly, & Krause, 1995). In this study, we would like to investigate corporate environmentalism comprehensively, particularly in the field of strategic management.

In order to understand corporate environmentalism thoroughly, it is essential to know how the previous researchers define this idea. Brown, Derr, Renn and White (1993) simply define corporate environmentalism as a "corporate concept of environmentalism" (p.222). Gupta (1995) states that corporate environmentalism includes "a range of programmes and practices which may include articulating environmental policy statements, developing environmental strategies, creating environmental staff functions, implementing aggressive pollution-prevention programmes and initiating environmental-related measures" (p.20). In response to the diverse

interpretations of corporate environmentalism, Banerjee (2002) proposes a working definition for this concept, i.e. "the organization-wide recognition of the legitimacy and importance of the biophysical environment in the formulation of organization strategy, and the integration of environmental issues into the strategic planning process" (p. 181). His definition of corporate environmentalism highlights two intriguing aspects. The first part of the definition deals with "corporate orientation" towards environmentalism. The second part refers to "corporate strategy", which stems from environmental orientation. He derived the above definition based on the interviews with senior managers in the United States as well as the empirical results of a questionnaire survey (Banerjee, 2001; Banerjee, 2002).

In Chapter 1, it is mentioned that Banerjee is regarded as one of the pioneer researchers who put forward the formal constructs of corporate environmentalism. Since current studies also draw on Banerjee's conceptualization of corporate environmentalism to analyze the relationship between the physical environment and corporate strategies (e.g., Baker & Sinkula, 2005; Chan, 2009; Menguc & Ozanne, 2005), it is well supported

for us to apply Banerjee's constructs to study the issue of corporate environmentalism.

2.1.2 The Natural-Resource-Based View of the Firm (NRBV) Perspective

Another strategic management perspective to study corporate environmentalism in this study is the natural-resource-based view of the firm (NRBV). The NRBV itself is an adaptation of the resource-based view of the firm (RBV). The RBV is one of the most widely accepted theories in strategic management (Newbert, 2007; Orsato, 2006; Powell, 2001; Robins & Wiersema, 1995). RBV argues that the differences in competitive positions of firms are based on firm-specific resource endowments. The genesis of the RBV perspective can be referred back to Ricardo's argument that superior production factors generate economic rents for their owners.

RBV suggests that "unique resources and capabilities" represent the core determining factors of corporate performance relative to competitors. Resources that exhibit the characteristics of value, rareness, inimitability

and non-substitutability can simply be classified as tangible or intangible (Grant, 1991).

A strategic management researcher, Hart (1995), expands the RBV perspective to include the constraints and opportunities of the biophysical environment. He is the first academic who expressly integrates the RBV perspective into a discussion of environmental strategy and competitive advantage (Menguc & Ozanne, 2005; Sharma & Aragon-Correa, 2005), and his new perspective is named the "natural-resource-based view of the firm" (NRBV). To incorporate the environmental issues into the strategic decision-making process will increase the ability of corporations to deal with the interface between business operations and ecological issues, and help them build up valuable capabilities with competitive advantage (Chan, 2005). Chan (2005) argues that these competitive capabilities will bring with them superior business performance based on the evidence from previous empirical studies. Further discussion relating to the nature of capabilities is provided later.

Different attempts have been made to test empirically the conceptual framework of the NRBV perspective. For instance, Russo and Fouts (1997)

conduct an empirical study by using firm-level data on environment and accounting profitability. They apply the NRBV perspective, and the results indicate a significant relationship between environment and financial performance. Judge and Douglas (1998) explore the ability of companies to integrate the natural environment into their strategic planning processes from the NRBV perspective. Sharma and Vredenburg (1998b) investigate the relationship between environmental strategies and competitive benefits. Their study indicates that from the NRBV perspective, companies can get competitive advantage by implementing proactive environmental strategy. Klassen and Whybark (1999) apply the NRBV perspective and provide empirical evidence that there is a positive relationship between environmental management and performance outcome. Particularly, the results show that investment in environmental technologies is found to affect significantly both environmental as well as manufacturing performance for manufacturing factories. Aragon-Correa and Sharma (2003) also apply the NRBV and propose how the dimensions of the general competitive environment of a business can influence the development of a dynamic, proactive corporate strategy for managing the business-natural

environment interface. Recently, Chan (2005) studies empirically whether companies operating in China can reap the benefits from the practice of the NRBV perspective. The results point out that the foreign invested enterprises in China enhance their corporate performance (both environmental and financial) through the implementation of environmental practices. Furthermore, Menguc and Ozanne (2005) test a model based on the NRBV on firm performance. To sum up, the vast amount of empirical studies show that the progress of research on organizations and the natural environment has been impressive in recent years. Overall, the empirical results are, to a great extent, consistent with the NRBV expectations, and this perspective has gained importance as "a competitive theory of the firm" (Marcus, 2005).

2.1.3 Institutional Theory

The previous section focuses on the internal forces which drive the firms' decision-making (Clemens & Douglas, 2006). The proactive attitudes of firms towards the physical environment will probably favor the development of new environmental resources and capabilities. This in turn

may help develop environmental strategies and finally achieve competitive advantages. Taking into account the external variables will help address the common criticism concerning the internal focus of most environmental management strategies adopting the NRBV perspective (Rueda-Manzanares, Aragon-Correa, & Sharma, 2008). To offer a more holistic view for investigating the issue of corporate environmentalism, the institutional theory provides useful directions on how companies can deal with the external forces (Clemens & Douglas, 2006).

The institutional theory, one of the most developed theories in the management literature, argues that firms' decision-making can be influenced by the external pressures from various institutions (Clemens & Douglas, 2006; Doh & Guay, 2006; Kostova, 1999; Scott, 2001, etc.). Powell and DiMaggio (1991) define institution as "a collective and regulatory complex consisting of political and social agencies that dominate other organizations through the enforcement of laws, rules and norms".

An original statement of the institutional theory is in general believed to be found in the article by Meyer and Rowan (1977). They argue that to achieve legitimacy and reduce uncertainty, organizations will

respond to socially prescribed norms dictating what they should do. The concept of legitimacy, which is the central principle of the institutional theory, is defined as a "generalized perception or assumption that the actions of an entity are desirable, proper or appropriate within some socially constructed system of norms, values, beliefs, and definitions" (Mitchell, Agle, & Wood, 1997, p. 857). It is believed that threats to a firm's legitimacy will undermine a firm's license to operate or its long-term survival (Bansal & Roth, 2000).

Institutional scholars have recently rejected the common descriptions of organizations as passive instruments of dominating external control systems (Hoffman & Ventresca, 2002). Instead, they argue that institutional pressures, particularly coercive forces, will lead to industry and firm-level variations in strategies (Hoffman, 2001). Regulative legitimacy is derived from regulations, rules, standards and expectations created by governments, professional bodies and even powerful organizations. Regulatory systems usually involve sanctions that can be used to ensure that organizations follow the rules, regulations, standards and expectations. Researchers have acknowledged the influence of regulatory pressures on the environmental

friendliness of firms (Jiang & Bansal, 2003). These pressures mould the organization structures, and may potentially have an important impact on the costs of business operations (Delmas, 2002). Wright, Filatotchev, Hoskisson and Peng (2005) also argue that especially in the developing countries, business strategies can largely be constrained by the institutional environment.

2.2 Antecedents

After identifying the three distinctive perspectives used in this study, it is necessary to determine what factors facilitate the process of corporate environmentalism. As previously discussed, Banerjee identifies two dimensions, i.e. environmental orientation and environmental strategies, to conceptualize the issue of "corporate environmentalism". In this research, "environmental orientation" is regarded as the antecedent. An extensive review of the term "environmental orientation" is provided below.

2.2.1 Environmental Orientations

Environmental orientation, or corporate environmental orientation, refers to "the notion of corporate responsibility towards the environment, the importance of recognizing the impact a firm has on the environment and the need to minimize such impact" (Banerjee, 2002, p.182).

Environmental orientation seems to be framed as part of an overall corporate value or philosophy. By its incorporation in mission statements, policies and procedures, environmental orientation describes the extent to which firms' missions and cultures explicitly endorse environmental values. Since managers have the ability to influence the degree of responsiveness of their firms for environmental issues, environmental orientation also refers to "the managerial perception of the importance of environmental issues facing the firms" (Banerjee, 2001, p.496).

2.2.1.1 Internal Environmental Orientation (IEO)

In Banerjee's (2002) paper, he further identifies two types of environmental orientation (internal and external). Internal environmental orientation (IEO) is defined as "a company's internal values, standards of ethical behavior and commitment to environmental protection" (p. 106). IEO reflects the

managers' perceptions of the significance of environmental subject matters faced by their firms. Managers try to internalize the environmental mission and culture of their firms. The degree of internal environmental orientation can be manifested by the communication of environmental goals within the whole organization. Many large corporations, for instance Digital, DuPont and Procter & Gamble, have detailed environmental policies and environmental mission statements which can help highlight the orientation of the firms towards environmental protection (Banerjee, 1998). In addition, in 3M China, environmental sustainability policies and practices are linked to the fundamental corporate values of the company. The manager of 3M China explains that the company is trying to become the champion in corporate social responsibility. Environmental orientation has spread through everywhere within the organization. The company has even accepted a loss of market share in China for maintaining its environmental standards (China Daily, 2006).

2.2.1.2 External Environmental Orientation (EEO)

External environmental orientation (EEO) is defined as "the aspects of a firm's environmental orientation that affect its relationships with external stakeholders" (p. 107). Freeman (1984) defines stakeholder as "any group or individual who can affect or is affected by the achievement of the organization's objectives" (p.46). The group or individual includes governmental agencies, regulators, environmental groups, customers, industrial groups, shareholders, suppliers, local community, media, etc. Fowler and Heap (1998) mention that managers are the ones who determine which stakeholders are critical to their business survival.

In reality, there are various cases in which significant stakeholders are seen to influence the behavior of firms. For instance, Coca-Cola Corporation is facing mounting criticism for its alleged environmental abuses in India (Stecklow, 2005). Coca-Cola has continued to argue that it has full government approval to draw water from local aquifers. However, the external stakeholders have been able to dominate the debate by engaging college students to press on the administrators for campus boycotts of Coca-Cola products and union representatives to file lawsuits. In these

situations, the company should re-emphasize the importance of environmental orientation in operation and regain their social "license to operate" (Howard-Grenville, Hoffman, & Bhattacharya, 2007). Moreover, various Chinese mobile phone manufacturers like China Mobile, Nokia, LG Mobile, Lenovo, Panasonic, NEC and Amio have joined the eco-friendly "Green Box program" as they have green orientations and would like to improve the quality of life for all their stakeholders by contributing to the reduction of environmental pollution (Liu, 2009). The "Green Box program" is a campaign to collect and properly dispose of obsolete and abandoned mobile phone handsets in China in order to reduce the e-wastes.

In summary, environmental orientation reflects "the degree of permeation of environmental values within firms' cultures". This permeation can be manifested internally through the acceptance of environmental protection as a corporate objective. That must be understood and shared among all the organization's staff. Externally, firms should balance their economic interests with the demands of important environmental stakeholders. Their decisions may determine the companies' competitiveness.

2.2.2 Resources of Firms

It is well recognized that the fundamental principle of the RBV is that the basis for competitive advantage of a firm lies primarily in the application of a bundle of valuable resources at the firm's disposal. According to Amit and Schoemaker (1993), resources are defined as "stocks of available factors that are owned or controlled by the firm" (p.35). Typically, resources can be grouped into two types, namely tangible and intangible. Tangible resources include "financial reserves and physical resources such as plant, equipment and stocks of raw materials" (Miller & Shamsie, 1996). For instance, in the environmental management area, the availability of technological resources of some international companies like IBM, Phillips, Apple Computer and Sony will improve their capabilities to control their environmental impacts through redeveloping their production processes (Kurk & Eagan, 2008). Besides, firms from developed countries are more capable of tackling environmental issues than those from developing countries (Wright, Filatotchev, Hoskisson, & Peng, 2005). One of the possible reasons is due to the high stock of some essential resources, like the advanced technologies and equipment in the developed countries.

In addition, there are a variety of intangible resources including "patents, trademarks, copyright and registered design, contracts, trade secrets, knowledge, entrepreneurial orientation, networks, organizational culture and reputation of product and company" (Hall, 1992; Runyan, Huddleston, & Swinney, 2006). In general business environment, an open and participative management structure helps facilitate communication across all levels of the firms. Hence, these companies can deal with environmental issues in a comprehensive manner (Daily & Huang, 2001). This kind of "management structure" can be regarded as a type of intangible resource which is conducive to the environmental management of the firm.

Between tangible and intangible resources, intangible resources are more likely to be the source of sustainable competitive advantage, since they are complex and it will take a lot of time to accumulate them (Villalonga, 2004). Moreover, intangible resources are causally ambiguous, thus making them less likely to be imitated by the competitors (Barney, 1991). Generally speaking, intangible resources are those that enable a company to perform in a more superior way than its competitors or to achieve better results (Barney, 1992; Hall, 1993).

In the strategic management literature, firms' unique bundles of resources, both tangible and intangible, have long been advocated as a major antecedent of capabilities and the basic unit of analysis to know more about the development of competitive advantage (Andersen & Kheam, 1998). Resources that are said to confer enduring competitive advantage to the firms, to the extent that they are "rare" or "hard to imitate", are regarded to "have no direct substitutes", and hence will permit companies to grasp business opportunities or evade threats (Barney, 1991). Resources also have some value in generating profits or preventing losses. However, if all firms have them, resources will be unable to contribute to superior returns.

2.2.2.1 Environmental Orientations as Firm-specific Resources

By Banerjee's definition, environmental orientation refers to "firm's internal values and ethical standards regarding the level of commitment it should render to environmental protection" (p. 182). Environmental orientation, especially as revealed in the firm's mission statement, can promote environmental ideology within the firm (Dechant & Altman, 1994).

The orientation is often initiated by corporate leaders out of their personal aspirations for being more environmentally responsible. It is likely that the personal commitment of the leaders will eventually become the corporate values of the entire organizations which are widely shared among the organizational members.

The integration of green values into firm cultures responds a change in the traditional corporate values. Firms are required to widen their scope of business and include the protection of the natural environment in their business objectives (Miles & Munilla, 1993). In addition, firms will consider various aspects and integrate different internal activities, such as finance, purchasing, human resources, etc., into their environmental considerations (Chamorro & Banegil, 2006).

Different firms display different kinds of environmental orientations (Klassen, 2001). The environmental orientations and missions of some firms are narrow. Their focus is mainly on profitability. If the firms' missions are narrow, they may not even adopt the basic environmental practices. In contrast, if their missions are broad, they may go much further and adopt proactive environmental strategies. If the top managers have eco-centric

values, they will put much more emphasis on the environmental issues. Managers will set environmental plans and objectives, and may even transform their pro-environmental mentalities into the norm of the organizations. Firms can thus secure their competitive advantages in the long run (Morgan & Strong, 2003).

Hart (1995) notices that it is difficult for most of the firms to reach a consensus on purposes and actions. Shared environmental vision and orientation are also rare and firm-specific and relatively few firms are able to create or preserve them. If firms consider the natural environment and incorporate these issues into their relevant company policies and strategies, these kinds of orientations can be regarded as their "intangible resources".

A number of researchers have conducted research relating to the environmental orientations of firms. For instance, Worthington and Patton (2005) investigate the environmental orientations of managers in the UK screen-printing sector, some of whose managers only regard environmental issues as a threat to their business operations. They have negative environmental attitudes and are reluctant to spend time, manpower and resources on environmental protection. These companies have missed the

opportunity to gain competitive advantage through superior ecological performance. Fernandex, Junquera and Ordiz (2003) claim in their paper that a firm's pro-environmental corporate culture can be perceived as an intangible resource. This kind of intangible resource can shape a firm's strategic vision and motivate its employees to be engaged in environmental issues. Between tangible and intangible resources, Barney (1991) argues that intangible resources are more likely to be the source of competitive advantage, as they are more difficult to be imitated by their competitors.

In addition to resources, another construct of the NRBV perspective is "capability". Capability can be viewed as a bundle of assets which facilitate the development of value-creating strategies (Barney, Wright, & Ketchen, 2001). Notably, capabilities and strategies can help firms render their competitive advantage.

2.3 Mediating Variables

2.3.1 Capabilities of Firms

Capability can be defined as "a skill for activating, combining and coordinating physical, financial, technological, organizational and

reputational resources within the framework of a process of action linked with the implementation of strategy in order to produce a result" (Amit & Shoemaker, 1993; Grant, 1991; Teece, Pisano, & Shuen, 1997).

From the competitive advantage literature, it should be noticed that capabilities of organizations are the "coordinating mechanisms" with which firms are able to use their resources most efficiently and competitively (Day, 1994). The competitive advantages of these capabilities, which help the companies compete in the market (Teece et al., 1997), come from their intangible nature based on the complexity of our society and the deep "embeddedness" in organizations (Teece, 1987). Due to their invisible nature, they are difficult to be identified and imitated by their competitors. Based on the assumption of heterogeneity among firms (Barney, 1991), the more heterogeneous the firms that compete in the market are, the more crucial capabilities are to superior performance. For instance, in the dynamic business environment, firms with innovation capabilities like internal research and development competency can identify opportunities and respond speedily to them (Weerawardena, Mort, Liesch, & Knight, 2007).

Capabilities cannot be taken for granted, as managers must develop them (Marcus, 2005). The firms need capabilities which they have developed or will have to develop in order to win the competition they face today and in the future. These capabilities are "collective skills, abilities and expertise of an organization". Zehir, Zafer and Tanriverdi (2006) suggest that capabilities have vital consequences on business performance to acquire competitive advantage.

Among the different types of capabilities, researchers emphasize that two of them which are related to environmental management (i.e. innovation and information capabilities) are worth noting (Christmann, 2000; Marcus & Anderson, 2006; Sharma & Vredenburg, 1998). They argue that the innovation capability is the most important determinating factor of firms' activities and hence performance (Baldwin & Gellatly, 2006; Cavusgil, Calantone, & Zhao, 2003; Sharma, Aragon-Correa, & Rueda-Manzanares, 2007). More specifically, Sirmon, Hitt and Ireland, (2007) believe that innovation capability has become the key to sustainable development. It is associated with proactive environmental strategies formulation. This kind of capability is likely to be used to generate a

proactive corporate strategy and reduce environmental impact (Sharma, Aragon-Correa, & Rueda-Manzanares, 2007).

2.3.1.1 Innovation Capability (INC)

Innovation capability can be defined as "the capacity of developing and adopting new product and processing technologies to satisfy the future needs" (Guan & Ma, 2003, p.740). In the facet of green management, with innovation capability, firms will be able to increase productivity, reduce defects and cut costs through redesigning the production process (Etzion, 2007). Firms with product and process innovation capabilities are more ready to obtain the benefits from the adoption of environmental practices (Christmann, 2000; Etzion, 2007; Ngo & O'Cass, 2009). From the dynamic capability perspective (Nelson, 1991), firms are constantly creating innovation capabilities by encouraging new ideas, continuous improvement and creativity in environmental aspects (Sharma et al., 2007).

Theoretically, empirical research substantiates the importance of innovation capability in environmental management. For instance, Arora and Cason (1996) find a positive correlation between the intensity of

innovation and voluntary compliance with the environmental laws and regulations. Russo and Fouts (1997) explain the link between environmental strategies and firm performance to be due to firms' environmental innovation. Rugman and Verbeke (1998a) suggest in their paper that manufacturing firms which concern the environmental issues will carry out innovative practices to improve business performance. Hastings (1999) carries out an empirical study with the oil companies in Latin America, which have acquired innovation capability by using environmentally sound technologies to minimize environmental impact. This capability appears to have mitigated the negative impacts of oil operations while enhancing the competitiveness of the companies. Christmann (2000) surveys the chemical companies and stresses that innovation capability associated with pollution prevention technologies can bring the overall cost reduction. In studying UK manufacturing firms, Kaleka (2002) purports that firm's competitive capability can be classified into informational capability, product development capability and the capability of implementing new systems and ideas in the production or manufacturing processes. She argues that these capabilities can help the firms achieve competitive advantage.

2.3.1.2 Information Capability (IFC)

In addition to innovation capability, prior research suggests that informational capability is another important type of capability (Haspeslagh & Jemison, 1991; Morgan, Kaleka & Katsikeas, 2004). In the context of environmental management, informational capability pertains to the "acquisition, identification, exploitation and dissemination of information about environmental issues". It can be described as a pool for accumulating technical, operational and environmental information. This capability will enable organizations to improve the understanding of environmental issues (Sharma & Vredenburg, 1998).

Companies which possess information capability will integrate knowledge acquired from the outside into their businesses and share the knowledge within their various departments. For instance, oil companies like Buffalo and Sioux have formal and informal meetings to share green information and discuss issues on the business-natural environment interface, and actions will be taken to reduce the environmental impacts of the companies (Sharma & Vredenburg, 1998). Marcus and Geffen (1998) conduct a case study of pollution prevention in the power generation

industry. They find that corporations with the capability of searching for external ideas and information are likely to acquire the capability that enables the implementation of proactive environmental strategies and will eventually improve their environmental performance. This study shows how proactive the electrical utilities companies are in acquiring knowledge from the main suppliers and deploying them to enhance their environmental performance.

Alternatively, Post and Altman (1992) argue that insufficient information about the potential results of adopting clean technologies will definitely affect the success of adopting environmental strategies. Indeed, the adoption of environmental protection measures involves various risks, such as a lack of knowledge of the impact on the financial results (Hillary, 2004; Kemp, 1993; Moors, Mulder, & Vergragt, 2005; Zilahy, 2004) and a lack of clear understanding about the environmental benefits (van Hemel & Cramer, 2002).

2.3.2 Environmental Strategies

Another mediating variable in this study is the "environmental strategies". Environmental strategies are considered from both the dimensions of corporate environmentalism from the conceptualization of Banerjee (2002) and the natural resource-based view of the firm (NRBV).

Firstly, referring to Banerjee (2002), the concept of environmental strategy is related to the degree of integration of environmental issues into the strategic planning process. The level of strategy in firms may differ widely, and some firms integrate environmental issues at higher strategic levels than the others. Environmental strategy is identified by Banerjee (2002) and Banerjee, Iyer and Kashyap (2003) to be two-dimensional, i.e. the corporate environmental strategy and the business/functional environmental strategy.

2.3.2.1 Corporate Environmental Strategy

Banerjee (2002) defines corporate environmental strategy as a strategy which influences the higher levels of strategic decision-making. Among the strategic actions influenced by environmental concerns at this level are new

product development, increased research and development (R&D) investments, technology development and changes in the product and process design. Product-market decisions are also driven by environmental concerns in the firms with a higher level of environmental strategy. By developing new products which are less environmentally damaging, firms can take advantage of the growing market for environmental goods and services (Dechant & Altman, 1994). For instance, Xerox, a global company in office equipment, adopts a green corporate strategy to manage its products and inventory in order to minimize their environmental impacts in every stage of their product life cycle (Rugman & Verbeke, 1998a).

2.3.2.2 Business/Functional Environmental Strategy

The business/functional environmental strategy, addresses environmental concerns at the lower level of strategy. This strategy focuses on the integration of functional areas like accounting and marketing into environmental strategies. For instance, at the functional level, environmental concerns can influence product development (e.g. biodegradable detergents), pricing decisions (e.g. biodegradable detergents at higher price) and

promotion decisions (e.g. green advertising). Environmental strategies at the functional level are limited in scope and aimed at emission reduction and waste management.

Nonetheless, the classification of environmental strategy into two levels, i.e. corporate and functional levels, by Banerjee (2002) is to a certain extent problematic. Morgan and Strong (2003) claim that the investigation of business strategies by classifying them into different typologies is arguable. For instance, to classify whether a firm is pursuing a "prospector, defender, analyzer or reactor strategy" according to Miles and Snow (1978) may not be comprehensive enough, because critical dimensions may have been left out from the typology, and the "parsimonious Miles and Snow model" offers an incomplete view of strategy (Hambrick, 1984). Besides, Banerjee's identification of environmental strategies is criticized as "ambiguous" (Karna, Hansen, & Juslin, 2003). His definitions of "environmental functional strategies", like *"we emphasize the environmental aspects of our products and services in our ads", "our*

marketing strategies for our products and services have been considerably influenced by environmental concerns", "we highlight our commitment to environmental preservation in our corporate ads", etc., cover mainly the marketing functions. Yet, business/functional strategies encompass more than marketing activities. Johnson and Scholes (2002) argue that this level of strategy focuses on various functional areas like accounting, marketing, human resource management, operations, etc. Analyzing only the marketing aspect is, by its nature, ambiguous and highly contestable. Gago and Antolin (2004) state that no existing typologies of environmental strategies have been widely accepted. Furthermore, Hart (1995) claim that dealing with natural environmental issues which an increasing number of firms must address is a complex social process.

Referring back to Banerjee's (2002) definition of corporate environmentalism, environmental strategy refers to the "integration" facet of the definition. It is the extent to which environmental issues are integrated with business strategies. "Integration" is the key issue, and environmental concerns are not treated as *ex post* issues after strategic plans are made, but as *ex ante* concerns to be integrated with the strategic planning process

(Buil-Carrasco, Fraj-Andres, & Matute-Vallejo, 2009; Karagozoglu, 2001; Lindell & Karagozoglu, 2001).

2.3.2.3 Proactiveness of Environmental Strategies

The degree of integration of environmental issues into the firms' strategic decision-making processes can be described as the "proactiveness" of the environmental strategies (Aragón-Correa & Rubio-Lopez, 2007). de Bakker, Fisscher and Brack (2002) contend that proactivity emphasizes a firm's own initiatives in environmental management. Environmental proactivity is therefore understood as the initiatives aimed at improving environmental situations and performance, each of which is characterized by a series of environmental practices (Aragon-Correa, 1998; Henriques & Sadorsky, 1999; Buysse & Verbeke, 2003).

Lee and Rhee (2007) argue that firm strategies may be different even though the firms are in the same business context. The most advanced environmental approach demands a higher level of integration into the business strategy (Cordano & Frieze, 2000). Regarding the proactiveness of environmental strategies, companies may at one end adopt the reactive

strategy, in which they achieve pollution reduction only within a short period of time (Hart, 1995; Russo & Fouts, 1997). Such companies show a low level of environmental awareness, and they frequently overlook the environmental issues. In other words, they only integrate a few environmental considerations into their business strategy. At the other end of the continuum of environmental strategies, companies will go beyond compliance and focus on "prevention", a systemic approach that emphasizes "source reduction" and "process innovation" (Russo & Fouts, 1997). Firms notice that well-planned environmental strategies can bring about various benefits, such as improved product quality, cost reduction, better company image, employee commitment and the expansion of existing markets (Quazi, 2001). The green business literature usually makes a distinction between firms that merely aim at meeting the minimum legal requirements in the environmental aspect, and those that implement more proactive environmental practices (Schot & Fischer, 1993). One essential consideration is that firms may show different environmental strategies depending on the internal factors like "environmental resources, environmental capabilities, management attitudes, corporate cultures and

past experience in environmental practices" (Lee & Rhee, 2005). Some companies have incorporated the protection of the ecology in their own cultures and enshrined the environment in their core values to guide their business activities (Buil-Carrasco, Fraj-Andres, & Matute-Vallejo, 2008).

In short, the concept of "integration" in the definition of environmental strategies, i.e. determining to what extent the companies have integrated the environmental issues into their strategic activities, is believed to be more sophisticated than Banerjee's (2002) two-level concept. The proposed notion of "integration" can fully illustrate the holistic manner in which companies deal with their environmental issues.

2.4 Consequences

2.4.1 Corporate Performance

The primary pursuit of a business is to create and maintain value (Conner, 1991). One of the most fundamental concerns for the managers to pursue corporate environmentalism is the impact of the adoption of environmental strategies on corporate performance (Robins & Wiersema, 1995). There is a long perceived image that business development and environmental

protection are incompatible and multifaceted (Bansal, 2005). This view is based on the conflicting perspective (win-lose perspective), in which improvement in environmental performance is thought to be a burden for the business and will lead to an increased cost for the consumers, whereas profitability will inevitably induce environmental degradation. Another view, the compatibility perspective (win-win perspective), is regarded as a new idea which indicates that a win-win situation may be achieved between businesses and the environment (Angel del Brio, Fernandez, & Junquera, 2005). Margolis and Walsh (2001) and Margolis and Walsh (2003) have reviewed the empirical studies dealing with the relationships between corporate social performance and corporate financial performance. Although the results were mixed, there was no contradiction between corporate social performance and maximizing shareholder values. In the light of these contrasting views, a more rigorous study of the relationship between environmental management and business performance will be beneficial to both the academics and the practitioners.

Firm performance is a multi-aspect phenomenon that is not easy to measure (Snow & Hrebiniak, 1980). Traditionally, corporate performance

refers to the financial performance of the firms. Financial performance is a construct emphasizing on profitability and growth of the firms (Judge & Douglas, 1998). Financial performance variables include widely used measures embracing levels, growth and variability in profit as well as such measures as market value, assets, equity, cash flow, sales and market/book value (e.g. Berman, Wicks, Kotha, & Jones, 1999; Capon, Farley, & Hoenig, 1990; Russo & Fouts, 1997). Objective financial information can be gathered from the financial reports and financial statements, especially if the companies are public listed. Besides, various financial databases such as COMPUSTAT and the Stern Stewart Performance 1000 provide reliable financial data (Ellinger, Ellinger, Yang, Howton, 2002).

The second source of financial data is the "perceptual performance data". Miller and Cardinal (1994) provide a potential reason for a preferred reliance on perceptual performance data. They state that "it may be that informant data, which individuals typically give under conditions of promised anonymity for their firms, basically reflect true performance, but archival data to a substantial degree reflect public relations, tax, and other extraneous considerations that create noise in the data" (Miller & Cardinal,

1994, p. 1661). Similarly, Beamish (1993) argues that there may be biases in the financial information released by the governments or firms of developing countries, particularly China.

Prior studies have suggested that subjective measures of financial performance like return on investment, return on assets and profitability relative to competitors are correlated with the objective measures with a high degree of reliability (Dess & Robinson, 1984). In the strategic management field, the use of perceived financial measures is also well established (Miller & Cardinal, 1994). Various researchers have collected perceived financial data in the environmental-related studies (Chan, 2005; Fraj-Andres, Martinez-Salinas, Matute-Vallejo, 2008; Judge & Douglas, 1998; Lee & Rhee, 2007; Lindell & Karagozoglu, 2001; Sharma & Vredenburg, 1998; Venkatraman & Ramanujam, 1986).

The NRBV theorists argue that "the measurement of corporate performance should take the firms' financial as well as environmental performance into account" (Chan, 2005). Environmental performance is conceptualized as organization-wide commitment to environmental excellence relative to the rest of the industry in a variety of areas (Judge &

Douglas, 1998). Many researchers attempt to explain environmental performance by using proxies such as toxic releases (King & Lenox, 2000; Klassen & Whybark, 1999; Russo & Harrison, 2005), waste generation and waste processing activities (King & Shaver, 2001), material consumption (Corbett & DeCroix, 2001), and the adoption of ISO 14001 (Christmann & Taylor, 2001; Gonzalez-Benito & Gonzalez-Benito, 2005; Jiang & Bansal, 2003). Meanwhile, much research in this stream rates environmental performance by the degree to which organizational actions exceed environmental regulations (Aragon-Correa, 1998; Aragon-Correa & Sharma, 2003; Buysse & Verbeke, 2003; Hart, 1995; McKay, 2001; Sharma, 2000; Winn & Angell, 2000). King and Lenox (2001) point out that some researchers use several measures of environmental performance derived from Kinder, Lydenberg & Domini (KLD) databases. In some studies, researchers have used the annual release of toxic emission data through the U.S. Environmental Protection Agency's Toxic Release Inventory (TRI) program as the event (King & Lenox, 2001).

Similar to financial performance, environmental performance can be measured by using perceived performance data. For instance, Judge and

Douglas (1998) assume that environmental performance is "the firm's effectiveness in achieving and exceeding societal expectations with respect to its concerns about the physical environment". They use multiple criteria to evaluate the "greenness" of a company, such as whether it has complied with the environmental regulations, or whether it has avoided and mitigated any environmental crises. These survey-based perceptual measures have been empirically validated and are reliable for future studies.

2.5 Moderating Variables

2.5.1 Regulatory Stakeholder Influence (RSI)

In quest for legitimacy, a firm will abide by all essential environmental regulations, which are either formal (e.g. environmental laws) or informal (e.g. demands for environmental protection by non-governmental organizations (NGOs) as well as customers, competitors and the community). Those parties which influence the firms' environmental practices are the stakeholders (Buysse & Verbeke, 2003). Organizations will adapt their internal characteristics in order to meet the expectations of the salient stakeholders in their environment.

Although there is no definite logical or causal relationship between the ideas of sustainable development and multi-stakeholder consultations, there appears to be a very strong similarity between the two concepts among the core actors in the environmental community (Jennings & Zandbergen, 1995). Environmental demands from salient stakeholders can actually enhance the company performance by translating corporate environmental consciousness into corporate strategies.

The resource dependency theory indicates that "organizations must attend to the demands of those in their environment that provide resources necessary and important for its continued survival…organizations will respond more to the demands of those organizations or groups in the environment that control critical resources" (Pfeffer, 1982, p. 193). Extension of resource dependency theory to the stakeholders shows that firms will be more concerned about the stakeholder groups who control critical resources to the survival of companies (Agle, Mitchell, & Sonnenfeld, 1999). For instance, the Canadian regulators can deny a forestry company license to operate on the government land unless it adopts certain sustainable practices (Sharma & Henriques, 2005).

Over the past decade, various stakeholders in China demand for better environmental standards from the manufacturing firms. In China, the government is the most important environmental stakeholder (Ulrich, Fang, & Lu, 2003). In many developing countries, environmental regulations have largely been initiated by the government in a "top-down" manner. Domestic environmental groups are seldom involved in the drafting of environmental regulations (Tang, Tang, & Lo, 2005).

Under the current environmental regulatory system in China, the State Environmental Protection Administration (SEPA) is the regulatory stakeholder in China which formulates the national policy, laws and administrative regulations for environmental-related issues. These regulations and laws definitely affect the operations of firms. For instance, in 2007, four hundred industrial firms were shut down by the SEPA during a crackdown aimed at cleaning up China's rivers. The campaign recovered US$96 million in pollution fines (China Economic Review, 2007). In the implementation level, the Environmental Protection Bureaus (EPBs) are the major stakeholders that exercise the environmental regulatory authority (Lu,

2005). The influence of regulatory stakeholders in this study is referred to as the "regulatory stakeholder influence (RSI)".

2.6 Research Gaps

Starting from the late 1980s, management scholars have begun to study different firms in order to develop and conduct firstly conceptual and then empirical studies on various facets of corporate environmentalism. However, it is argued by some scholars that corporate environmentalism has not been clearly defined and operationalized (Sharma & Aragon-Correa, 2005). The seriousness of environmental problems facing the world today makes it urgent for the theoretical and applied research in this area to move forward. After reviewing the environmental-related literature, a number of research gaps which are worth studying further have been identified. These research gaps include: 1) theoretical issues, 2) methodological issues, and 3) research setting.

2.6.1 Theoretical Issues

Regarding the theoretical issues, it is argued by Gladwin, Kennelly and Krause (1995) that the current research on the natural environment is mostly done in areas such as environmental economics, sociology and psychology. Relatively few studies have yet been conducted in the management disciplines (Sharma, 2002). Although the recent research in corporate environmentalism has introduced insights from the management field, an examination of the environmental management of organizations is still regarded as a recent scholarly phenomenon (Zhu, Sarkis, & Lai, 2007). Besides, it is stated by Slater and Angel (2000) that the nature of interactions between environmental issues and organizational strategies is complex and dynamic. Researchers also criticize the fragmentation of ideas that corporate environmentalism positively affects business performance (Capaldi, 2005; Dyllick & Hockerts, 2002; Lindell & Karagozoglu, 2001). Nevertheless, previous researchers tend to study these dynamic issues from a single perspective (Bansal, 2005). There is still work to be done to bring together the different strands of work on environmental issues and develop their theoretical grounding (Barakat, 2006). Referring to Appendix 1, it

reveals that the majority of the research relating to environmental issues relies mainly on a single perspective at one time. Different perspectives can actually cross-fertilize each other, and a holistic picture of corporate environmentalism can thus be obtained. Also, the generalization power of the research can be increased.

Barakat (2006) argues that fragmented academic theory is grounded in various theoretical disciplines with little coherent theory on corporate environmentalism. As mentioned previously, we would like to apply the NRBV perspective to investigate the issue of corporate environmentalism in a holistic manner. During the last couple of decades, the NRBV perspective has been a useful and influential research stream in the strategic management field. The literature has evolved from a generic rationale for the strategic importance of organizational resources, through the identification of specific resources and capabilities that can help firms generate competitive advantage, to the arguments and rationales for examining the contingent effects of the business environment on capability development and deployment. We have tried to apply the NRBV perspective as the fundamental framework to organize our study.

In addition to the NRBV perspective which emphasizes the internal side of operation of firms, institutional theory provides management scholars a conceptual way to consider the concerns that were often seen as external to the operation of firms (Saiia, 2007). The salient institutions can interfere with the pursuit of objectives, goals and mission of firms. The NRBV perspective is considered far from comprehensive, as it undermines the pivotal role that various external institutions/stakeholders often play in shaping the firm's environmental strategies (Buysse & Verbeke, 2003). Hoffman (1997) suggests that firms are not always profit maximizers. Their policies often reflect external pressures for legitimacy. To gain the legitimacy, firms have to operate with green strategies (Prakash, 2002). Barakat (2008) argues that fragmented academic theory is grounded on various theoretical disciplines with few coherent theories on corporate environmentalism. By integrating different theoretical perspectives (i.e. the NRBV perspective and the institutional theory), we shall be able to understand both the internal and external mechanisms of corporate environmentalism. To consider the institutional influence (i.e. the external

influence) in this study can help investigate the issues of corporate environmentalism in a holistic way.

2.6.2 Methodological Issues

With regard to the methodological issue, the earliest research works on this topic mainly include case studies, dissertation-based articles, textbooks and text supplements. Stubbs (2000) comments that for the theory to have more practical value, there is a need for more empirical research. Besides, most of the previous studies have been conducted by using a single method. For instance, from 1995 to 2007, over sixty empirical studies relating to environmental issues in the business operations had been published in the academic journals like *Academy of Management Journal, Business Strategy and the Environment, Strategic Management Journal,* etc. Most of them have applied either qualitative or quantitative method alone. Only a few of them, such as Simpson, Taylor and Barker (2004) and Lee and Rhee (2005) have applied both quantitative and qualitative methods. For instance, Simpson et al. (2004) have carried out their research by combining postal questionnaires, telephone interviews and factory site visits in order to collect

the relevant data. The use of a combination of quantitative and qualitative research methods is essential to overcome the deficiencies of single method (Oppermans, 2000). Moreover, it is argued that the complementary use of the dual approach will provide a greater range of insights and perspectives and permit triangulation or confirmation of findings by different methods. This will improve the overall validity of the results and make the study of greater value to the academics as well as the practitioners.

2.6.3 Research Setting

One major limitation of the previous corporate environmentalism research is that the majority of the literature focuses on advanced and industrialized economies (refer to Appendix 1). Relatively few studies have been conducted on corporate environmentalism in the developing countries, where more challenging socio-economic and political institutions are found in operations (Cummings, 2006). China in the late 1990s offers an ideal setting for studying the formulation of green strategies (Branzei, Ursacki-Bryant, Vertinsky, & Zhang, 2004). In particular, the rapid economic growth in the Pearl River Delta Region (PRD) relies on the

"extensive expansion of production with high consumption of energy and natural resources" (Hong Kong Trade Development Council, 2007). This fast growth rate has resulted in quick generation of wastes and serious air and water pollution. In fact, the environmental problems have aggravated to the extent that they may constrain its GDP growth. Zhang (2008) comments that research about the Chinese firms' strategic decision-making relating to the environmental issues is insufficient and fragmented. More studies are required to examine how the Chinese firms respond to the worsening environmental issues.

2.7 Summary

In sum, a review of the literature on corporate environmentalism and other related theories, i.e. the NRBV perspective and institutional theory, has provided a strong basis for the development of theoretical framework for this study. A thorough review of the available literature has revealed the research gaps mentioned above. In Chapter 3, a proposed model to study the concept of corporate environmentalism in the PRD, China is explained in detail.

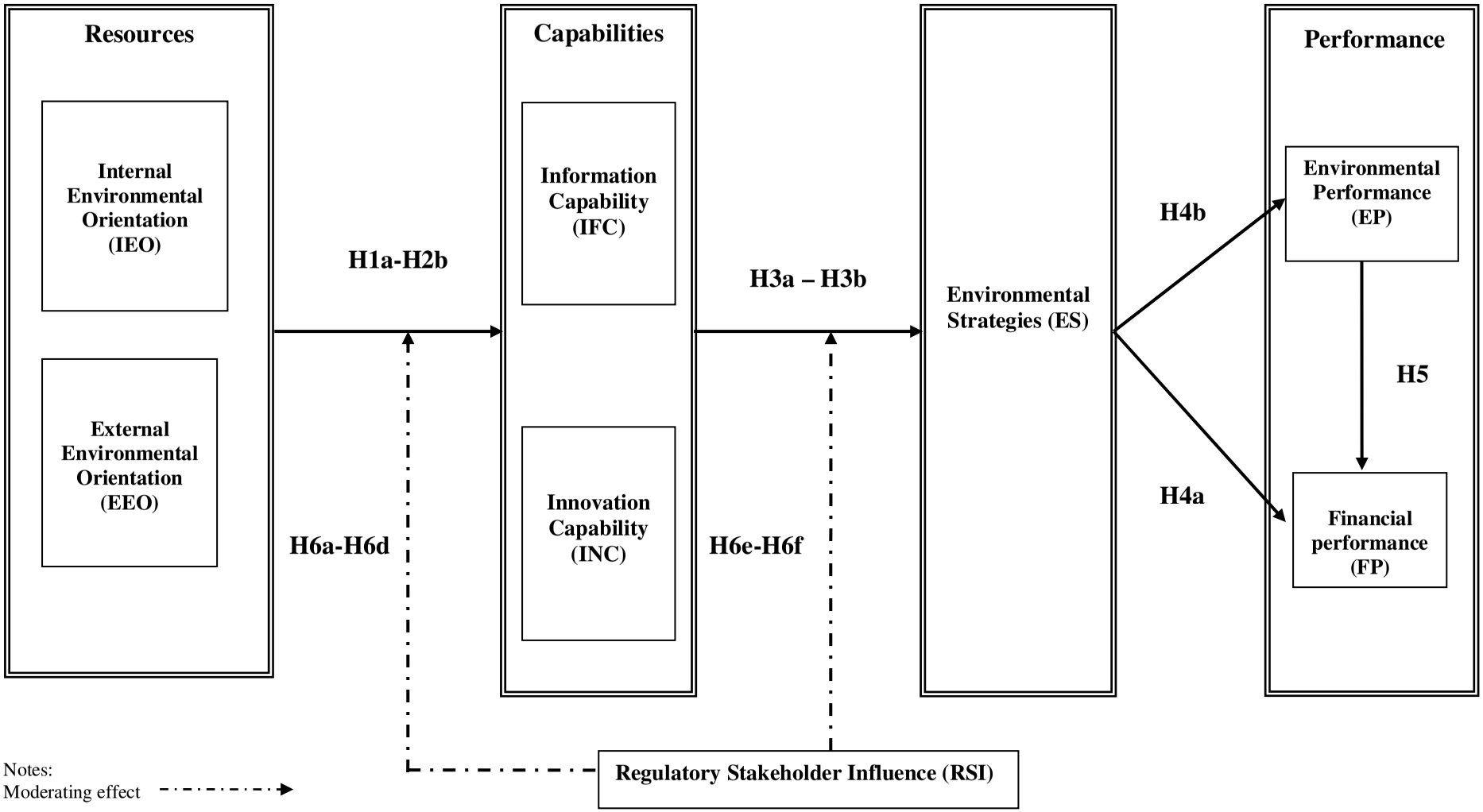
CHAPTER 3

THEORETICAL DEVELOPMENT AND HYPOTHESES

3 Introduction

Based on the literature review in Chapter 2, a conceptual model delineating the hypothesized relationships among all the constructs under investigation is presented in Figure 1. In the following, the research questions and the theoretical framework as well as the hypotheses are reviewed.

Figure 1. Proposed Conceptual Model



3.1 Research Questions

1. What is the current situation of corporate environmentalism in the Pearl River Delta region (PRD), China?
2. How much do environmental orientation and capabilities matter in explaining the variations in firm performance?
3. To what extent does the practice of proactive environmental strategies lead to positive environmental and financial performance?
4. Does the institutional factor influence the pursuit of corporate environmentalism?

3.2 Research Model

As mentioned in the previous Chapter, the model of this study is constructed based on the related studies of corporate environmentalism, the NRBV literature and institutional theory (Banerjee, 2001; Bansal, 2005; Chan, 2005; Clemens & Douglas, 2006; Henriques & Sadorsky, 1999; Judge & Douglas, 1998, Khandekar & Sharma, 2005; Melnyk, Sroufe, & Calantone, 2003; Wagner & Schaltegger, 2004, etc.). The proposed model describes the antecedents (resources), mediating variables (capabilities and environmental strategies), consequences (financial and environmental performance) and moderator (regulatory stakeholder influence) of this study. The rationales behind the setting up of these hypotheses are discussed below.

3.2.1 Relationship between Environmental Resources (IEO, EEO) and Environmental Capabilities (IFC, INC)

In the NRBV perspective, Hart (1995) has adopted Grant's (1991) view by treating resources as the antecedent of capabilities and the fundamental unit of analysis for studying the competitive advantage of firms. It is argued by Grant (1991) that resources are the inputs into the production processes. They comprise capital equipment, finance, skills of individual employees, patents, brand names, finance and so on. On the other hand, capabilities are the capacities for a group of resources to perform some tasks or activities. In other words, they constitute what companies can do as a result of bundles of human and non-human resources working together.

Grant's view on the distinction between resources and capabilities has been widely shared among other researchers. For instance, Amit and Schoemaker (1993) emphasize in their conceptual paper that there is a difference between resources and capabilities. Capabilities can be viewed as the antecedent of resources. Besides, Judge and Douglas (1998) have conducted an empirical research using a set of data collected from an array of U.S. companies and industries. They have concluded that adequate resources must be committed to the planning of activities for firms to be successful. To put it briefly, these resources become the organizations' capabilities to incorporate environmental issues into their strategic planning processes, thus leading to better business performance. Aragon-Correa and Sharma (2003) also accept the distinction between resources and capabilities in their conceptual paper. They claim that it is possible for firms to

accumulate large stocks of resources without generating any competitive and useful capabilities. Recently, Chan (2005) explicitly differentiates between "firm-specific resources" and "organizational capabilities" by studying the adoption of environmental strategies of foreign invested companies in China.

Referring to our study, we have already mentioned in Chapter 2 that internal environmental orientation (IEO) can be interpreted as "a firm's pro-environmental corporate culture" (Banerjee, 2001), which is a kind of firm-specific resource. In the strategic management literature, corporate culture can be conceived as a pattern of belief and expectation shared by the employees and constituting the foundation for shaping their behavior (Prahalad & Bettis, 1986). If firms focus a large part of their internal orientations towards the environmental issues, all employees will consider environmental protection as a fundamental moral obligation. Consequently, they will be more sensitive to the environmental-related information as the environmental issues are legitimate corporate concerns (Charter & Polonsky, 1999). The employees can also gain more environmental information by information sharing and idea exchange. As a result, the whole company can eventually acquire deepened environmental knowledge. With better environmental information, firms will improve their competence in addressing environmental issues. This competence can be regarded as a firm's "information capability" (IFC). Likewise, Sharma, Pablo, and Vredenburg (1999) discover from their longitudinal study in the Canadian oil industry that firms with pro-environmental cultures undertake detailed

environmental audits and make the environmental-related information available to all of their employees.

On the other hand, the external environmental orientation (EEO) refers to the managerial perceptions of the need to respond to the environmental demands of external stakeholders (Banerjee, 2001). This orientation is also regarded as a kind of resource. Bansal and Roth (2000) present their case study data and argue that if firms fail to react to the constraints from external stakeholders, they will not gain legitimacy from the stakeholders, and will risk their license to operate. In the empirical study of Buysse and Verbeke (2003), they find that firms tend to respond to a wider range of stakeholders if they are concerned about green issues in their operations. Consequently, environmental managers are the most likely ones to interact with these stakeholders in the context of green information sharing and resolve the green-related problems.

Secondly, companies with stronger strategic orientations, both internal and external, are usually more innovative (Silverman, 1999). In other words, firms with stronger environmental orientations may spend relatively more effort to comply with the current environmental regulations or adapt to the environmental issues by developing more innovative products. By studying the United States retail food industry, Marcus and Anderson (2006) argue that it will be more likely for companies to design environmentally sound technologies to minimize their environmental impacts, since they have a mission to protect the environment. Besides, if the employees perceive strong signals of their companies' orientations to

reduce their environmental impacts, they are more likely to facilitate and trigger the development of innovative technologies to solve the environmentally related problems. This kind of ability can be regarded as the firm's "innovation capability" (INC). Ashford (1993) proposes a similar argument that if there is a full environmental involvement of the employees, different employees can bring together different sources of expertise. As a result, the companies will be able to apply and adapt to the eco-friendly technologies effectively. By conducting a survey in the European companies, Ramus and Steger (2000) conclude that with substantial involvement in the environmental issues, the whole company will try to exploit innovative methods to tackle the environmental problems.

Furthermore, by studying the green supply chain management in China, Zhu, Sarkis and Lai (2007) suggest that firms with both internal and external environmental orientations will integrate their environmental considerations into the whole product life cycle. To support the new green product life cycle, companies will spend a considerable amount of research and development efforts on green-related aspects. These efforts can be regarded as a kind of innovation capability.

In the light of the above discussion on the relationship between environmental orientations (IEO and EEO) and environmental capabilities (IFC and INC), four hypotheses have been formulated.

*Hypothesis 1a: A firm's level of **internal environmental orientation** is positively related to the extent to which it develops **information capability.***

*Hypothesis 1b: A firm's level of **internal environmental orientation** is positively related to the extent to which it develops **innovation capability**.*

*Hypothesis 2a: A firm's level of **external environmental orientation** is positively related to the extent to which it develops **information capabilit**y.*

*Hypothesis 2b: A firm's level of **external environmental orientation** is positively related to the extent to which it develops **innovation capability**.*

3.2.2 Relationship between Environmental Capabilities (IFC, INC) and Environmental Strategies (ES)

Having resource and capability alone is not enough to guarantee success in pursuing corporate environmentalism. Once the firms have acquired the necessary capabilities, they hence have the ability to coordinate various resources and make use of these resources to implement the firms' strategies (Aragon-Correa & Matias-Reche, 2005; Bansal, 2005; Barney & Hansen, 1994; Delmas, 2002; Ginsberg, 1994; Hart, 1995; Montgomery & Wernerfelt, 1988). In the management context, Eisenhardt and Martin (2000) emphasize that capabilities consist of a set of explicit and identifiable processes allowing companies to generate new, creative and value-added

strategies. Aragon-Correa and Rubio-Lopez (2007) propose in their conceptual paper that proactive strategy to manage the business/natural environment interface must have dynamic capability characteristics in order for the companies to align themselves with the changes in their general business environment.

The dynamic capability approach may further illustrate the relationship between capabilities and strategies. Dynamic capability refers to "the ability of a firm to achieve new forms of competitive advantage by continually building, adapting and reconfiguring its competence to achieve congruence with the changing business environment" (Teece, Pisano, & Shuen, 1997; Eisenhardt & Martin 2000). Examples of dynamic capabilities in the literature include innovative product development and knowledge management (Eisenhardt & Martin 2000). Dynamic capabilities are necessary for businesses to identify practices that are important for the success of organizations (Luo, 2000). If companies can acquire firm-specific capabilities and keep developing these capabilities, they can strengthen their ability to implement specific business strategies (Helfat, Finkelstein, Mitchell et al., 2007; Ray, Barney, & Muhanna, 2004). In short, the ability of firms to pursue certain strategies may be limited by the capabilities they possess.

It is mentioned in Chapter 2 that among the different types of capabilities, academics highlight two which are related to environmental management, i.e. information and innovation capabilities. In the current study, if firms have more information capability (IFC), they can combine

external knowledge with existing internal knowledge to help develop new strategies for tackling the environmental problems (Sharma, 2005). For instance, Dean and Brown (1995) share a similar view that companies with deepened environmental knowledge will have better competence in addressing the environmental issues. Van Kleef and Roome (2007) argue in their paper that the capability of companies to acquire the business-natural environment knowledge can have a fundamental influence on the development of sustainable solutions to environmental problems. Furthermore, Zsoka (2008) concludes from his survey of Hungarian manufacturing companies that companies can obtain external knowledge through outside experts and management systems (e.g. external audit, environmental management system, etc.) and gain internal knowledge from previous experience (e.g. environmental incidents leading to prosecution) in order to set up new environmental strategies.

On the other hand, if companies have innovative capability (INC), they can develop new methods and ideas in their production processes which help them operate with proactive environmental strategies (ES). If companies put more emphasis on environmental innovation, they will have relatively greater motivation to adopt advanced and comprehensive environmental practices. By studying one of the world's largest automobile companies, Honda, Schilling, Johng, Kang, Sul and Takanashi (2005) point out that this company has devoted the highest percentage of its revenue to research and development in order to develop novel technologies and

position itself as the environmental leader among the automobile manufacturers.

Based on all aspects discussed above, two pertinent hypotheses have been formulated.

*Hypothesis 3a: A firm's level of **information capability** is positively related to the extent to which it practices **environmental strategies**.*

*Hypothesis 3b: A firm's level of **innovation capability** is positively related to the extent to which it practices **environmental strategies**.*

3.2.3 Relationship between Environmental Strategies (ES) and Performance (FP, EP)

The impact of strategy on the firms' performance has been a central concern of strategic management for decades (Robins & Wiersema, 1995). In general, integrating the natural environment into business strategies enables the companies to improve their performance (Angel del Brio, Fernandez, & Junquera, 2005). Their business performance has been regarded as the ultimate dependent variable in empirical terms (Chakravarthy, 1986).

Traditionally, corporate performance is equated to financial performance. Corporate environmentalism initially follows the economic bottom line (Agarwala, 2005). Shrivastava (1995c) provides a comprehensive explanation of how the implication of various environmental strategies (ES) may provide firms with positive financial performance (FP). Actually, the positive influence on financial performance is mainly

attributed to the costs of production are reduced and the production processes are improved.

Theorists of NRBV assert that the measurement of business performance should consider both the financial and environmental performances (Judge & Krishnan, 1994). Indeed, Judge and Douglas (1998) regard environmental performance as "the firms' effectiveness in meeting and exceeding societal expectations with respect to concerns about the natural environment". More specifically, it refers to "the firms' proactive attitudes concerning future environmental considerations, and extends beyond mere compliance with the existing environmental laws and regulations" (Chan, 2005). In the empirical study of Judge and Douglas (1998), the results show that the adoption of proactive environmental strategies (ES) leads to higher environmental performance (EP) as well as financial performance (FP).

Based on the above rationales, two more hypotheses have been developed:

Hypothesis 4a: The extent to which a firm practices ***environmental strategies*** *is positively related to its* ***financial performance.***

Hypothesis 4b: The extent to which a firm practices ***environmental strategies*** *is positively related to its* ***environmental performance****.*

Along with the direct influence of proactive environmental strategy on financial performance, this study further suggests that the adoption of proactive environmental strategy will exert an indirect influence on financial performance through environmental performance. The development of this proposition is based on the argument that the implementation of environmental strategies will lead to enhanced good will and, as a result, higher sales (Sharma & Vredenburg, 1998). An empirical survey conducted by Russo and Fouts (1997) on firms in the United States confirm that the firms' environmental performance does have statistically positive relationship with their financial performance. Konar and Cohen (2001), who conduct an empirical study on the U.S. firms, also obtain similar results that the environmental performance of firms does have a statistically significant positive relationship with their financial performance. In the same year, Margolis and Walsh (2001) reviewed 95 empirical studies in academic journals to study the relationship between corporate social performance (CSP) and corporate financial performance (CFP). Similarly, two years later, Margolis and Walsh (2003) reviewed 127 studies conducted between 1972 and 2002 which deal also with the relationship between CSP and CFP. Almost half of the studies found a positive relationship between CSP and CFP, while only 7 studies indicated a negative relationship. They therefore conclude that the collection of findings suggests a positive rather than negative relationship between CSP and CFP. Similar results are found by the meta-analysis of Orlitzky, Schmidt and Rynes (2003). They examine the relationship between CSP and CFP, and find that there is apparently no

conflict between corporate social and environmental responsibility and maximization of financial performance. Furthermore, Nakao, Amano, Matsumura, Genba and Nakano (2007) have conducted an empirical research on the Japanese firms. From their research, they conclude that the environmental performance has a positive influence on its financial performance and vice versa.

On the contrary, poor environmental practices can expose firms to increased risk of serious industrial accidents that may result in large regulatory fines and costly lawsuits and adversely affect the financial performance of the firms (Rees, 1994). Various researchers state that good environmental performance is associated with increased operational effectiveness, improved innovation, enhanced learning, reduced insurance costs and differentiation of products and services. In combination, they can well offset the costs of implementing environmental improvements, and hence will eventually improve the financial performance of the firms (Hart & Ahuja, 1996; King & Lenox, 2002; Klassen & McLaughlin, 1996; Klassen & Whybark, 1999; Porter & van der Linde, 1995). On the above basis, hypothesis5 is developed:

*Hypothesis 5: A firm's **environmental performance** is positively related to its **financial performance**.*

3.2.4 Moderating Effects of Regulatory Stakeholder Influence (RSI)

This study also hypothesizes the moderating effects of regulatory stakeholder influence (RSI) on the relationship between environmental orientation and environmental capability, as well as the relationship between environmental capability and environmental strategy.

Prior to the discussion of RSI, it is important to understand first the concept of "uncertainty". Uncertainty means that "the managerial perception of the general business environment or one of its components is unpredictable" (Dee & Beard, 1984; Milliken, 1987). Coping with uncertainty in the general business environment has been considered as a central problem for organizations (Becker & Kundsen, 2005). Scholars have maintained that managers facing uncertain business environment tend to be more proactive, and willing to take more risks and use more pioneering strategies than those in a less turbulent environment (Miles & Snow, 1978; Milliken, 1987). Another theory, the contingency theory, can help explain the moderating effects proposed in this study. Contingency theory purports that to remain viable, organizations in an uncertain environment will adapt their capacities to the rapidly changing environment (Terreberry, 1968). With reference to the contingency view of organizations (Donaldson, 2001), several management researchers like Claycomb, Droge and Germain (2001) have treated state uncertainty as a moderator in order to examine the possible effect on the relationship among various variables in the strategic decision-making process. They find that firms which can determine the moderating effect of different types of environmental uncertainties they face

upon their knowledge-performance relationship will perform better in terms of market performance indicators.

Besides, according to the perceived uncertainty literature, increasing institutional influence, which is likely to lead to new regulations for environmental performance, will raise the level of perceived uncertainty in the operating environment (Aragon-Correa & Sharma, 2003). By reviewing uncertainties as a moderating variable, the two researchers argue that if companies perceive the business environment as "uncertain", they will be more proactive in putting in their resources to generate competitive capabilities and utilizing these capabilities to practice environmental strategies (Chan, 2005).

In some developing countries like China, the inadequate institutional infrastructure complicates the business operating environment (Xin & Pearce, 1996). The relatively immature governmental agencies and legal institutions in China have led to "environmental instability" (Li & Atuahene-Gima, 2001). By empirically studying the waste management industry, Delmas (1999) observes that if companies perceive the business environment as highly uncertain (i.e. they perceived inability to predict the accurate information in doing business), they will be more eager to spread the environmental culture within firms in order to collect as much environmentally-related information as possible in their operation.

For organizations with environmental orientations, especially when the environment of operation is dynamic with institutional pressures, more innovative technologies will be developed, and more information about the

environmental issues of the firms will be collected. In other words, if the companies are concerned that the institutional parties will set up more laws and regulations, they will be more attentive to the environmental aspects, seek for more information and search for innovative ways to deal with environmental problems (Child & Tsai, 2005). Thus, the relationship between intangible resources (internal and external environmental orientations) and capabilities (information and innovation capabilities) will be strengthened by institutional influences.

Moreover, it is argued that in order to survive in a more unstable business environment, firms will be more willing to develop capabilities such as continuous innovation, and to collect more green information related to the production processes associated with a proactive environmental strategy. This argument is based on the rationale that an increase in state uncertainty will make the firms realize the serious nature of threats to their survival. Besides, as environmental uncertain situations become more critical, more information must be processed among the decision-makers to accomplish better performance (Galbraith, 1977). Majumdar and Marcus (2001) also find that uncertain business operations have contributed to innovative solutions in the US utility firms.

Furthermore, firms will devote more effort to ensure that their capabilities are effectively transferred to develop suitable environmental coping strategies. Aragon-Correa and Sharma (2003) argue in their conceptual paper that an increase in state uncertainty will lead to a stronger positive effect of resources and capabilities on proactive environmental

strategies. Their theoretical framework explains how the characteristics of business operating environment moderate the utilization of capabilities for environmental strategies.

Based on the above analysis, the following hypotheses have been formulated:

Hypothesis 6a: Regulatory stakeholder influence positively moderates the relationships between ***internal environmental orientation*** *and* ***information capability***.

Hypothesis 6b: Regulatory stakeholder influence positively moderates the relationships between ***external environmental orientation*** *and* ***information capability***.

Hypothesis 6c: Regulatory stakeholder influence positively moderates the relationships between ***internal environmental orientation*** *and* ***innovation capability***.

Hypothesis 6d: Regulatory stakeholder influence positively moderates the relationships between ***external environmental orientation*** *and* ***innovation capability***.

Hypothesis 6e: Regulatory stakeholder influence positively moderates the relationships between ***information capability*** *and* ***environmental strategies***.

Hypothesis 6f: Regulatory stakeholder influence positively moderates the relationships between ***innovation capability*** *and* ***environmental strategies***.

3.3 Summary

In summary, the above hypotheses were examined in the Pearl River Delta region in order to answer the research questions of this study. In the next chapter, the mixed method (both qualitative and quantitative) of this study is presented in detail. The combination of these two research methods are believed to be a strong feature of this study.

CHAPTER 4
RESEARCH METHODOLOGY

4. Introduction

This chapter discusses the specific methodological procedures employed in this research to test the proposed model of corporate environmentalism. The data collection involves two main stages, i.e. the in-depth interviews and the questionnaire survey. The objectives of these two stages are to verify and test those specific hypotheses stated in Chapter 3.

4.1 Research Methods

A combination of both qualitative and quantitative research methods was employed in order to make the study more comprehensive. These two types of research methods served different aims. For the in-depth interviews, the main premises and ideas from corporate environmentalism literature, NRBV perspective and institutional theory were applied to investigate the current situations of manufacturing industry in the China's Pearl River Delta Region (PRD) in implementing corporate environmental strategies. The interviews provided respondents an opportunity to describe different stories

about firms and their relation with the natural environment. The qualitative research contributed to the survey design, the questionnaire development, data collection and data analysis in the later stage. For instance, previous studies by Banerjee (1996) suggested that interviews with managers would help develop a more relevant survey design and allow for greater specificity of the items in the survey.

Besides, quantitative analysis was employed to validate the constructs and test the hypotheses. It was also used to evaluate the proposed model which was developed by obtaining ideas from literature review and interviews. By utilizing multiple sources to investigate the situation, it might reasonably be referred to as a mixed (Tashakkori & Teddlie, 2002) or triangulating methodology (Yin, 1994). As all methods of data collection have limitations, the use of multiple methods can neutralize or cancel out some of the disadvantages of certain methods (e.g. the detail of qualitative data can provide insights not available from a general quantitative survey). Hence, it is widely accepted that "a combination of different types of data collection methods can strengthen a study" (Tashakkori & Teddlie, 2002).

In the following, the details of our qualitative as well as quantitative research are discussed.

4.2 Phase One: In-depth Interviews

4.2.1 Samples: In-depth Interviews

As mentioned in the previous chapter, the PRD was selected as the focus of this qualitative study because of its fast pace of economic growth, unique institutional structure and being in the early stage of environmentalism (Child & Tsai, 2005; Tan & Tan, 2005). The manufacturing industry is important to the economy of the PRD. This industry is regarded as an economic powerhouse, contributing to more than 10 percent of the country's gross domestic product in 2007 (Shi, 2008). However, the PRD has paid a great price in terms of environment for the economic miracles it has created. For instance, the emission of sulfur dioxide in the PRD accounted for five percent of the country's total emission in 2007 (APECC, 2008). The PRD region thus provides a preferable setting for conducting this study.

With the cooperation of the Federation of Hong Kong Industries (FHKI) and the Guangzhou Environmental Protection Bureau (GZEPB), a

list of potential respondents was developed. The selected firms were recognized as "environmental leaders" in their industries and were recipients of various environmental excellence awards, similar to those selected in comparable studies in the past (e.g. Banerjee, 2001; Verschoor & Reijnders, 2000). Since all selected firms had already implemented some types of environmental programmes, this had enabled us to gain more knowledge in the field of corporate environmentalism.

Besides, the respondent had to be 1) the senior/top person who was directly responsible for the environmental issues, or 2) a senior/top manager with substantial environmental responsibilities. The understanding of the perceptions of corporate environmentalism by the top management is therefore critical, as it usually plays a vital role in formulating and enforcing corporate environmental strategies (Banerjee, 1998; Starik & Rands, 1995; Taylor & Welford, 1993).

In total, seventeen managers with the job titles of "Senior Manager", "Plant Manager", "Senior Plant Manager", "Manufacturing Director", "Chief Operating Officer", "Electric and Mechanical Manager", "Managing Director", "Head (Environmental, Health and Safety)" and "Chief Executive

Officer" had been interviewed. All selected respondents were key informants who had access to privileged information about their firm's environmental activities. Particulars and details of the firms are given in Chapter 5.

4.2.2 Research Instruments: In-depth Interviews

For the in-depth interviews, questions were asked in order to understand the attitudes of managers and their perception of corporate environmentalism. These included the principles and concepts of environmental responsibility, the fundamental factors which contributed to the ecological responsiveness of the firm, and the production processes, institutional influences and operations benefits regarding the corporate environmental strategies of the firm. Questions of the interviews were developed according to the input from the appropriate and relevant literature, e.g. the basic concepts from Freeman (1984), Hart (1995) and Sharma (2000). Research questions were assessed by a group of academics including three professors and two Master's students. The final research protocol was developed after several

revisions and amendments. A copy of question template for the interview is included in Appendix 2.

4.2.3 Data Collection: In-depth Interviews

Seventeen in-depth interviews were carried out in the period between January 2007 to June 2007, and sixteen site visits were paid with the permission of the companies. Each interview generally lasted for around sixty minutes, and notes were taken during the interviews. Thirteen of the interviews were recorded with a recorder and then transcribed. For the other four interviews which were not audio recorded, detailed notes were taken by the researcher and transcribed immediately after the interviews had been conducted.

In order to ensure the reliability of information collected, we had adopted the data triangulation method, i.e. to use multiple sources of evidence by asking the respondents as well as paying site visits aimed at corroborating the same fact or same phenomenon (Yin, 1994). Specifically, a range of company materials were collected during the interviews. Information of the companies gathered from the Internet, company

newsletters as well as other publications was used for further analysis. With data triangulation, the potential problems of construct validity can be addressed because multiple sources of evidence essentially provide multiple measures of the same phenomenon (Brannon, 1992; Yin, 1994).

Regarding the procedure of the interview, every interview was started by introducing the study to the interviewees. Next, the interviewees would be asked to describe briefly their firms and operations, their titles or roles, and their firms' environmental practices. Then, they were asked what kinds of environmental activities they had practiced. The interviewees were also asked other questions such as the outcomes of their environmental practices. The questions were open-ended in order to give the managers the greatest degree of freedom of expression.

4.2.4 Data Analysis: In-depth Interviews

To carry out the data analysis, the interview transcripts were analyzed through categorization to identify whether there were any emergent concepts and ideas (Miles & Huberman, 1984). We had carried out the content analysis by firstly identifying a corpus of texts, and then selecting

the unit of analysis within the text (Denzin & Lincoln, 2000). The content of the notes was coded according to the themes/categories appearing in the response to every question (Kondracki & Wellman, 2002; Jehn, 1997). To ensure the reliability and validity of the data coding process, We had two coders, both at Master's level, to identify the emerging themes in corporate environmentalism. The coders went back and forth through the text to establish the emerging themes as well as the relationships between them. The independent marking of the same text for a theme provided evidence that it had external validity and was not just a creation of the investigator's imagination (Ryan, 1999). Examples of how the two coders worked on the corpus of texts are shown in Appendix 3. The details of data analysis of this qualitative research are presented in the Chapter 5.

4.3 Phase Two: Questionnaire Survey

4.3.1 Samples: Questionnaire Survey

The criteria of the targeted respondents of the questionnaire survey were same as the in-depth interviews, i.e. the factory managers in the PRD. Yeung, Shen and Zhang (2004) argue that the PRD has become one of the

world's leading centers for a wide range of manufactured goods, famed for household furniture, electrical products (such as watches and clocks), toys, garments and textiles, plastic products, aluminium products, and a range of other consumer goods. However, considerable pollution in the PRD has been caused by the manufacturing firms (Streets, Yu, Bergin, Wang & Carmichael, 2006). Besides, manufacturing firms face significant pressures from various stakeholders, and they are relatively more environmentally sensitive than firms in the other industries (Angell & Rands, 2002). Hence, environmental business practices were more likely to be found in the manufacturing firms (Handfield, Walton, Seegers & Melnyk, 1997; Buil-Carrasco, Fraj-Andres & Matute-Vallejo, 2008). Services companies were excluded in this study as they differ significantly from industrial firms (Chan, 2005).

To determine the intended sample size (i.e. the number of participants planned to be included in this study), power analysis should be conducted. We illustrated the power analyses by using the data from a published environmental management journal to pool the effect size (MacCallum, Browne, & Sugawa, 1996). The effect size (f^2) was 0.204, and

the total minimum sample size was 109. It meant that there should be at least 109 respondents to achieve adequate power to carry out the planned hypothesis tests.

4.3.2 Research Instruments: Questionnaire Survey

Measurement items in the questionnaire survey were developed based on the inputs from both the interviews and the literature of strategic management, corporate environmentalism and institutional theory. The measuring instruments were assessed by three academics who were knowledgeable about the topic.

The questionnaire items to measure the constructs are presented in Appendix 4 (English version) and Appendix 5 (Chinese version). The questionnaire items were originally in English. To ensure the instrument validity, two Master's students helped translate the proposed questionnaire into Chinese and then translate it back into English (Adler & Campbell, 1989). The process ended when the back-translation was similar to the original English version. A comprehensive review of the questionnaire was conducted, and detailed corrections were made. The items of the

questionnaire were then evaluated for ambiguity, construction faults, sequencing and flow, and the questionnaire was revised accordingly. A pilot test with fifteen top managers was carried out in late 2007 before launching the large-scale survey in early 2008. Those respondents in the pilot test were managers of manufacturing companies who were familiar with the environmental practices in the PRD.

4.3.2.1 Internal and External Environmental Orientations (IEO, EEO)

As mentioned previously, the internal and external environmental orientations will influence the extent to which companies may adopt different kinds of environmental practices. To operationalize the environmental orientations, i.e. IEO and EEO, this study used the instrument adapted and modified from the interview results and the research by Banerjee (2002) and Banerjee, Iyer and Kashyap (2003). With regard to IEO, respondents were asked to indicate their perception on four items on a seven-point scale (1= "strongly disagree" to 7= "strongly agree"). The items were *"environmental preservation is a high-priority activity in our firm", "preserving the environment is a central corporate value in our firm", "our*

firm has a clear policy statement urging environmental awareness in every area" and "most of the employees in our company do not recognize the needs of environmental protection of our firm (reserved item)". In addition, they were also asked to express their opinion on four items that operationalize EEO, i.e. *"our firm has a responsibility to preserve the environment", "environmental preservation is vital to our firm's survival", "my organization's contribution to environmental damage is small" as well as "the natural environmental does not currently affect our firm's business activity (reversed item)".*

4.3.2.2 Environmental Capabilities (IFC, INC)

Similar to environmental orientations, the instruments of measuring environmental capabilities in this study came from two sources, i.e. the results of the in-depth interviews, and the adaptation and modification from the study of Kaleka (2002), Morgan, Kaleka and Katsikeas (2003), Piercy, Kaleka and Katsikeas (1998), Zou, Fang and Zhao (2003). The instruments were also on a seven-point Likert scale ('1= strongly disagree' to '7=strongly agree') in order to solicit information on the degree of

agreement by the respondents with the statements contained in the questionnaire regarding the environmental-related capabilities. Specifically, four items, i.e., *"our company can capture green related information", "our company can acquire green related information", "our company can facilitate collective green learning within the firm", and finally "our company can develop a shared or long-range vision to incorporate environmental issues into the development of the firm",* were set to indicate the information capabilities of firms.

Also, four additional items, *i.e., "our firm can improve and/or modify the existing products (especially in environmental products)", "our company can develop new green product"; "our company can adopt new methods and ideas in the production/manufacturing processes" as well as "our company can facilitate and/or trigger green innovation within the firm"* were used to measure the innovation capabilities of firms.

4.3.2.3 Environmental Strategies (ES)

In this study, in order to determine the facets of environmental proactivity, respondents were asked to describe the extent (using a seven-point scale) to

which environmental practices were implemented in their organizations, from "1=small extent" and 7 denoting "large extent". In short, there were seven major environmental management activities, i.e. *"participate in government-sponsored environmental programs", "set environmental performance objectives as part of our annual business plans" , "prepare and release of environmental reports", "develop a certifiable environmental management system (e.g. ISO 14001)", "measure key aspects of our environmental performance", "scientifically assess the life-cycle impact of our products" and "make investments in clean production technologies"* to explore the environmental proactivity of firms. Measurement items were mainly adapted and modified from Angel del Brio, Fernandez, Junquera and Jose Vazquez (2001), Aragon-Correa (1998), Buysse and Verbeke (2003), Egri and Hornal (2002), Sharma and Vredenburg (1998), Aragon-Correa, Matias-Reche and Senise-Barrio (2004).

4.3.2.4 Performance

Although objective data about the performance of the firms may be regarded as preferable, managers are often very sensitive about the provision of this

type of competitive information. Self-reported perceptual measures of performance relative to competitors have been used extensively in the literature with success (Carmeli & Tishler, 2004; Klassen & Whybark, 1999; Judge & Douglas, 1998; Melnyk, Sroufe & Calantone, 2003). In this study, managers had been asked to assess how well their firms were performing relative to their competitors at the time of the survey on a seven-point Likert-type scale.

4.3.2.4.1 Environmental Performance (EP)

Environmental performance, having four items, is operationalized from the modification of the items in the study of Judge and Douglas (1998). In brief, the instrument asked the respondents on each of the following four items: *1. Complying with environmental regulations; 2. Educating employees and the public about the environment; 3. Preventing and mitigating environmental crises; and 4. To avoid facing stricter environmental regulations in the future.* These items were coded on a seven-point scale ranging from "1=much worse to "7= much better". These items were consistent with Russo and Fouts (1997) conception of environmental performance, which

emphasized on firms' compliance and prevention efforts in facilitating environmental protection.

4.3.2.4.2 Financial Performance (FP)

Subjective measures of financial performance were adopted in this study because of the potential biases of the financial information provided by the governments or firms in developing countries, especially China (Luo, 1999). Such self-reported measures of performance relative to competitor performance have been used extensively and successfully in the literature (Dess & Robinson, 1984; Wagner, 2005). The use of "perceived measures" is also well recognized in the strategic management field (Covin, Slevin, & Schulz, 1994) and environmental management research (Sharma & Vredenburg, 1998). In this study, the items used to measure financial performance were adapted mainly from the scale of Judge and Douglas (1998). In short, the instrument asked the respondents to rate their financial performance relative to that of their competitors in the previous three years. Items concerning "*profitability, returns on investment, sales growth and growth in market share"* were used to measure their financial performance.

All items were coded on a seven-point scale ranging from "1=small extent" to "7=large extent".

4.3.2.5 Regulatory Stakeholder Influence (RSI)

Institutional pressure has often been considered as an external force that shapes the corporate ecological responsiveness toward environmental issues (Buysse & Verbeke, 2003). With the unique institutional characteristics in China, regulatory institutes have become significant parties in the business operations.

Since managers acted only according to what they perceive (Bourgeois III, 1985), this study regarded the institutional pressure exerted by the Chinese government as "regulatory stakeholder influence (RSI)". In fact, RSI could be defined as a perceptual construct that indicate the managers' perception of the amount of pressures the Chinese government exerted on their environmentally-related decisions.

In this research, we asked the respondents to rate four relevant items on a seven-point scale (1 = "no influence at all" to 7 "very strong influence") to indicate whether the regulatory institutes like the Central Government,

State Environmental Protection Bureau, Local Government and Local Environmental Protection Bureau had any influence over their companies' environmental management.

4.3.2.6 Control Variables

Firm size has often been shown to have a statistical effect as a control variable in the studies of corporate environmental management (e.g. Aragon-Correa, 1998; Buysse & Verbeke, 2003; Montabon, Melnyk, Sroufe, & Calanton, 2000; Russo & Fouts, 1997; Sharma, 2000). This variable was controlled in this study and measured by the number of employees in the companies. Companies with sufficient financial means, i.e. larger companies, would be able to deal more easily with environmental and non-commercial demands than low-budget companies (Bremmers, Omta, Kemp & Haverkamp, 2007). Resource dependency theory suggests that larger organizations will have more resources to initiate new environmental programmes, and may be more motivated to initiate such strategies due to their greater public visibility (Egri & Hornal, 2002). In this study, "firm size" was measured by the number of employees in the firms. Lee and Rhee

(2007) state that firm size determines the degree of availability of extra resources. Large firms are supposed to have extra resources (e.g. financial, material and human resources) and are more likely to implement innovative environmental practices readily. Besides, firm age was also controlled in this study. Controlling the firm age is important for the reason that the more developed the firm, the greater is the likelihood that problems associated with path dependency will hinder strategic change in the firm (Henderson & Clark, 1990). Firm age was measured by the year of establishment of a firm. Lastly, the 5-item instrument from Hayes, Hayashi and Stewart (1989) was included to control the respondents' social desirability bias.

4.3.2.7 Context of Organizations

Information regarding the following organizational characteristics was requested: organization's type of manufacturing (eight categories: chemical, paper, electroplating, plastics, cement, electronics, textiles and dyeing, and others), organization size (five categories: under 100 employees, 100-499 employees, 500-999 employees, 1000-4999 employees, above 4999 employees), type of ownership (five categories: state-owned enterprises, wholly foreign-owned, joint-venture, privately owned and others), years of

establishment (six categories: under 5 years, 5-10 years, 11-15 years, 16-20 years, 21-25 years and above 25 years), location of the firms (seven categories: residential, industrial, commercial, mixed residential and industrial, mixed residential and commercial, mixed commercial and industrial and mixed residential, commercial and industrial), percentage of company's product sold to overseas market (eight categories: under 10 percent, 10-20 percent, 21-30 percent, 31-40 percent, 41-50 percent, above 50 percent and not applicable) and finally types of international accreditations (five categories: ISO 14001, ISO9000/ISO 9001, RoHS, WEEE and others).

4.3.2.8 Context of Respondents

In this study, the details about the respondents' characteristics were recorded, like the position of the respondents (three categories: general manager, manager in charge of environmental management and others), gender (male and female), education (six categories: below post-secondary, post-secondary, undergraduate, master's degree, doctorate degree and others) and age (four categories: under 30, 30-40, 41-50 and above 50). Further data like the industry experience (six categories: under 5 years, 5-10 years, 11-15

years, 16-20 years, 21-25 years and above 25 years), and managerial experience (six categories: under 5 years, 5-10 years, 11-15 years, 16-20 years, 21-25 years and above 25 years) were collected.

4.3.3 Data Collection: Questionnaire Survey

Regarding the data collection process, it is sometimes desirable to combine several techniques, thereby offsetting the strengths and limitations of any single technique (Simsek & Veiga, 2000). Firstly, Li and Atuahene-Gima (2001) argue that in most emerging economies, there is lack of reliable archival data. To fill in the questionnaires face-to-face is a better way to contact the right respondents, make a correct use and understanding of the terms and obtain a better response rate. Also, Gilbert, Fiske and Lindzey (1998) comment that face-to-face survey will allow clarification on complex or sensitive issues, ensure that the questionnaire is delivered to the intended respondent and produce better quality data. Another survey method, the online survey, has its own merits. Simsek and Vegia (2000) consider that the researchers are able to increase the response rate while reducing the costs of survey by using online survey. Cobanoglu and Cobanoglu (2003)

conceive that online survey can help researchers achieve the highest and most comprehensive response rate. In order to reduce costs and provide more timely data, a mixed mode survey strategy can be applied (Schaefer & Dillman, 1998). Researchers like Roster, Rogers, Hozier Jr, Baker and Albaum (2007) employ a combination of face-to-face interview and online survey in order to increase the response rate. They find that there is no significant difference in the results between two samples.

Following the above argument, a mixed mode of face-to-face questionnaire survey and online questionnaire survey was employed. In this study, the respondents were asked to fill in the questionnaires face-to-face in the trade fairs. Previous researchers like Blythe (2002), Kozak (2005), Luo and Bao (2007) also asked the respondents to complete the questionnaires in person in trade fairs.

4.3.3.1 Face-to-face Questionnaire Survey

For the face-to-face questionnaire survey, we targeted the trade fairs organized both in Guangzhou and Hong Kong by the Ministry of Commerce of the People's Republic of China, the People's Government of Guangdong

Province and the Hong Kong Trade Development Council. From January to May 2008, major trade fairs such as "*Import and Export Trade Fair in Guangzhou" and "China Sourcing Fair"* were visited. In these trade fairs, different exhibitors of the same province and industry were grouped together. For instance, the booths of companies from the PRD which manufactured wooden products were located in Hall 1A, whereas PRD companies manufacturing plastic products were located in Hall 2A. We located the booth location of each target company in the exhibition. Then, we approached them one by one and asked for their permission to conduct the face-to-face survey with us. Target respondents were selected from those with factories established in the Pearl River Delta region. From the 311 exhibitors in these trade fairs which operated in the Pearl River Delta region, 151 questionnaires were collected in the fairs and used for further analysis. The effective response rate was about 49 percent. Researchers like Luo and Bao (2007) who conducted paper and pencil questionnaire survey in trade fairs in Guangdong Province, China achieved 20 percent response rate with reliable results. Hence, it is acceptable for this study to get a response rate of 49 percent.

From the face-to-face survey, we could validate the questions of our questionnaire. As we went through the items of the questionnaire with our respondents, they had no problem in understanding our questions, and could provide an answer to them without much hesitation. This confirmed that our questionnaire had been properly set. The participants had been assured of complete confidentiality and anonymity. However, the names of the companies were recorded without identification in the filled questionnaires in order to avoid any unnecessary duplication.

Apart from asking the respondents to fill in the questionnaires in the presence of the interviewers, an online version of the questionnaire was also set up to ensure that a cross-section of firms participated in the study as well as to increase the response rate. In a research conducted by Joppe, Choi and Yun (2006), they distributed their questionnaires in trade fairs and set up a web-based questionnaire for their respondents to fill in so as to raise the overall response rate. In view of the advantages of mixed mode survey, both methods were adopted to collect the required data in this study.

4.3.3.2 Online Questionnaire Survey

The sampling frame of the online survey was compiled from the "*Database of Industry Business: Business directory of industries in China, 2006"*. This database was a business directory which captured detailed information, like company names, detailed addresses, provinces, postal codes, contact person, position of the contact person, business types, scale of the companies, etc., on various types of businesses in China, including the PRD. The companies which had already responded to the questionnaire in the trade fairs were excluded from the list to ensure that there was no duplication with those participating in the face-to-face questionnaire survey. Firstly, we identified the manufacturing firms with factories locating in Pearl River Delta region and set our sampling frame. Then, we selected the target respondents randomly that each firm in the directory operating in the PRD had an equal chance of being selected. Finally, 1180 target companies were selected.

This online questionnaire survey was carried out from August to December 2008. Firstly, email notifications of the survey questionnaires were sent by email to the targeted respondents, i.e. manufacturing factory

managers in the PRD. A cover letter explaining the nature and purpose of the study (Chinese Version), together with the link to this online questionnaire, was sent to the targeted companies. As the target respondents of this research were the managers of the factories operating in China, the Chinese version of the questionnaire was sent. However, the English version of the questionnaire was provided if requested. The participants were assured of complete confidentiality and anonymity. A reminder email was sent to all informants between two and four weeks after the first notifications.

Out of the 1180 emails distributed to the targeted respondents, 160 were undeliverable and 102 online questionnaires were received in total. It was argued by Hair, Black, Babin, Anderson and Tatham (2006) that missing data under 10 percent of an individual case or observation could generally be ignored, and we followed this rule. After removing 15 questionnaires with over 10 percent missing values, a total of 87 online questionnaires were used for this study, which represented a response rate of around 9 percent. To compare with a previous email questionnaire survey in the Chinese context, He, Duan, Fu and Li (2006) achieved around 7 percent

response rate with reliable results. Thus, it is acceptable for our study to obtain around 9 percent response rate. In addition, we performed some validation tests in Chapter 6 to verify the combination of the results from face-to-face and online questionnaire surveys statistically.

Together with the face-to-face respondents, a total of 238 questionnaires were usable for further analysis. It is mentioned before that by calculating the effect size, the minimum sample size of this study was 109. Thus, our total sample size of 238 met the minimum level.

4.4 Summary

In summary, this chapter discusses the methods, samples, research instruments as well as data analysis procedures of both the in-depth interviews and the face-to-face as well as online questionnaire surveys. Supplementing the in-person completion of survey questionnaires at trade fairs with internet-based surveys was to ensure that a cross-section of organizations participated in the study. The findings and discussion of the in-depth interviews are presented in the next Chapter.

CHAPTER 5

IN-DEPTH INTERVIEWS-FINDINGS AND DISCUSSION

5. Introduction

It is argued that qualitative research provides a much richer account of phenomenon (Welford, 1998). As mentioned before, we carried out both qualitative and quantitative studies in this research. Firstly, we had set the interview templates, six open-ended questions, based on the main ideas of corporate environmentalism, natural-resource-based view of the firm (NRBV) and institutional theory. Table 1 provides a summary of the characteristics of the companies and they were regarded as environmental leaders in their industries. The types of companies ranged from toy manufacturing, metal and mechanical product manufacturing, textiles and dyeing, plastic product manufacturing, bag manufacturing, food manufacturing, electrical and electronic product manufacturing to electro-plating services.

Table 1. Characteristics of Companies

Companies	Characteristics	Interviewee's Position/Title	Number of Employees	Headquarters	Location	Industry *
Company 1 (C 1)	Manufacturing of toys	Plant Manager	Over 5000	Hong Kong	Dongguan	T
Company 2 (C 2)	Manufacturing of injection molding machines	Plant Manager	1001-5000	Hong Kong	Shenzhen	MM
Company 3 (C 3)	Manufacturing of circular knitted fabric and the company's product range also includes dyed yarns, sewing threads and garments.	Senior Manager	1001-5000	Hong Kong (joint-venture)	Dongguan	TD
Company 4 (C 4)	Doing injection molding, tool making, metal stamping, spray painting	Plant Manager	1001-5000	Hong Kong	Shenzhen	P
Company 5 (C 5)	Manufacturing of computer carrying cases	Head (Environmental, Health and Safety)	Over 5000	Hong Kong	Dongguan	B
Company 6 (C 6)	Producing oyster flavored sauce, gourmet sauces, soy sauces, chicken bouillon and chili sauces	Senior Plant Manager	Less than 1000	Hong Kong	Jiangmen	F
Company 7 (C 7)	Making tools, molding, laser cutting, powder coating, powder painting, products assembly	Manager	1001-5000	Hong Kong	Shenzhen	MM
Company 8 (C 8)	Producing power equipment products, floor care, leaser and electronic products, etc.	Senior Manager	Over 5000	Hong Kong	Dongguan	EE
Company 9 (C 9)	Manufacturing battery operated flashlight and lantern including OEM and/or ODM projects	Managing Director	1001-5000	USA	Shenzhen	EE
Company 10 (C 10)	Manufacturing of electronic wire and cable	Senior Manager (Corporate Environmental Health and Safety Management)	1001-5000	USA	Huizhou	EE
Company 11 (C 11)	Engaging in the purchasing, blending, bottling, marketing and distribution of edible oils	Head (Environmental, Health and Safety)	Less than 1000	Hong Kong	Guangzhou Panyu	F
Company 12 (C 12)	Manufacturing of electronic products	Chief Executive Officer (CEO)	1001-5000	Hong Kong	Shenzhen	EE

Company 13 (C 13)	The main products of the company are electrograph, imprinter and computer special using DVD-ROM drivers etc.	Plant Manager	1001-5000	Japan (joint-venture)	Guangzhou	EE
Company 14 (C 14)	Manufacturing of compressors of air-conditioners	Manager (Environmental, Health and Safety Management)	1001-5000	Japan	Guangzhou	EE
Company 15 (C 15)	Manufacturing escalators	Senior Officer (Quality and Environment Management Section)	1001-5000	Japan	Guangzhou	MM
Company 16 (C 16)	Providing customers with chemical analysis, material science and functional test services	Manager (Environmental, Health and Safety Management)	1001-5000	France	Guangzhou	EP
Company 17 (C 17)	Manufacturing battery chargers, interface processors, screens, loud speakers, etc.	Director	Over 5000	Hong Kong	Huizhou, Dongguan	EE

Notes:

* Eight Industries: T (Toys), MM (Metal and Mechanical Products), TD (Textiles and Dyeing), P (Plastics); B (Bags); F (Foods Processing); EE (Electrical and Electronic Products); EP (Electroplating).

According to *"Outline of the Environmental Protection Plan (2006-2020)"《廣東省環境保護規劃綱要（2006-2020 年）》*, the six heavy polluting industries include the production and supply of electrical power, petrochemical industry, steel manufacturing industry, non-metal mineral production, textile and dyeing industry and paper making and paper products (Ministry of Environmental Protection of the People's Republic of China, 2008). Also, with reference to "*Action Plan of Combating Illegal Discharge of Wastes and Environmental Protection*"《關於打擊違法排污行為保障環境安全專項行動的工作方案》, the ten heavy polluting industries are chemical production, petrochemical industry, smelting, electro-plating, feather production, printing and dyeing, cement production, paper making and paper products, nuclear and radiation as well as handling of hazardous wastes (Ministry of Environmental Protection of the People's Republic of China, 2006).

From the above definitions, two of the companies were from the very polluting industries with high energy consumption and high pollutant emission (i.e. textiles and dyeing and electro-plating services). The others were from the polluting industries (toy manufacturing, metal and mechanical product

manufacturing, plastic product manufacturing, bag manufacturing, electrical and electronic product manufacturing) and one from low polluting industries (food processing). Among the seventeen companies, around 65 percent (i.e. eleven companies) were headquartered in Hong Kong, whereas the others were headquartered in Japan (around 17 percent, i.e. three companies), the United States (around 11 percent, i.e. two companies) and France (around 5 percent, i.e. one company).

The number of employees of all the companies ranged from 500 to over 5000. Eleven companies had between 1001 and 5000 employees. Responses given by the informants from all the eight different industries were fairly consistent. The interview results are discussed below.

5.1 Environmental Orientations

In this study, we first asked the respondents to describe their environmental orientations and visions. Environmental orientations provide directions for the companies to tackle environmental issues in their business contexts (Bansal & Roth, 2000). The visible and explicit environmental visions and orientations of the companies guide and channel staff effort to work in an integrated manner.

That manner can best support the environmental strategies of firms and contribute to the successful implementation of corporate environmental strategies (King & Zeithaml, 2001; Marshall, Cordano, & Silverman, 2005; Pitts & Lei, 2003).

From the interviews, all the companies replied that they had their own green orientations and were committed to conducting their businesses with due care for the environment. These visions were revealed in their environmental policies, which covered both internal operations and external stakeholders (Table 2).

Specifically, the respondent from Company 5 stated that:

> "One of our corporate values is to ensure a safe and healthy workplace and achieve a good citizen status on environmental affairs through continuous sustainable improvement. In fact, our top management group has the environmental mentality and would like to spread the ideas of environmental protection within the factory. This environmental value does not only exist internally. We are also committed to social and environmental

responsibility and care for our external parties like our customers and business partners. Furthermore, we concern our environment by preventing contamination and minimizing resource consumption. In order to promote environmental awareness within the factory, the corporate environmental policy is printed in the employee's manuals, and our employees will receive training regarding the environmental issues of our company and society."

Besides, the manager of Company 7 said that:

"Our company vision is to minimize the environmental impact of our operations. We perceive that this kind of business philosophy, i.e. to take into consideration the physical environment in business operations, is the characteristics of the manufacturing industry nowadays. There are seven guidelines highlighting the environmental strategies of our company. To enhance the environmental awareness of our staff, these environmental guidelines are displayed in our factory and distributed to our

employees through email or during the training sessions. I believe that our employees also think that environmental protection is a must, and environmental ethics have been embedded in every aspect of our company. In addition, our environmental guidelines cover all parties in our society. We have incorporated the consideration of stakeholders in our operations, which do not simply focus on profits."

The CEO of Company 12 responded that:

"Nowadays, doing business is not merely to achieve or maintain good profits. We are fully committed to our responsibility for the environment and promote the environmental responsibility as part of our overall organizational philosophy. In order to ensure the effectiveness of our environmental commitment for everyone, we provide various opportunities for our employees to update their environmental skills and encourage them to become environmentally friendly. Also, we try to demonstrate to our stakeholders that our formal environmental management system

is designed to meet their needs for clean living environment. We put effort to promote the importance of environmental protection in China by cooperating with the industrial association, which is one of our stakeholders."

Furthermore, the director of Company 17 mentioned that:

"We would like to be a pioneer in green manufacturing, as we think that green manufacturing is not an option but a must towards sustainability. Especially, we incorporate the concept of environmental protection into part of our corporate culture and treat it as one of our core values. We would like to see every one of our employees to have the initiatives to work in an environmentally friendly manner. Also, we should pay attention to and act according to the needs of all the external stakeholders in our business environment. For instance, in last year, we contacted the European Union (EU) to discuss the issues about 'the Restriction of Hazardous Substances Directive (RoHS)' in China. Our top management is committed to corporate social

responsibility by helping not only our own company but also the whole industry, including our suppliers and even our competitors, understand this important green regulation."

Table 2. Types of Environmental Orientations

Environmental Orientations	Number of Firms	Companies
Internal Environmental Orientation	17	All
External Environmental Orientation	17	All

In summary, researchers like Szekely and Knirsch (2005) note that to include environmental concerns into business strategy involves paying attention to the management style originating from the top. It is followed by the top management's active promotion of ecological concern as part of an overall, integrated organizational trend and philosophy. In the interviews, the respondents suggested that corporate environmental management was perceived as part of their overall corporate values. Besides, we noticed that the responding firms were accountable to their stakeholders, and they considered that the environmental objectives of the firms and the stakeholders' objectives were complementary but not in rivalry. All the respondents in this study believed that their overall corporate values included the environmental

elements, and they would try to fulfill the expectations of their environmental stakeholders.

5.2 Environmental Capabilities

At the organizational level, previous studies have addressed environmental issues in relation to the capabilities of firms (Judge and Douglas, 1998; Sharma and Vredenburg, 1998; Teece, Pisano and Shuen, 1997, etc.). In our study, we asked the respondents to describe and elaborate in detail the capabilities in environmental management that they had acquired. From the interviews, eleven companies had capabilities in operation, and they could have more than one kind of capabilities. The capabilities mainly fell into two aspects, i.e. information-related and innovation-related capabilities. Seven companies confirmed that they had innovation capabilities, whereas ten of them had information capabilities

For instance, with regard to innovation capability, the CEO of Company 12 commented that:

> "We always adopt new methods and technologies in the manufacturing processes, and we believe those are our capabilities. As we are concerned about the environmental issues, we are more sensitive towards the development and usage of innovative skills in our operations. As an example, we have developed new electronic products that are produced from recycled materials and packaged with recycled packaging materials using our eco-product design skills and competence. These new products show our ability of continuous improvement on reduction of pollution during the production process. Furthermore, energy is being used efficiently by installing new technological devices with our innovative capabilities. "

The manager of Company 14 also shared a similar view that:

> "Our company has incorporated the concept of corporate environmental responsibility in our daily operations. In fact, our top

management team has committed itself to environmental protection. It will proactively search for innovative ways to streamline and improve our production process in order to reduce our impact on the environment. For example, we have applied the advanced technological skills and competencies learnt from our headquarters in Japan to treat our waste water. Our treated effluent is clean enough for growing fish. We believe this is one of our capabilities in environmental management. ”

In addition to the innovation capability, ten companies replied that they obtained green information-related capability, as their companies were operated according to the philosophy of “consideration of the physical environment”. For instance, the director of Company 17 stated that they had the capabilities of sharing different environmental-related information within the whole group:

“We have more than ten operating factories in the PRD, and different factories are strong in different aspects. For instance, some of them have specialized knowledge in Chinese environmental laws

and regulations, some are specialized in environmental auditing and reporting, and some are specialized in environmental management. Different factories focus mainly on areas in which they have competitive edge, and they teach and share experiences with those 'green-born' and less experienced factories. We can therefore describe this kind of green information sharing as our company's capability."

Besides, the manager of Company 16 echoed that:

"Our director always emphasizes the importance of including environmental considerations in operation. As we are the subsidiary of a French company, our headquarters considers environmental protection, health and safety as our top priority in operation. Hence, we actively collect environmental-related data from different sources, such as the Environmental Bureau, the French headquarters R&D department, our suppliers, etc. We are sure that as compared with our local competitors, we can obtain much more sophisticated, updated, key and useful information for carrying out

green production. This new information and new knowledge can create more business opportunities. We regard this as our capability in operation. ”

From the interviews, we can obtain an overall picture that the Chinese manufacturers who have environmental orientations are to a certain extent aware of the existence of information and innovation capabilities in operations (Table 3).

Table 3. Types of Environmental Capabilities

Capabilities / **Characteristics**	**Without Capabilities** (Number of Firms)	**Innovation Capabilities** (Number of Firms)	**Information Capabilities** (Number of Firms)	**Both Innovation and Information Capabilities** (Number of Firms)
Company Names	6 Companies (C1, C5, C7, C9, C13, C15)	1 Companies (C 12)	3 Companies (C4, C 6, C11)	7 Companies (C2, C3, C8, C10, C14, C16, C17)
Pollution Level				
- Very Polluting	0/2 (0%)	0/2 (0%)	0/2 (0%)	2/2 (100%)
- Polluting	6/13 (46%)	1/13 (8%)	1/13 (8%)	4/13 (38%)
- Low polluting	0/2 (0%)	0/2 (0%)	2/2 (100%)	0/2 (0%)
Size				
- Less than 1000	0/2 (0%)	0/2 (0%)	2/2 (100%)	0/2 (0%)
- 1001-5000	4/11 (37%)	1/11 (9%)	1/11 (9%)	5/11 (45 %)
- Over 5000	2/4 (50%)	0/4 (0%)	0/4 (0%)	2/4 (50%)
Headquarters				
- Overseas	3/6 (50%)	0/6 (0%)	0/6 (0%)	3/6 (50%)
- Hong Kong	3/11 (27%)	1/11 (9 %)	3/11 (27%)	4/11 (37%)

Unlike environmental orientations which all the firms replied that they had obtained, only seven and ten of them claimed that they had innovation and information capabilities. Capabilities are more advanced, and they enable business enterprises to create, deploy and protect the intangible assets that support superior long-run business performance (Teece, 2007). Capabilities are relatively more difficult to develop, and it is possible for firms to build up large stocks of resources without generating any valuable capabilities (Aragon-Correa & Sharma, 2003). Hence, it is understandable to learn that some respondents claimed not to possess environmental capabilities.

Regarding the nature of innovation capability, from the management perspective, innovation capability is the management of all resources from within and outside a firm to foster new ideas for new development. From a technological perspective, innovation capability is considered as a technological change or breakthrough applied to new product development (Szeto, 2000). Actually, innovation capability has been described as complex, knowledge-intensive and often difficult to build up (Forsman, 2009). In contrast, regarding the information capability, it is relatively easier to obtain, especially in a modern society where information is available with advanced

information technology from numerous sources (Auster & Choo, 1994). Information like the industry's environmental codes of practice, method to handle hazardous materials, eco-label requirements for products, ways to manage wastes, etc., can be easily obtained from various sources.

5.2.1 Further Analysis of Environmental Capabilities

To further analyze the patterns of the environmental capabilities according to organizational characteristics, it is noticed that the pollution level as well as the size of the companies will drive their environmental capabilities. Two companies which fall within the category of very polluting industry obtained both information and innovation capabilities (Table 3). Cole, Elliott and Shimamoto (2005) argue that firms from an industry which is polluting in nature will try to better manage and use various assets in production to reduce the environmental impacts and operate more efficiently. Several studies have suggested a positive link between capabilities, for instance the innovation capabilities, and pollution intensity in the US and UK industries (Antweiler, Copeland & Taylor, 2001). In the more polluted industries, companies are

more likely to invest in various kinds of capital, both tangible and intangible (e.g., information, technologies), to reduce their pollution levels.

Secondly, in the analysis, it was found that 50 percent of the companies with over 5000 employees obtained both information and innovation capabilities, whereas none of the companies with less than 1000 employees had both kinds of capabilities. Previous strategy research has revealed that firms of larger size often enhance their ability by investing in advanced technology and are able to seek more valuable information (Kogut & Singth, 1988). In addition, many empirical studies have demonstrated a positive relationship among firm size, innovative activities (Cohen & Levin, 1989) and information transfer (Applehans, Globe, & Laugero, 1999). The larger the companies, the more resources they will have to develop that kind of dynamic information and innovation capabilities.

Furthermore, most of the MNCs, especially those headquartered in the Western countries, will have more state-of-the-art technologies and advanced knowledge (Caves, 1996). These companies will have a wealth of knowledge and better technological abilities to deal with the problems during business operations (Wang, Tong, & Koh, 2004). Such technologies and knowledge will

become the sources of competitive advantage of firms (Spender, 1996). This explains why the companies with headquarters overseas like the USA, Japan and France have both information and innovation capabilities.

5.3 Environmental Strategies

Corporate environmental strategies range from pollution control at industrial facilities with a focus on end-of-the-pipe treatment to sustainable environmental strategies like the adoption of innovative technologies (Russo & Routs, 1997), life cycle analysis (Sharma & Henriques, 2005) and green research and development policy (Fang, Cote, & Qin, 2007).

Among the various environmental management systems, ISO 14001 is a set of international guidelines developed by the International Organization for Standardization (ISO) through which a facility, either a single plant or a whole organization, can establish or strengthen its environmental policy (Weaver, 1996). Among the seventeen interviewed companies, ten of them had obtained ISO 14001, i.e. the international environmental management system (EMS) which represented a high level set-up of environmental management structure (Table 4). The remaining companies, even though not accredited by

ISO, implemented formal EMS in operations. From the interviews, all the companies had components of EMS in their establishments, such as environmental policies (Table 5). A comprehensive and well-formulated environmental policy can serve as guidelines directing the whole company to operate in an environmentally friendly manner. Company 2 and Company 5 were not ISO 14001 accredited. However, these two companies were preparing to get this accreditation in the future.

Table 4. Environmental Management System

EMS / **Characteristics**	**Without ISO 14001** (Number of Firms)	**With ISO 14001** (Number of Firms)
Company Names	7 Companies (C1, C2, C5, C6, C8, C9, C11)	10 Companies (C3, C 4, C 7, C 10, C12, C 13, C 14, C 15, C 16, C 17)
Pollution Level		
- Very Polluting	0/2 (0%)	2/2 (100%)
- Polluting	5/13 (38%)	8/13 (62%)
- Low polluting	2/2 (100%)	0/2 (0%)
Size		
- Less than 1000	2/2 (100%)	0/2 (0%)
- 1001-5000	2/11 (18%)	9/11 (82%)
- Over 5000	3/4 (75%)	1/4 (25%)
Headquarters		
- Overseas	1/6 (17%)	5/6 (83%)
- Hong Kong	6/11 (55%)	5/11 (45%)

Table 5. Environmental Policy

Environmental Policy / Characteristics	Simple Environmental Policy (Number of Firms)	Comprehensive Environmental Policy (Number of Firms)
Company Names	5 Companies (C1, C6, C8, C9, C11)	12 Companies (C2, C3, C4, C5, C7, C10, C12, C13, C14, C15, C16, C17)
Pollution Level		
- Very Polluting	0/2 (0%)	2/2 (100%)
- Polluting	3/13 (23%)	10/13 (77%)
- Low polluting	2/2 (100%)	0/2 (0%)
Size		
- Less than 1000	2/2 (100%)	0/2 (0%)
- 1001-5000	1/11 (9%)	10/11 (91%)
- Over 5000	2/4 (50%)	2/4 (50%)
Headquarters		
- Overseas	1/6 (17%)	5/6 (83%)
- Hong Kong	4/11 (36%)	7/11 (64%)

ISO 14001 requires both internal (by the firms themselves) and external (by using a third-party organization) environmental audits and reporting. Monitoring, auditing and reporting are the important parts of formal inspection programmes (Berry & Rondinelli, 1998). Audits can be used to measure the extent of progress made since the implementation of changes in the system and procedures. Fourteen companies had both internal and external environmental audits and reports (Table 6).

Table 6. Environmental Audit/Reporting

Environmental Audit/ Reporting / Characteristics	Internal (Number of Firms)	Both Internal and External (Number of Firms)
Company Names	3 Companies (C 2, C 6, C 11)	14 Companies (C1, C3, C4, C5, C7, C8, C9, C10, C12, C13, C14, C15, C16, C17)
Pollution Level		
- Very Polluting	0/2 (0%)	2/2 (100%)
- Polluting	1/13 (8%)	12/13 (92%)
- Low polluting	2/2 (100%)	0/2 (0%)
Size		
- Less than 1000	2/2 (100%)	0/2 (0%)
- 1001-5000	1/11 (9%)	10/11 (91%)
- Over 5000	0/4 (0%)	4/4 (100%)
Headquarters		
- Overseas	0/6 (0%)	6/6 (100%)
- Hong Kong	3/11 (27%)	8/11 (73%)

The director of Company 9 commented that:

"Since our headquarters has a specialized team with experience in environmental auditing, the experts of the team will provide us the knowledge and information about how to conduct the audits. By carrying out regular audits, we are able to identify wastage of paper, plastics, cans and even inefficiency in the consumption of energy. This can help us streamline our operation processes. "

After consolidating the responses from the firms, it is found that a number of companies have adopted three proactive environmental strategies, i.e. green procurement policy, life cycle analysis and the use of green technologies. In the following, the three practices are discussed in detail.

Min and Galle (1997) comment that environmental factors may reshape the supplier's selection decisions. All the companies reported that they had enforced green procurement policy (Table 7). Nine of them even conducted comprehensive reviews of environmental performance of their suppliers. Indeed, all of them had implemented green guidelines in order to select their suppliers. They tried to reduce the upstream waste sources associated with the purchased materials or parts from their suppliers.

Table 7. Green Procurement Policy

Green Procurement Policy / Characteristics	Just applied (Number of Firms)	Comprehensive and Sophisticated (Number of Firms)
Company Names	8 Companies (C1, C2, C4, C6, C8, C11, C 17, C13)	9 Companies (C3, C5, C7, C9, C10, C12, C14, C15, C16)
Pollution Level		
- Very Polluting	0/2 (0%)	2/2 (100%)
- Polluting	6/13 (46%)	7/13 (54%)
- Low polluting	2/2 (100%)	0/2 (0%)
Size		
- Less than 1000	2/2 (100%)	0/2 (0%)
- 1001-5000	3/11 (27%)	8/11 (73%)
- Over 5000	3/4 (75%)	1/4 (25%)
Headquarters		
- Overseas	1/6 (17%)	5/6 (83%)
- Hong Kong	7/11 (64%)	4/11 (36%)

Referring to the comments from the manager of Company 7, he stated that:

> "Our CEO always emphasizes that our company would like to be the leader in the environmental aspects. Hence, we are very careful about our supplier selection. We have comprehensive green guidelines to assist the selection process. In reality, we learn how to implement the green procurement policy by collecting information from various sources. For instance, the manufacturer association in

our industry will provide useful information about our suppliers, including whether the suppliers are ISO 14001 accredited, whether the suppliers are well established firms, etc. This information can facilitate the implementation of procurement policy."

Besides, companies carrying out life cycle analysis will think about the impacts of their products on the environment throughout their life cycle. From the interviews, sixteen companies had implemented life cycle analysis, and four of them had even set up comprehensive life cycle assessments of their products (Table 8).

Table 8. Life Cycle Analysis

Life Cycle Analysis / Characteristics	Without Life Cycle Analysis (Number of Firms)	Simple (Number of Firms)	Comprehensive (Number of Firms)
Company Names	1 Company (C5)	12 Companies (C1, C2, C3, C4, C6, C7, C8, C11, C13, C14, C15, C16)	4 Companies (C9, C10, C12, C17)
Pollution Level			
- Very Polluting	0/2 (0%)	2/2 (100%)	0/2 (0%)
- Polluting	1/13 (8%)	8/13 (62%)	4/13 (30%)
- Low polluting	0/2 (0%)	0/2 (100%)	0/2 (0%)
Size			
- Less than 1000	0/2 (0%)	2/2 (100%)	0/2 (0%)
- 1001-5000	0/2 (0%)	8/11 (73%)	3/11 (27%)
- Over 5000	1/4 (25%)	2/4 (50%)	1/4 (25%)
Headquarters			
- Overseas	0/6 (0%)	4/6 (67%)	2/6 (33%)
- Hong Kong	1/11 (9%)	8/11 (73%)	2/11 (18%)

For instance, the CEO from Company 12 explained that:

"We are equipped with innovative skills, and our staff will actively search for relevant and reliable environmental-related information in order to minimize the effects of our products from concept and design through manufacturing, distribution, usage to disposal. Specifically, we have set up environmental indicators like the level of energy used, the amount of materials used, etc., in order to assess the environmental impacts of the whole product life cycle.

From the assessment, it has been identified that we can further improve the efficiency of using the raw materials in production."

Finally, operating with green technologies can reduce the pollution during operation as well as the resource consumption. In this study, all the companies reported that they had adopted green technologies in their operations (Table 9). Eight of them had developed green technologies by themselves and six of them relied on imported technologies from outside. Three of them had proactively developed green technologies by themselves and at the same time adopted the high-tech machines from outside (Table 9).

Table 9. Use of Green Technology

Use of Green Technology / Characteristics	**Just Out-sourcing** (Number of Firms)	**Just Self-developed** (Number of Firms)	**Both self-developed and out-sourcing** (Number of Firms)
Company Names	6 Companies (C1, C4, C5, C6, C7, C8)	8 Companies (C9, C10, C11, C13, C14, C15, C16, C17)	3 Companies (C2, C3, C12)
Pollution Level			
- Very Polluting	0/2 (0%)	1/2 (50%)	1/2 (50%)
- Polluting	5/13 (38%)	6/13 (46%)	2/13 (16%)
- Low polluting	1/2 (50%)	1/2 (50%)	0/2 (0%)
Size			
- Less than 1000	1/2 (50%)	1/2 (50%)	0/2 (0%)
- 1001-5000	2/11 (18%)	6/11 (55%)	3/11 (27%)
- Over 5000	3/4 (75%)	1/4 (25%)	0/4 (0%)
Headquarters			
- Overseas	0/6 (0%)	6/6 (100%)	0/6 (0%)
- Hong Kong	6/11 (55%)	2/11 (18%)	3/11 (27%)

For instance, the manager from Company 10 replied that:

"In reality, our suppliers provide us with a lot of useful information and advice about what kinds of raw materials are more cost effective and environmentally friendly. We also have a chemical list to determine what sorts of chemicals are more suitable for our production. The list will constantly be revised and updated, since we are able to obtain new information from different sources. With

this information, our research team is able to develop new technologies in order to substitute the use of 'Polyvinylchloride (PVC)' in producing electronic wires and cables. PVC is regarded as 'the poisonous plastic' and is dangerous to the environment through its entire life cycle. Since we believe that we have the responsibility to protect the environment, we shall proactively explore innovative technologies for producing environmentally friendly wires and cables. Now, we have already been selling the 'halogen-free wires and cables'. These kinds of wires and cables are safer and cleaner relative to traditional ones."

Also, the CEO of Company 12 answered that:

"With our advanced and innovative capabilities, we are able to develop green technologies in various product qualification tests, like the product accuracy test, the product vibration test, etc. We shall grasp the opportunities to search for the best available technologies in the market".

From the interviews, it is noticed that companies, especially those which have developed comprehensive environmental management systems, are incorporating environmental management into the mainstream of doing businesses. Another feature of these companies is that they possess a lot of environmental information and advanced technological competencies. This will enable them to adopt green practices more effectively.

5.3.1 Further Analysis of Environmental Strategies

Heavy polluters are frequently penalized even in countries where formal regulation is weak or absent (Dasgupta, Laplante, Wang, & Wheeler, 2002). Hence, the level of pollution of an industry can strongly influence its factory operations. Given that the institutions as well as the whole society will keep an eye on the companies from the polluting industries, they are more visible to the public and media. Compared with companies which are low polluting in nature, the heavily polluting companies are more willing to adopt proactive environmental strategies (Preuss, 2001).

In our interviews, the percentage of firms in the very polluting industries which adopt advanced environmental strategies was higher than the

companies in the less polluting industries. For instance, firms in the electroplating industry would like to have international accreditation, i.e. ISO 14001 (Table 4), set very comprehensive environmental policies (Table 5), carry out both internal and external environmental audits (Table 6), implement comprehensive and sophisticated green procurement policies (Table 7), as well as acquire both out-scoured and self-developed green technologies (Table 9).

Secondly, size of the firm is the predictor to influence the implementation of corporate environmental responsibility practices (Perrini, Russo, & Tencati, 2007). Since the small firms have comparatively less resource endowments (O'Connor & Kjollerstrom, 2008), they need to invest a greater proportion or percentage of time, money, technologies and energy than the large firms in order to operate in an environmentally friendly way (Spence, Jeurissen, & Rutherfoord, 2000). In other words, as small firms in small scale, the costs involved with the development of environmental practices are relatively large. In our studies, firms with less than 1000 employees were less likely to be accredited with ISO 14001 (Table 4), conduct comprehensive life cycle analysis (Table 8), use both self-developed and out-sourcing green technologies (Table 9).

Companies with headquarters in overseas countries, especially in the developed countries, are more likely to adopt novel and proactive environmental strategies. They do this by transferring more advanced environmental standards from their operations in the developed nations to those in the developing nations (Dunning & Hamdani, 1997). From the interviews, it was noticed that generally, the environmental strategies of companies with headquarters overseas were relatively more proactive (e.g., Table 4, Table 5, Table 6, Table 7 and Table 8).

5.4 Pressures from Institutions

The environmental awareness of institutions has significantly increased. Higher pressures from the institutions are likely to lead to the inclusion of environmental values in the firm's mission, policy and plans. Institutional bodies like customers, suppliers, governments, communities, non-governmental organizations, media and competitors will affect business operations (Angell & Rands, 2002). In many developing countries with an "authoritarian political system", most of the environmental laws have been initiated by the government in a "top-down" manner.

Respondents in this study had listed out all institutional bodies which would affect their environmental practices (Table 10).

Table 10. Pressure from Stakeholders

Stakeholders / Characteristics	**Chinese Government** (Number of Firms)	**Customers** (Number of Firms)	**Competitors** (Number of Firms)	**Business Associations** (Number of Firms)
Company Names	All	5 Companies (C1, C5, C9, C15, C16)	4 Companies (C1, C2, C7, C14)	2 Companies (C7, C17)
Pollution Level				
- Very Polluting	2/2 (100%)	1/2 (50%)	0/2 (0%)	0/2 (0%)
- Polluting	13/13 (100%)	4/13 (31%)	4/13 (31%)	2/13 (15%)
- Low Polluting	2/2 (100%)	0/2 (0%)	0/2 (0%)	0/2 (0%)
Size				
- Less than 1000	2/2 (100%)	0/2 (0%)	0/2 (0%)	0/2 (0%)
- 1001-5000	11/11 (100%)	3/11 (27%)	0/11 (0%)	1/11 (9%)
- Over 5000	4/4 (100%)	2/4 (50%)	4/4 (100%)	1/4 (25%)
Headquarters				
- Overseas	6/6 (100%)	2/6 (33%)	1/6 (17%)	0/6 (0%)
- Hong Kong	11/11 (100%)	3/11 (27%)	3/11 (27%)	2/11 (18%)

Among the institutional bodies, government influence is the main source of pressure. For instance, the plant manager of Company 1 mentioned that:

> "The governmental bodies keep on urging us to implement various measures to reduce our environmental impact during production. We have our waste water treatment plant. Our discharged water meets the provincial standard and has been certified by Dongguan municipality government to have fulfilled its wastewater treatment requirement. Besides, the government is concerned about the emission of provincial industrial exhaust gases. To meet the standard of the local government, we have invested a few million dollars for the installation of exhaust gas treatment facilities to filter our exhaust gas. The local regulatory agencies will come to visit us on an ad-hoc basis for a few times in a year. We have to meet the standards in order to survive."

Besides, the senior manager of Company 8 answered that:

'At this moment, the government and regulatory stakeholders have definitely exerted pressure on our operations. The Chinese Environmental Protection Laws are comprehensive, although we cannot ignore the enforcement problems. As far as I remember, one of the textile companies in Dongguan was fined for about RMB$210,000 due to illegal discharge of wastewater, and it was required to pay back over $10 million of water discharge fees. We always keep in mind that we must meet the requirements of the regulations."

In addition, the senior officer of Company 15 stated that:

> "In order to meet the local environmental standards, we have invested over RMB$100 million in the wastewater treatment facilities. The officials from the Environmental Protection Bureau will visit us regularly and give us marks regarding our production process. The governmental bodies will undoubtedly affect our business decisions."

With regard to another institutional body, namely the customer, the results are quite surprising. Only five companies recognized the influence of customers on their environmental strategies. The plant manager of Company 2 explained that:

> "Customers, especially local Chinese customers, are not fully aware of the environmental issues."

Furthermore, four companies responded that their competitors in the same industry would impose some pressure on their environmental management. Finally, the perceived pressures from business associations were relatively weak. Only two of the companies considered those associations as influential to their operations. The CEO of Company 12 commented that:

> "Among all the external parties which affect our operations, business associations are less influential on us. Our company has already placed a lot of emphasis on environmental protection, and the influential power of business associations in China is generally not too strong."

This finding echoes the previous research concluding that the regulatory factors still seem to be the most important pressure (Zhu, Sarkis, & Geng, 2005). Firms aspire to comply with the legislation in order to avoid incurring legal liabilities (Aragõn-Correa, 1998). Actually, the other pressures are not perceived as being particularly strong. The trivial role of business associations confirm that corporate environmentalism is still in an early stage in China. For example, until recently, there is no need for the enterprises to be very concerned about the powerful employee organizations, business associations or non-governmental organizations.

5.4.1 Further Analysis of Institutional Pressures

It is no doubt that the influence from the Chinese governmental bodies is the major source of pressure on the firms which operate in the Chinese context (Ulrich et al., 2003). Besides, customers are showing preferences for environmentally oriented companies, especially for those regarded as operating in the polluting industries (Rosewicz, 1990). Manufacturers who demonstrate efforts to minimize the negative environmental impacts of their production processes are more easily to expand their customer bases (Rao, 2002). Results

of the interviews revealed that firms from the polluting industries were subjected to greater pressure from their customers to operate in an environmentally friendly way (Table 10). Firms should make their environmental practices more transparent to their customers in order to attract more businesses.

It is argued that the larger firms are more motivated than the smaller firms to practice environmental management in order to outperform their major competitors (Graafland, Ven van de, & Stoffele, 2003). Since large firms are more likely to address environmental management, there will be a higher public expectation on their environmental performance. Achieving only the bare minimum is far from sufficient for these companies to stand out from their competitors. Therefore, if these large companies would like to acquire competitive advantage, they should make more use of their environmental strategies. Similar situations were revealed in our interviews, which showed that the larger firms faced greater pressure from their competitors to adopt environmental management (Table 10).

Furthermore, it was noticed from the results that companies with headquarters overseas like in France, USA and Japan were less likely to be

influenced by business associations than the Hong Kong based companies. One of the possible reasons may be that companies headquartered overseas are "geographically remote". It is believed that companies based in Hong Kong, which are closer to China, would be subjected to greater influence by the Chinese business associations. In the context of international economic relations, multinational corporations interact with and respond primarily to the most visible and formal institutions (Teegen, Doh, & Vachani, 2004). Since NGOs are originated from informal institutions, it will be more likely for them to be overlooked by MNEs (Vachani, Doh, & Teegen, 2009).

5.5 Performance and Benefits

It is assumed that the primary motivation for corporations to perform environmental management is to attain competitive advantages for self-interest and survival (Lee & Ball, 2003). In this study, the responding firms mentioned that their environmental strategies and programmes had brought a number of satisfactory results. Most of the respondents could name more than one benefit (Table 11).

Table 11. Performance and Benefits of Environmental Strategies

Outcomes / Characteristics	**Reduction of Water Pollution** (Number of Firms)	**Reduction of Solid Wastes** (Number of Firms)	**Reduction of Air Pollution** (Number of Firms)	**Reduction of Noise** (Number of Firms)	**Energy Saving** (Number of Firms)	**Cost Savings** (Number of Firms)	**Improved Company Image** (Number of Firms)
Company Names	12 Companies (C1, C2,C3, C6, C8, C10, C11,C12, C13, C15, C16, C17)	12 Companies (C3, C5, C6, C7, C8, C9, C10, C12, C14, C15, C16, C17)	10 Companies (C1, C2, C4, C5, C6, C8, C11, C14, C15, C16)	3 Companies (C5, C7, C8)	14 Companies (C1, C2, C3, C4, C5, C6, C7, C8, C 9, C10, C13, C14, C16, C17)	7 Companies (C2, C3, C4, C6, C8, C9, C17)	10 Companies (C1, C3, C4, C8, C9, C13, C14, C15, C16, C17)
Pollution Level							
- Very Polluting	2/2 (100%)	2/2 (100%)	1/2 (50%)	0/2 (0%)	2/2 (100%)	1/2 (50%)	2/2 (100%)
- Polluting	8/13 (62%)	9/13 (69%)	7/13 (54%)	3/13 (23%)	11/13 (85%)	5/13 (38%)	8/13 (62%)
- Low polluting	2/2 (100%)	1/2 (50%)	2/2 (100%)	0/2 (0%)	1/ 2 (50%)	1/2 (50%)	0/2 (0%)
Size							
- Less than 1000	2/2 (100%)	1/2 (50%)	2/2 (100%)	0/2 (0%)	1/2 (50%)	1/2 (50%)	0/2 (0%)
- 1001-5000	7/11 (64%)	8/11 (73%)	5/11 (45%)	2/11 (18%)	9/11 (82%)	4/11 (36%)	7/11 (64%)
- Over 5000	3/4 (75%)	3/4 (75%)	3/4 (75%)	1/4 (25%)	4/4 (100%)	2/4 (50%)	3/4 (75%)
Headquarters							
- Overseas	4/6 (67%)	5/6 (83%)	3/6 (50%)	0/6 (0%)	5/6 (83%)	1/6 (17%)	0/6 (0%)
- Hong Kong	8/11 (73%)	7/11 (64%)	7/11 (64%)	3/11 (27%)	9/11 (82%)	6/11 (55%)	1/11 (9%)

Table 11 (Cont'd) Performance and Benefits of Environmental Strategies

Outcomes / Characteristics	**Customer Commitment** (Number of Firms)	**Employee Commitment** (Number of Firms)	**More Business Opportunities** (Number of Firms)	**Easier Access to Bank Loans** (Number of Firms)	**Reduction of the Chances of being Sued** (Number of Firms)
Company Names	3 Companies (C3, C6, C7)	2 Companies (C 7, C 16)	3 Companies (C3, C10, C16)	1 Company (C 17)	1 Company (C1)
Pollution Level					
- Very Polluting	1/2 (50%)	1/2 (50%)	2/2 (100%)	0/2 (0%)	0/2 (0%)
- Polluting	1/13 (8%)	1/13 (8%)	1/13 (8%)	1/13 (8%)	1/13 (8%)
- Low polluting	1/2 (50%)	0/2 (0%)	0/2 (0%)	0/2 (0%)	0/2 (0%)
Size					
- Less than 1000	1/2 (50%)	0/2 (0%)	0/2 (0%)	0/2 (0%)	0/2 (0%)
- 1001-5000	1/11 (9%)	2/11 (18%)	3/11 (27%)	0/11 (0%)	0/11 (0%)
- Over 5000	1/4 (25%)	0/4 (0%)	0/4 (0%)	1/4 (25%)	1/4 (25%)
Headquarters					
- Overseas	0/6 (0%)	1/6 (17%)	2/6 (33%)	0/6 (0%)	0/6 (0%)
- Hong Kong	3/11 (27%)	1/11 (9%)	1/11 (9%)	1/11 (9%)	1/11 (9%)

Twelve companies stated that the amount of untreated waste water was reduced with the use of waste water treatment facilities, and the amount of solid wastes was reduced by the recycling programmes. The plant manager of Company 1 stated that:

> "One of our production processes, the electrostatic spraying process, will produce wastewater. We have invested over a few million dollars in order to install the wastewater treatment plant. The treated effluent meets the discharge standard of the government. We also implement a recycling scheme in order to recycle paper, glass, bottles, clothes and plastics. This scheme can reduce the amount of wastes which we produced. "

Besides, it was replied by ten companies that air pollutants like CO_2 and NOx had been reduced in amount. In addition, three companies thought that their noise emission had been reduced. The head of environmental, health and safety department of Company 5 mentioned that:

> "In total, we have five power generators, and we have enclosed the power generator buildings with acoustic insulation materials to

reduce noise. Our neighbors have once complained the noise emitted from our power generators. However, after the implementation of our noise abatement measures, we have received no further complaint."

Another typical example of the environmental benefit mentioned by the respondents was energy saving (fourteen companies). These companies had set energy saving targets for their business operations, monitored their energy consumption, published appropriate reports on a regular basis and finally reduced the consumption of energy. The manager of Company 16 told us that:

"We have already installed energy saving devices in our plant, and we have our own solar power generator. We have also promoted the idea of energy conservation among our employees. For example, they are encouraged to switch off the light in the daytime and not to use air-conditioners as far as possible. Through these measures, our total energy consumption has been reduced by approximately 20 to 30 percent per year."

As well, various researchers (e.g., Nall, 2002; Russo & Fouts, 1997) believe that corporate reputation and image is a rent-earning resource which will eventually bring benefits to the companies. The senior manager of Company 10 stated that:

> "We have established a good public image as a result of adopting a very sophisticated and comprehensive environmental management system. Also, we believe that the award of the Green Medalist Certificate to us will give a positive green image to both our customers and suppliers that we have been engaged in green production."

In addition, seven firms realized the benefit of cost saving as a result of implementing environmental programmes. The manager of Company 7 responded that:

> "In order to use the more environmentally friendly raw materials in our production process, our costs were increased initially. It was unavoidable that we suffered at the beginning. However, as our

production scale is increased, we finally reap the financial benefits. The environmental benefits are long-term and prolonged."

Moreover, three companies agreed that customers were more willing to buy their products if they were environmentally responsible. Most of these companies responded that they had gained more businesses as a result of the fact that their customers were satisfied with their products and committed to the companies. The manager of Company 7 stated that:

"As most of our customers are renowned companies, they are conscious about the quality and environmental standards of our products. Especially, when we sell our products to the European countries, we should definitely follow the European standards, like the standards of RoHS. Since we strictly follow the recognized environmental standards (e.g., our paints do not contain any harmful substances), our customers have strong confidence in our company, and are willing to buy our products."

Two firms that replied that their employees were more loyal to the companies. When a firm is concerned about the physical environment as well as the working environment, its employees will have a positive attitude towards the organization. This kind of satisfaction can enhance the staff's pride in the company (Heskett, Jones, Loveman, Sasser, & Schlesinger, 1994). It follows that the staff will become more loyal to the companies (Kassini & Soteriou, 2003). This is supported by the observation of the manager from Company 16:

> "Since we have implemented various waste reduction measures, we can reduce the amount of different kinds of wastes emitted during the operation process. The internal environment of our plant has been improved, and the wastes are handled with care. Our employees are happy that they can now work in a clean and safe environment. The turnover rate of our frontline employees is relatively lower than our competitors, I believed."

Some other benefits like getting loans more easily from the bank, reducing the chance of being sued and ensuring the sustainable development of the environment were mentioned.

Firms in the sample agreed that with the adoption of various kinds of environmental strategies, they would probably gain both financial and environmental benefits like cost saving as well as the reduction of various kinds of wastes. Since some of the benefits like the reduction of water pollution, solid wastes or air pollution are easier to be observed and measured, respondents were able to associate their green practices with the achieved benefits without much difficulty. Other benefits like customer commitment or employee commitment, however, are not so apparent in nature. This may be one of the reasons why fewer firms claimed to have got the commitment from customers or employees even though they had adopted green practices.

5.5.1 Further Analysis of Performance and Benefits

For the types of pollution reduction, there was not much difference among companies with different pollution levels and sizes. However, in relation to energy savings, due to the scale of economies, we discovered that companies of larger size could achieve more energy savings (Table 11).

Since most of the polluting industries, like the paper and pulp industry, are commonly perceived to have poor environmental performance, companies

in these industries have to work more proactively in order to improve their company image. The results also indicated that all companies from the polluting industries agreed that they could improve company image after implementing environmental strategies (Table 11). Similarly, compared with companies in the less polluting industries, companies in the very polluting industries tended to believe that operating in environmental sustainable ways could distinct themselves from their competitors and enable them to create more business opportunities.

Finally, larger firms agreed that they could gain easier access to bank loans with better environmental performances (Table 11). These large firms usually have a stronger demand for funds to operate and expand their business. Since better environmental performance can bring lower loan rates (Banerjee, 2007), large firms may benefit from a more comprehensive environmental management system on the financing aspect.

5.6 Summary

To conclude, corporate environmentalism is becoming increasingly important for companies in China. Companies in these interviews attempted to link environmentalism with company strategies. All these companies had taken action beyond the existing environmental legislation and requirements, and were committed to corporate environmental responsibility. Generally, all the companies were found to have both internal and external environmental orientations. Company managers perceived that environmental issues are important, and corporate environmentalism appeared to have been framed as corporate values. Besides, all the companies were aware that they should respond to the environmental demands of external stakeholders.

In addition, the interviews had shed light on the capabilities obtained by the companies. Since environmental considerations were embedded in the daily operations of the firms being interviewed, the staff of the firms would try actively to search for relevant information in order to build a capacity for implementing proactive environmental strategies. In other words, with an environmental culture diffused within the entire firms, their staff would proactively obtain the necessary information to help the firms maintain a

strategic fit with its environment. Besides, the companies in this study claimed that they were competent in improving and pioneering innovation to the existing environmental processes. The capability of bringing innovation to the entire production process was essential for the successful implementation of corporate environmentalism.

Regarding the relationship between environmental strategies and business performance, the firms considered that they would achieve the desired benefits like the reduction of pollution, reduction of costs due to improved operations, reduction of the chance of being sued, etc. However, we should keep in mind that not every firm was capable of generating competitive advantage by adopting environmental strategies. Hence, firms should pay more attention to the circumstances under which the respective environmental strategies contribute to competitive advantage.

In China, institutions, especially the Chinese government, help promote new environmental guidelines and practices among the firms. It is noticed that the governmental sector shoulders most of the responsibility for environmental protection and relies on administrative order and control mechanisms to trigger the companies' compliance with the environmental policies (Scott, 1995). The

findings of the interviews can still revealed the fact that regulation by the Chinese Government, including inspections and enforcement actions, was one of the most important factors affecting the firms' environmental decision-making.

The information of the exploratory interviews was used in the quantitative study, which helped operationalize the constructs with suitable measurement items.

CHAPTER 6

QUESTIONNAIRE SURVEY-FINDINGS

6. Introduction

In this chapter, the results of the common method variance (CMV) assessment are presented at the beginning. Then, the sample features and descriptive statistics are summarized. The results of model validation and hypothesis testing, as well as the moderating effect of regulatory stakeholder influence, are shown at the end.

6.1 Preliminary Analyses

6.1.1 Sampling Validation

In this study, 87 of the 238 respondents (37 percent) filled in the online questionnaire, whereas 151 of them (63 percent) completed the questionnaire face-to-face. Since the respondents could answer the questionnaire in two different ways, t-test and chi-square test were performed to check whether there was any significant deviation in the results collected by the two methods. The t-test results of the two sets of responses had p-values ranging between 0.139 and 0.653 on 35 interval scaled measurement items. These results revealed that there was no significant difference between the two sets of responses. Besides, no significant difference was detected by the chi-square tests between the two sets of respondents in terms of all the categorical variables, i.e. “company

characteristics" as well as "respondent characteristics". The categorical variables were "types of ownership", "year of establishment", "location", "number of employees", "overseas sales", "industry", "types of international accreditations", "position in the company", "education", "gender", "age", "industrial experience" and "managerial experience". The results of the company and respondent characteristics had p-values ranging between 0.146 and 0.807. Hence, all the data could be combined for subsequent analyses.

Besides, in order to check the non-response bias of the online survey, Armstrong and Overton's (1977) non-response bias check was carried out. The first 25 percent of the questionnaires received were compared to the final 25 percent to check for consistency. Chi-squared cross tabulations (categorical late respondents revealed no significant differences, with all variables having p-values over 0.10. As a result, no response bias was detected.

6.1.2 Measure Validation

Before testing the hypotheses, it is necessary to perform post-hoc statistical analyses on the collected survey data for the purpose of validation. Table 12 shows the correlation matrix for the constructs. The correlation coefficients in the matrix indicated the strength of the linear relationship between the variables. This table also shows the Cronbach's alpha coefficients of all the constructs, and all the coefficients lied above the threshold of 0.70, thus providing support for acceptable reliability of the constructs (Nunnally, 1978).

Table 12. Correlation Matrix

	Mean	S.D.	1	2	3	4	5	6	7	8	9
1. IEO	4.54	1.06	**0.85**								
2. EEO	4.85	0.91	0.20 **	**0.81**							
3. IFC	5.04	0.97	0.61 **	0.62 **	**0.83**						
4. INC	5.11	1.05	0.60 **	0.63**	0.25 **	**0.92**					
5. ES	4.34	1.25	0.69 **	0.67 **	0.69 **	0.65 **	**0.96**				
6. EP	5.22	0.85	0.65 **	0.61 **	0.63 **	0.60 **	0.66 **	**0.84**			
7. FP	4.21	0.77	0.55 **	0.46 **	0.55 **	0.47 **	0.46 **	0.55 **	**0.94**		
8. RSI	5.78	0.95	0.42 **	0.28 **	0.40**	0.42 **	0.51 **	0.49 **	0.31 **	**0.95**	
9. SDT	NA	NA	-0.03	0.03	0.03	-0.06	-0.05	0.03	-0.04	-0.05	**NA**

Notes:
IEO=Internal Environmental Orientation; EEO= External Environmental Orientation; IFC=Information Capability; INC=Innovation Capability; ES=Environmental Strategies; EP=Environmental Performance; FP= Financial Performance; RSI=Regulatory Stakeholder Influence, SDT=Social Desirability Test.
Diagonal elements (bold) are the Cronbach's alpha of the constructs.
**Correlation is significant at the 0.01 level.

In addition, the discriminant validity of the constructs was assessed by using Fornell and Larcker's (1981) measure of average variance extracted (AVE). The AVE measures the amount of variance captured by the construct (through its items) relative to the amount of variance due to measurement error. To meet the requirements of discriminant validity, the values of AVE of a construct must be greater than its squared correlations with other constructs in the model (Fornell & Larcker, 1981). In Table 13, the diagonal elements were all higher than the squared correlations between constructs without exceptions, and the values of AVEs were all above 0.50. This confirmed the discriminant validity of all the constructs in this study (i.e. the constructs were both conceptually and empirically distinct from each other) (Fornell and Larcker 1981).

Table 13. Average Variance Extracted (AVE) and Squared Correlation

	Mean	S.D.	1	2	3	4	5	6	7	8	9
1. IEO	4.54	1.06	**0.63**								
2. EEO	4.85	0.91	0.04	**0.55**							
3. IFC	5.04	0.97	0.37	0.38	**0.61**						
4. INC	5.11	1.05	0.36	0.40	0.06	**0.78**					
5. ES	4.34	1.25	0.48	0.45	0.48	0.42	**0.76**				
6. EP	5.22	0.85	0.42	0.37	0.40	0.36	0.44	**0.59**			
7. FP	4.21	0.77	0.30	0.21	0.30	0.22	0.21	0.30	**0.77**		
8. RSI	5.78	0.95	0.18	0.08	0.16	0.18	0.26	0.24	0.10	**0.79**	
9. SDT	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**NA**

Notes:

IEO=Internal Environmental Orientation; EEO= External Environmental Orientation; IFC=Information Capability; INC=Innovation Capability; ES=Environmental Strategy; EP=Environmental Performance; FP= Financial Performance; RSI=Regulatory Stakeholder Influence, SDT=Social Desirability Test.

Diagonal elements (bold) are the average variance extracted (AVE) between the constructs and their measures. Off-diagonal elements are the squared correlations. To establish discriminate validity, diagonal elements should be larger than off-diagonal elements in the same column and row.

Values of AVE were all above 0.50 were regarded as acceptable (Fornell and Larcker 1981).

6.1.2.1 Confirmatory Factor Analysis

Gerbing and Anderson (1988) comment that confirmatory factor analysis (CFA) is a more rigid method for testing unidimensionality when compared with Cronbach's alpha, exploratory factor analysis and item total correlations. The CFA validation procedure for all constructs was conducted by using the structural equation modeling (SEM) software, AMOS 6. SEM is a multivariate technique combining aspects of factor analysis and multiple regression. It enables the researcher to examine a series of interrelated dependence relationships among the measured variables and the latent constructs as well as among several latent constructs simultaneously (Hair, Black, Babin, Anderson, & Tatham, 2006). This technique has gained enormous popularity in the

management field due to its ability for assessing complex theoretical structures (Escriba-Esteve, Sanchez-Peinado & Sanchez-Peinado, 2008).

Based on Hair et al. (2006), we conducted the one-factor CFA analysis by testing the chi-square statistics, the normed fit index (NFI), the comparative fit index (CFI) and the root mean square residual (RMSR), which were the popular goodness of fit indices. The results of the one-factor CFA model showed that the χ^2 statistic was 697.27, and the degree of freedom (d.f.) was 436 with $p<0.05$. The χ^2/degrees of freedom (d.f.) ratios in the range of 1.5-3.0 are adequate, and lower values indicated a good fit (Byrne, 1989). In this study, the χ^2/degrees of freedom (d.f.) ratios was 1.60 which was acceptable.

Following the common practice, we consider that the values of NFI and CFI greater than 0.90 are regarded as demonstrating a good fit for the model fit indices used (Hair et al., 2006). Other than the fitness indices, the root mean square error of approximation (RMSEA) is also commonly used to measure the expected error of the model. The threshold value of 0.08 or below is acceptable (Hair et al., 2006). In this study, the other fit indices indicated acceptable fit (NFI=0.92, CFI= 0.97, RMSEA=0.04). Taken together, the one-factor CFA results demonstrated satisfactory reliability and validity for all the constructs under examination. In Table 14, the indicators of the constructs were loaded significantly as hypothesized at $p<0.05$ (Byrne, 1989).

Table 14. Finalized CFA Results for the Constructs

Indicator/Item	Factors/Constructs								Composite Reliability [b]
	IEO	EEO	IFC	INC	ES	EF	FF	RSI	
Internal Environmental Orientation (IEO)									**0.871** [b]
IEO1	**0.87**[a]								
IEO2	0.89*								
IEO3	0.82*								
IEO4	0.56*								
External Environmental Orientation (IEO)									**0.828** [b]
EEO1		**0.63** [a]							
EEO2		0.73*							
EEO3		0.80*							
EEO4		0.79*							
Information Capability (IFC)									**0.861** [b]
IFC1			**0.60** [a]						
IFC2			0.77*						
IFC3			0.87*						
IFC4			0.86*						
Innovation Capability (INC)									**0.932** [b]
INC1				**0.79** [a]					
INC2				0.93*					
INC3				0.97*					
INC4				0.82*					
Environmental Strategies (ES)									**0.970** [b]
ES1					**0.70** [a]				
ES2					0.86*				
ES3					0.89*				
ES4					0.87*				
ES5					0.95*				
ES6					0.89*				
ES7					0.92*				
Environmental Performance (EF)									**0.848** [b]
EF1						**0.93** [a]			
EF2						0.81*			
EF3						0.74*			
EF4						0.54*			
Financial Performance (FP)									**0.932** [b]
FF1							**0.87** [a]		
FF2							0.84*		
FF3							0.92*		
FF4							0.89*		

Regulatory Stakeholder Influence (RSI)		**0.938** [b]
RSI1	**0.95** [a]	
RSI2	0.95*	
RSI3	0.86*	
RSI4	0.79*	

Notes:
IEO=Internal Environmental Orientation; EEO= External Environmental Orientation; IFC=Information Capability; INC=Innovation Capability; ES=Environmental Strategy; EP=Environmental Performance; FP= Financial Performance; RSI=Regulatory Stakeholder Influence.
First item of each factor or construct has been emboldened to ease reading.
[a] Initially fixed at 1.0 for estimation purposes (Byrne, 1994).
[b] The values of composite reliabilities were all higher than the recommended 0.7 (Nunnally, 1994).
*Estimated standardized factor loading significant at $p<0.05$.
Model fit indexes: χ^2 statistic = 697.27 $_{(d.f.=436,\ p<0.05)}$; NFI=0.92, CFI= 0.97, RMSEA=0.04.

6.1.2.2 Common Method Variance (CMV) Tests

To investigate the potential threat of common method variance (CMV) bias, Podsakoff and Organ's (1986) recommend that Harman's one-factor test should be performed. The underlying principle behind the test is that if common method or common source bias is a problem, factor analyses should show either a single factor or a clearly dominant factor that accounts for most of the variance (Marcus & Anderson, 2006). In this study, the principal components factor analysis revealed that no single factor was identified, and no general factor emerged in the unrotated factor structure. Besides, a more rigorous the approach, i.e. the single-method-factor approach recommended by Podsakoff, MacKenzie, Lee and Podsakoff (2003) was employed. The inclusion of a common method construct, i.e. social desirability measure, did not change the significance of any paths in the original model (Table 15). These results eliminated the possibility of any serious common method variance bias.

Table 15. Common Method Variance (CMV) Test

Indicator/Item	Factors/Constructs								Composite Reliability [b]
	IEO	EEO	IFC	INC	ES	EF	FF	RSI	
Internal Environmental Orientation (IEO)									**0.862** [b]
IEO1	**0.86**[a]								
IEO2	0.88*								
IEO3	0.82*								
IEO4	0.53*								
External Environmental Orientation (IEO)									**0.816** [b]
EEO1		**0.60** [a]							
EEO2		0.72*							
EEO3		0.79*							
EEO4		0.78*							
Information Capability (IFC)									**0.856** [b]
IFC1			**0.58** [a]						
IFC2			0.77*						
IFC3			0.86*						
IFC4			0.86*						
Innovation Capability (INC)									**0.929** [b]
INC1				**0.78** [a]					
INC2				0.92*					
INC3				0.97*					
INC4				0.82*					
Environmental Strategies (ES)									**0.970** [b]
ES1					**0.70** [a]				
ES2					0.86*				
ES3					0.88*				
ES4					0.87*				
ES5					0.95*				
ES6					0.89*				
ES7					0.92*				
Environmental Performance (EF)									**0.729** [b]
EF1						**0.93** [a]			
EF2						0.80*			
EF3						0.72*			
EF4						0.53*			
Financial Performance (FP)									**0.898** [b]
FF1							**0.87** [a]		
FF2							0.86*		
FF3							0.83*		
FF4							0.89*		

Regulatory Stakeholder Influence (RSI)		**0.888**[b]
RSI1	**0.92**[a]	
RSI2	0.93*	
RSI3	0.85*	
RSI4	0.77*	

Notes:
IEO=Internal Environmental Orientation; EEO= External Environmental Orientation; IFC=Information Capability; INC=Innovation Capability; ES=Environmental Strategy; EP=Environmental Performance; FP= Financial Performance; RSI=Regulatory Stakeholder Influence.
First item of each factor or construct has been emboldened to ease reading.
[a] Initially fixed at 1.0 for estimation purposes (Byrne, 1994).
[b] The values of composite reliabilities were all higher than the recommended 0.7 (Nunnally, 1994).
*Estimated standardized factor loading significant at $p<0.05$.
Model fit indexes: χ^2 statistic = 899.52 $_{(d.f.=568,\ p<0.05)}$; NFI=0.90, CFI= 0.97, RMSEA=0.05.

In Table 16, the two model fits did not suggest any significant changes between Measurement Model and Common Method Variance (CMV) model in chi-square/degree of freedom (1.60 vs. 1.58), NFI (0.92 vs. 0.90), CFI (0.97 vs. 0.97) as well as RMSEA (0.04 vs. 0.05). It ensured that this study would not be affected by common method variance bias.

Table 16. Different Model Fits of Measurement Model and CMV Model

	Measurement Model	CMV Model
Chi-square	697.27	899.52
Degree of freedom	436	568
Chi-square/degree of freedom	1.60	1.58
NFI	0.92	0.90
CFI	0.97	0.97
RMSEA	0.04	0.05

$\triangle$ chi-square/$\triangle$ degree of freedom = 1.53

6.1.2.3 Social Desirability Bias Test

Before evaluating the final model, it is necessary to address the social desirability bias relating to environmental management-related studies (Darnall, Jolley, & Handfield, 2008). Social desirability bias is the tendency of individuals to underestimate (overestimate) the likelihood that they will perform an undesirable (desirable) action (Chung & Monroe, 2003). One shortfall of conducting environmental-related research is that its results may be affected by the social desirability bias. This bias is usually stronger in the more sensitive and ethical issues. If social desirability bias exists, researchers are unlikely to find statistically significant relationships because there is less variability in the respondents' answers (Randall & Fernandes, 1991). Social desirability bias may affect the endogenous variables, i.e. the information capability (IFC), innovation capability (INC), environmental strategies (ES), environmental performance (EP), and financial performance (FP) in our proposed model. We initially included "social desirability test" as the control variable for all endogenous variables in this model, and the results showed that p-values ranged from 0.15 to 0.91. This showed that "social desirability test" was insignificantly related to all the endogenous variables. The anonymity of all respondents was also guaranteed in order to further reduce the possibility of social desirability bias. To simplify the model, we only conducted the social desirability test for the ultimate endogenous variable (i.e. financial performance) in our final model.

6.2 Samples Characteristics

6.2.1 Characteristics of Organizations

Table 17 shows the sample characteristics of the 238 manufacturing enterprises in the Pearl River Delta Region (PRD) of China which provided response to the questionnaire survey. The 238 responding companies represented a wide spectrum of 8 manufacturing industries: paper (11 percent), plastics (30 percent), cement (2 percent), electronics (29 percent), textiles and dyeing (15 percent), automobile components (1 percent), leather products (2 percent), wooden products (4 percent) and others (6 percent). The distribution of industrial sectors of the respondents in this study reflected the current state in the PRD, where a broad range of industrial clusters such as garments and textiles, plastic products, electrical goods and electronics had emerged (Enright & Scott, 2007). In this context, the samples from this study were therefore comparable with those manufacturing companies operating in the PRD.

With regard to the years of establishment, 11 percent of the companies had been established for less than 5 years, 29 percent between 5–10 years, 24 percent between 11–15 years, 21 percent between 16–20 years, 11 percent between 21–25 years and 4 percent over 25 years. Overall speaking, 85 percent of the respondents had their businesses set up for 5–25 years. The number of years of establishment was similar to the previous research on the PRD manufacturing firms (Chow & Liu, 2007).

Thirdly, among the 238 enterprises, 36 percent of them were joint ventures. Foreign and self-owned enterprises accounted for 25 percent and 24 percent of the respondents respectively. The traditional state-owned enterprises, which were characteristic of the socialist economy in China, represented 14 percent of the sample. Since the PRD remains by far the most internationally-oriented regional economy in China (Enrigh, Scott & Associates, 2007), foreign capital plays a major role in the PRD's industrial development. In recent years when private enterprises have formally allowed and recognized in China, their number mushroomed in the PRD (Hong Kong Trade Development Council, 2008b). The characteristics of the ownership types of the respondents, with over 50 percent of them being joint ventures or foreign comapnies, were also similar to the current situation in the PRD. The remaining 1 percent was from other ownership type.

With regard to organization size, 14 percent had under 100 employees, 20 percent had 100–499 employees, 28percent had 500–999 employees and 2percent had over 5000 employees. Specifically, around 50 percent of the respondent companies were of medium size with 100–999 employees. Regarding the size of the responding companies, they were similar to those in the previous studies and reports about China, especially in the PRD (Zhu, Sarkis, & Geng, 2005; Enright & Scott, 2007; Zeng, 2004). Only a small proportion of them hired less than 100 employees (14 percent) or over 5,000 employees (2 percent).

Concerning the percentage of foreign sales, 1 percent of the companies had under 10 percent of foreign sales. Besides, 3 percent of the companies had 10–20 percent of foreign sales, 4 percent had 21–30 percent of foreign sales, 5 percent had 31–40 percent of foreign sales, and 15 percent had 41–50 percent of foreign sales. The majority of them (71 percent) had over 50 of foreign sales.

In respect to the international accreditations that organizations had obtained, it was worth noting that 79 percent of the respondents had already obtained at least one internationally recognized accreditation for environmental management. For instance, 96 companies (40 percent) were certified with ISO 14001, 36 (15 percent) of them had obtained the Restriction of Hazardous Substances Directive (RoHS) accreditation and 7 enterprises (3 percent) had acquired the Waste Electrical and Electronic Equipment (WEEE) certification. Since the implementation of ISO 14001, environmental management system can be adopted by almost all industries, whereas RoHS and WEEE mainly focus on the electrical and electronic industry (Zhang, Zhang, & Jiao, 2006). Thus, it was reasonable to observe that in our samples, more companies have ISO14001 accreditation than RoHS and WEEE. Finally, regarding the locations of the organizations, around 84 percent of them were located in industrial area and 5 percent were in mixed residential and industrial area.

Table 17. Organization Characteristics

	No. of firms	Percentage
Primary Industry		
Paper	27	11%
Plastics	71	30%
Cement	4	2%
Electronics	68	29%
Textiles and dyeing	36	15%
Automobile components	3	1%
Leather products	4	2%
Wooden products	9	4%
Others	16	6%
Year of Establishment		
Less than 5 years	27	11%
5-10 years	70	29%
11-15 years	57	24%
16-20 years	50	21%
21-25 years	25	11%
Over 25 years	8	4%
Types of Ownership		
Joint-venture	85	36%
State-owned enterprises	33	14%
Foreign enterprises	60	25%
Self-owned enterprises	58	24%
Others	2	1%
Number of Employees		
Under 100	33	14%
100-499	46	20%
500-999	67	28%
1000-4999	86	36%
Over 5000	5	2%
Percentage of Products Sold to Overseas Markets		
Under 10%	2	1 %
10-20%	6	3 %
21-30%	10	4 %
31-40%	11	5 %
41-50%	35	15 %
Above 50%	169	71%
Not applicable	4	1 %

Obtained International Accreditations		
ISO 14001	96	40%
RoHS	36	36%
WEEE	7	3%
Location		
Residential	0	0%
Industrial	202	84%
Commercial	6	3%
Mixed residential and industrial	11	5%
Mixed residential and commercial	4	2%
Mixed commercial and industrial	12	5%
Mixed residential, commercial and industrial	1	1%

6.2.2 Characteristics of Respondents

In Table 18, characteristics of the respondents are shown. The majority (94 percent) of respondents were general managers, while 3 percent of respondents held environmental positions within their organizations. Besides, 50 percent of the respondents had bachelor and master degrees, and 43 percent of them had received post-secondary education. Furthermore, 25 percent of the respondents were under 30 years old, 47 percent were 30 - 40 years old and 22 percent of the respondents were 41–50 years of age. Furthermore, 53 percent of the respondents were male.

Regarding the industrial experience of the respondents, 9 percent had less than 5 years of experience. In addition, 27 percent had between 5–10 years of experience, 40 percent had between 11–15 years of experience, 14 percent had between 16–20 years of experience, 7 percent had between 21–25 years of experience and 2 percent had over 25 years of experience. The distribution of

industrial experience of the respondents was similar to previous research, like that of Li, Shang and Zhao (2007), with managers who had mostly got 5–15 years of working experience in the PRD. Finally, 41 percent of the respondents had under 5 years of managerial experience, 40 percent of them had 5–10 years of managerial experience, and around 3 percent of them had 16 – 20 years of managerial experience.

Table 18. Respondents Characteristics

Position		
General manager	222	94%
Manager in charge of environmental management	7	3%
Others	7	3%
Education		
Below post-secondary	16	7%
Post-secondary	102	43%
Under-graduate	111	47%
Master's degree	8	3%
Doctorate degree	0	0%
Others	0	0%
Age		
Under 30	60	25%
30-40	111	47%
41 – 50	52	22%
Above 50	12	6%
Gender		
Male	126	53%
Female	110	47%
Industrial Experience		
Under 5	21	9%
5-10	65	27%
11-15	96	40%
16-20	33	14%
21-25	17	7%
Above 25	5	2%
Managerial Experience		
Under 5	98	41%
5 – 10	95	40%
11 – 15	35	15%
16 – 20	6	3%
21 – 25	1	0.4%
Above 25	2	0.6%

6.2.3 Exploration of the Samples: Ownership Types

In order to analyze preliminarily the impact of ownership types on corporate environmentalism among the manufacturing firms in China, a multivariate analysis of variance (MANOVA) was conducted. Specifically, the analysis was to test the ownership differences on all measured variables: internal environmental orientation (IEO), external environmental orientation (EEO), information capability (IFC), innovation capability (INC), environmental strategy (ES), environmental performance (EP), financial performance (FP) and regulatory stakeholder influence (RSI). Types of ownership were dummy coded (0= local Chinese enterprises; 1= non-local Chinese enterprises). Local Chinese enterprises included state-owned and self-owned enterprises, whereas non-local Chinese enterprises consisted of foreign enterprises and joint-venture.

A significant multivariate main effect emerged, $F(8, 227) = 5.78$, $p < 0.05$, partial $\eta^2 = 0.17$ (Table 19), and follow-up univariate analyses of variance (ANOVAs) showed significant differences for ES, FP and RSI (Table 20). The mean scores for ES, FP and RSI were 3.96, 3.89 and 5.56 for local Chinese enterprises and 4.63, 4.41 and 5.91 for non-local Chinese enterprises respectively. However, we found no significant differences in IEO ($F = 1.99$, $p > 0.10$), EEO ($F = 0.09$, $p > 0.10$), IFC ($F = 0.74$, $p > 0.10$), INC ($F = 0.14$, $p > 0.10$) and EP ($F = 1.59$, $p > 0.10$). The reasons for the differences between local and non-local Chinese enterprises in ES ($F = 21.17$, $p < 0.01$), FP ($F = 21.17$, $p < 0.01$) and RSI ($F = 8.44$, $p < 0.01$) are explained in Chapter 6.

Table 19. Means, Standard Deviations, and Ownership Differences on Variables and MANOVA Results

Variables	Local Chinese Enterprises (state-owned and self-owned) (n = 91)		Non-local Chinese Enterprises (foreign enterprise and joint-venture) (n =145)	
	M	*SD*	*M*	*SD*
IEO	4.50	1.01	4.59	1. 80
EEO	4.96	0.86	4.99	0.76
IFC	5.08	0.81	5.13	1.13
INC	5.22	0.88	5.26	0.78
ES	3.96	1.01	4.63	1.14
EP	5.31	0.75	5.38	0.73
FP	3.89	0.66	4.41	0.70
RSI	5.56	0.95	5.91	0.89

$F(8, 227) = 5.78$, $p < .05$, partial $\eta^2 = 0.17$.

Note. $N = 236$

IEO=Internal Environmental Orientation; EEO= External Environmental Orientation; IFC=Information Capability; INC=Innovation Capability; ES=Environmental Strategy; EP=Environmental Performance; FP= Financial Performance; RSI=Regulatory Stakeholder Influence.

$^{*}p < 0.05$; $^{**}p < 0.01$.

Table 20. Means, Standard Deviations, Ownership Differences on Variables and ANOVA Results

Variables	Local Chinese Enterprises (state-owned and self-owned) (n = 91)		Non-local Chinese Enterprises (foreign enterprise and joint-venture) (n =145)			
	M	*SD*	*M*	*SD*	*F*	Partial η^2
IEO	4.50	1.01	4.59	1. 80	1.99	0.01
EEO	4.96	0.86	4.99	0.76	0.09	0.00
IFC	5.08	0.81	5.13	1.13	0.74	0.00
INC	5.22	0.88	5.26	0.78	0.14	0.00
ES	3.96	1.01	4.63	1.14	21.17**	0.10
EP	5.31	0.75	5.38	0.73	1.59	0.01
FP	3.89	0.66	4.41	0.70	34.96**	0.13
RSI	5.56	0.95	5.91	0.89	8.44**	0.04

Note. $N = 236$

IEO=Internal Environmental Orientation; EEO= External Environmental Orientation; IFC=Information Capability; INC=Innovation Capability; ES=Environmental Strategy; EP=Environmental Performance; FP= Financial Performance; RSI=Regulatory Stakeholder Influence.

$^{*}p < 0.05$; $^{**}p < 0.01$.

6.2 Descriptive Statistics

Summary statistics as well as the Cronbach's alpha of all the major constructs under investigations are reported in Table 21. To summarize, the results of the mean scores, standard deviations as well as the alpha coefficients of the two kind of environmental orientations, i.e. internal environmental orientation ($\bar{X}$ = 4.54, s.d. = 1.06, α = 0.85) and external environmental orientation ($\bar{X}$ = 4.85, s.d. = 0.91, α = 0.81) are indicated in Table 21. Besides, the results of the two kinds of capabilities, i.e. information capability ($\bar{X}$ = 5.04, s.d. = 0.97, α = 0.83) and innovation capability ($\bar{X}$ =5.11, s.d. = 1.05, α =0.92), are shown in the same table. Finally, the results of the remaining constructs, i.e. environmental strategies ($\bar{X}$ =4.34, s.d. = 1.25, α = 0.96), environmental performance ($\bar{X}$ = 5.22, s.d. = 0.85, α = 0.84), financial performance ($\bar{X}$ = 4.21, s.d. = 0.77, α = 0.94), and institutional stakeholder influence ($\bar{X}$ = 5.78, s.d. = 1.00, α = 0.95) are displayed.

Table 21. Descriptive Statistics

Variables	*Mean*	*Standard deviation (S.D.)*	Cronbach's alpha
Environmental Resources			
Internal Environmental Orientation (IEO) (1= "strongly disagree" to 7= "strongly agree")	**4.54**	**1.06**	**0.85**
IEO1: Environmental preservation is a high-priority activity in our firm.	4.57	1.16	
IEO2: Preserving the environment is a central corporate value in our firm.	4.59	1.11	
IEO3: Our firm has a clear policy statement urging environmental awareness in every area.	4.95	1.00	
IEO4: Most of the employees in our company did not recognize the needs of environmental protection of our firm (R).	4.03	0.95	
External Environmental Orientation (EEO) (1= "strongly disagree" to 7= "strongly agree")	**4.85**	**0.91**	**0.81**
EEO1: The natural environmental does not currently affect our firm's business activity (R).	4.35	0.94	
EEO2: Our firm has a responsibility to preserve the environment	5.10	0.87	
EEO3: Environmental preservation is vital to our firm's survival.	5.10	0.83	
EEO4: My organization's contribution to environmental damage is small.	4.85	1.01	
Environmental Capabilities			
Information Capability (IFC) (1= "strongly disagree" to 7= "strongly agree")	**5.04**	**0.97**	**0.83**
IFC1: Our company can capture green related information.	5.49	0.72	
IFC2: Our company can acquire green related information.	4.85	1.19	
IFC3: Our company can facilitate collective green learning within the firm.	4.90	1.01	
IFC4: Our company can develop a shared or long-range vision to incorporate environmental issues into the development of the firm.	4.92	0.96	
Innovation Capability (INC) (1= "strongly disagree" to 7= "strongly agree")	**5.11**	**1.05**	**0.92**
INC1: Our firm can improve and/or modify the existing products (especially in environmental products).	4.71	1.18	
INC2: Our company can develop new green product.	5.34	0.93	
INC3: Our company can adopt new methods and ideas in the production/manufacturing processes.	5.32	0.95	
INC4: Our company can facilitate and/or trigger green innovation within the firm.	5.05	1.12	
Environmental Strategies (ES) (1= "small extent" to 7= "large extent")	**4.34**	**1.25**	**0.96**
ES1: Participate in government-sponsored environmental programs.	4.23	1.31	
ES2: Set environmental performance objectives as part of our annual business plans.	4.46	1.21	

ES3: Prepare and release of environmental reports.	4.33	1.28	
ES4: Develop a certifiable environmental management system (e.g. ISO 14001).	4.35	1.35	
ES5: Measure key aspects of our environmental performance.	4.30	1.22	
ES6: Scientifically assess the life-cycle impact of our products.	4.38	1.21	
ES7: Make investments in clean production technologies.	4.30	1.20	
Environmental Performance (EP) (1= "much worse" to 7= "much better")	**5.22**	**0.85**	**0.84**
EP1: Complying with existing environmental regulations	5.27	0.75	
EP2: Preventing and mitigating environmental crises	5.30	0.80	
EP3: Educating employees and the public about the environment	4.95	0.92	
EP4: Avoiding to face stricter environmental regulations in the future	5.37	0.91	
Financial Performance (FP) (1= "much worse" to 7= "much better")	**4.21**	**0.77**	**0.94**
FP1: Profitability	4.18	0.79	
FP2: Return on investment	4.21	0.74	
FP3: Growth in market share	4.25	0.79	
FP4: Sales growth	4.20	0.75	
Regulatory Stakeholder Influence (RSI) (1= "no influence at all" to 7="very strong influence")	**5.78**	**1.00**	**0.95**
RSI1: Central Government	6.02	1.00	
RSI2: Central Environnemental Protection Bureau	5.92	1.07	
RSI3: Local government	5.64	0.95	
RSI4: Local environnemental protection bureau	5.53	0.98	

Notes:
(R) Reversed-score item.

6.4 Data Analysis

6.4.1 Full Structural Analysis

After satisfactory reliability and validity had been established for the constructs, full structural analysis was conducted to test all the hypothesized causal relationships (i.e. Hypotheses 1a- 5) by using SEM technique.

To evaluate the proposed model, this study followed the recommendations of Shook, Ketchen, Hult, & Kacmar (2004) in order to examine multiple indices on model fit. The first overall test of model fit was the chi-square test. The χ^2 statistics of the proposed model was 841.574, and the degree of freedom (d.f.) was 464 with $p < 0.05$. A significant chi-square statistic indicated a poor model fit. Given that the χ^2 statistic was highly sensitive to sample size (Bagozzi & Foxall, 1996; Hair et al., 2006), other more powerful fit indices such as NFI, CFI, and RMSEA had also been computed.

As shown in Figure 2, the NFI, CFI and RMSEA values were 0.90, 0.95 and 0.05 respectively. All these values met the recommended threshold requirements (Browne & Cudeck, 1993; Byrne, 1989, Hair et al., 2006). Overall, the analysis indicated that the data fitted the proposed model reasonably well.

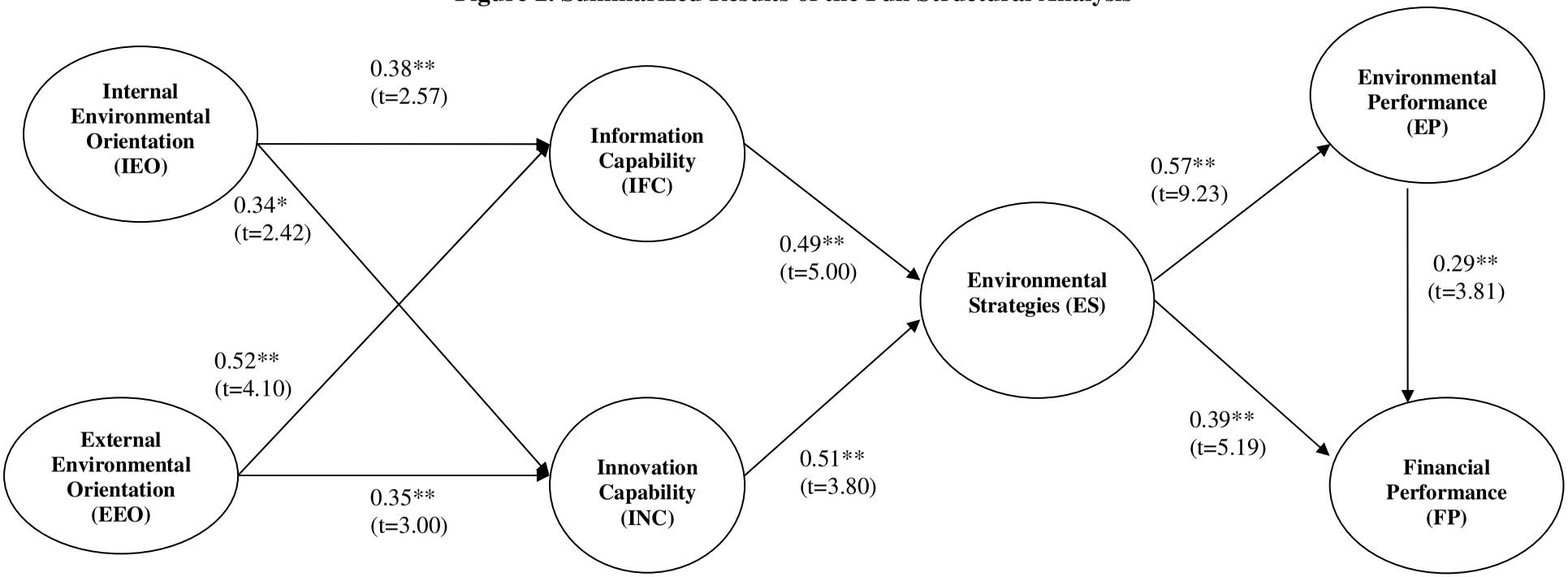
Figure 2 also displays the estimated standardized path coefficients of the proposed model. All coefficients were significant ($p < 0.05$), with the sign of influence as hypothesized. There were significant positive paths between the internal environmental orientation and the development of information capability ($\beta = 0.38$, $p < 0.01$), as well as between the internal environmental orientation and

the innovation capability ($\beta = 0.34$, $p < 0.05$). Likewise, the external environmental orientation of firms was positively related to the information capability ($\beta = 0.52$, $p < 0.01$) and the innovation capability ($\beta = 0.35$, $p < 0.01$).

Regarding the two different capabilities, our model confirmed the positive relationship between information capability and environmental strategies ($\beta = 0.49$, $p < 0.01$) as well as between innovation capability and environmental strategies ($\beta = 0.51$, $p < 0.01$). With regard to Hypothesis 4a and 4b, the results revealed that environmental strategies led to positive financial performance ($\beta = 0.39$, $p < 0.01$) and positive environmental performance ($\beta = 0.57$, $p < 0.01$). Finally, environmental performance was positively related to financial performance ($\beta = 0.29$, $p < 0.01$)

More to the point, t-statistics for testing the correlation among the latent constructs were used to test the path links. t-statistics exceeded the critical value (± 1.96) for the 0.05 significance level as well as for the 0.01 significance level (Reisinger & Turner, 1999).

Figure 2. Summarized Results of the Full Structural Analysis



Notes:
Summary of overall model fit indexes: $\chi^2 = 841.574$; Degree of freedom (d.f.) =464, $p<0.05$.
NFI=0.90; CFI=0.95; RMSEA=0.05.
*Estimated standardized path coefficient significant at $p<0.05$; **Estimated standardized path coefficient significant at $p<0.01$.
t-statistics exceeded the critical value (1.96) for the 0.05 significant level as well as for the 0.01 significance level.

Table 22 shows the path estimates of constructs and items of the final model. It was found that the path estimates of the three control variables, i.e. the social desirability test, firm age in terms of year of establishment and firm size in terms of number of employees of the firms, were insignificantly related to the ultimate endogenous variable, i.e. the financial performance. Actually, hypotheses (Hypotheses 1a to 5) were empirically supported.

To sum up, the above full structural analysis indicated that having critical resources (environmental orientations) would facilitate the development of capabilities (information and innovation), which would consequently contribute to the implementation of proactive environmental strategies. Finally, the findings also demonstrate that the adoption of environmental strategies will positively influence the environmental as well as financial performance.

Table 22. Path Estimates of Constructs and Items (Full Structural Analysis)

Constructs/Items		Path Estimates							
IEO →	**IEO1**	0.85							
IEO →	**IEO2**	0.86							
IEO →	**IEO3**	0.80							
IEO →	**IEO4**	0.51							
EEO →	**EEO1**		0.54						
EEO →	**EEO2**		0.73						
EEO →	**EEO3**		0.81						
EEO →	**EEO4**		0.80						
IFC →	**IFC1**			0.51					
IFC →	**IFC2**			0.54					
IFC →	**IFC3**			0.78					
IFC →	**IFC4**			0.85					
INC →	**INC1**				0.79				
INC →	**INC2**				0.94				
INC →	**INC3**				0.97				
INC →	**INC4**				0.78				
ES →	**ES1**					0.69			
ES →	**ES2**					0.85			
ES →	**ES3**					0.86			
ES →	**ES4**					0.86			
ES →	**ES5**					0.95			
ES →	**ES6**					0.90			
ES →	**ES7**					0.92			
EP →	**EP1**						0.83		
EP →	**EP2**						0.81		
EP →	**EP3**						0.91		
EP →	**EP4**						0.86		
FP →	**FP1**							0.89	
FP →	**FP2**							0.82	
FP →	**FP3**							0.91	
FP →	**FP4**							0.92	
SDT →	**FP**								-0.07
FA →	**FP**								0.10
FS →	**FP**								-0.06

Notes:

Internal Environmental Orientation=IEO; External Environmental Orientation=EEO; Information Capability= IFC; Innovation Capability=INC; Environmental Strategies= ES; Environmental Performance: EP; Financial Performance; SDT= Social Desirability Test; FA= Firm Age; FS= Firm Size.

6.4.2 Testing Alternative Models

In order to assess more precisely the relationship between different constructs and to identify the best overall model for investigating corporate environmentalism, a comparison of two alternative models was carried out. Researchers examine alternative models by either adding paths, reversing paths or removing paths to explore the data fitness (Prussia1 & Kinicki, 1996). Hence we would follow the normal practices to develop two alternative models to examine the situaitons of corporate enviornmentalism in the PRD.

6.4.2.1 Alternative Model 1

A structural path was added to argue that the managers' perception of the needs to respond to the environment of the external stakeholders (EEO) will be positively related to the managers' commitment on environmental protection (IEO). IEO can also be interpreted as the firm's pro-environmental corporate culture (Banerjee, 2001).

Gronhaug and Lines (1995) argue that manager's perception of the business environment will influence their focuses and mindsets on how to deal with the external operating environment. Likewise, any change in the external business environment will alter the top management's attitude towards the environment. Zahra and Covin (1995) propose that how the top management defines the issues facing their firms will affect the commitment of managers towards that particular source of pressures. In particular, if the top management

perceives that the external constraints are significant to their operations, they will try to take more social responsibility and commitment to advance ecological well-being. The top management will be concerned about the undesirable consequences associated with the firms' failure to meet the environmental demands from the external stakeholders. In order to gain legitimacy to operate, it is likely that the top management will promote the environmental values throughout the whole organization, and those values will become a corporate culture that is widely shared among the organization members (Dennis, Neck, & Goldsby, 1998). In this case, we propose that a firm's level of external environmental orientation (EEO) exerts a positive effect on the firm's internal environmental orientation (IEO).

6.4.2.2 Alternative Model 2

Another structural path was added to test whether the information capability (IFC) will positively influence the innovation capability (INC). Lynn, Skvo and Abel (1999) state that firms which create and use information rapidly and effectively are able to innovate faster and more successfully. If there is in-depth communication, information can be shared and exchanged freely among the employees of organizations. This can facilitate the devleopment of advanced technologies (Kraatz, 1998). Owing to the pressure from market and technological changes, innovation becomes more costly and risky. Obtaining useful and valuable information can improve innovation capability of firms, which reduce firms' innovation costs eventually (Li & Calantone, 1998). We therefore postulate that a

firm's level of information capability (IFC) exerts a positive effect on the firm's innovation capability (INC).

6.4.2.3 Results of the Alternative Models

After the structural analysis of Alternative Model 1, the values of χ^2 statistic was 835.001, degree of freedom was 463 with $p < 0.01$. The other fit indices (NFI = 0.89 and CFI = 0.93) were worse than our proposed full model (χ^2/d.f. = 841.574/464; NFI = 0.90 and CFI = 0.95).

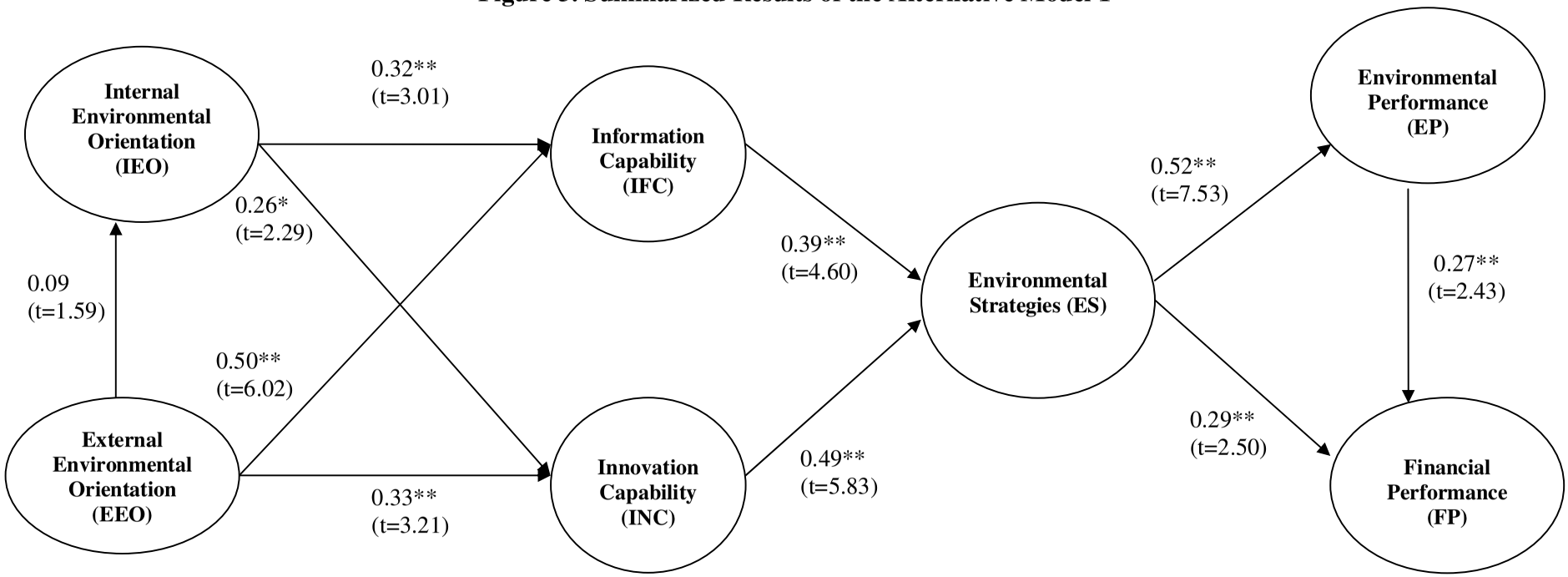
Figure 3 and Table 23 show the path estimates of constructs and items of the Alternative Model 1. The coefficient of the additional structural path, i.e. external environmental orientation to international environmental orientation was 0.09 at $p > 0.05$. Hence, the path from EEO to IEO was not significant.

However, there were significant positive paths between the internal environmental orientation and the development of information capability ($\beta = 0.32$, $p < 0.01$), and between the internal environmental orientation and the innovation capability ($\beta = 0.26$, $p < 0.05$). Similarly, the external environmental orientation of firms was positively related to the information capability ($\beta = 0.50$, $p < 0.01$) and the innovation capability ($\beta = 0.33$, $p < 0.01$).

Regarding the two different capabilities, our model identified the positive relationship between information capability and environmental strategies ($\beta = 0.39$, $p < 0.01$) and between innovation capability and environmental strategies ($\beta =$

0.49, $p < 0.01$). Furthermore, the results revealed that environmental strategies led to positive financial performance ($\beta = 0.29$, $p < 0.01$) and positive environmental performance ($\beta = 0.52$, $p < 0.01$). Finally, environmental performance was positively related to financial performance ($\beta = 0.27$, $p < 0.01$). t values for all the significant paths ranged from 2.29 to 7.53.

Figure 3. Summarized Results of the Alternative Model 1



Notes:
Summary of overall model fit indexes: χ^2=827.271; Degree of freedom (d.f.) =463, p<0.05.
NFI=0.87; CFI=0.91; RMSEA=0.07.
*Estimated standardized path coefficient significant at p<0.05; **Estimated standardized path coefficient significant at p<0.01.
t-statistics exceeded the critical value (1.96) for the 0.05 significant level as well as for the 0.01 significance level.

Table 23. Path Estimates of Constructs and Items (Alternative Model 1)

Constructs/Items		Path Estimates						
IEO →	**IEO1**	0.83						
IEO →	**IEO2**	0.84						
IEO →	**IEO3**	0.70						
IEO →	**IEO4**	0.51						
EEO →	**EEO1**		0.53					
EEO →	**EEO2**		0.72					
EEO →	**EEO3**		0.78					
EEO →	**EEO4**		0.78					
IFC →	**IFC1**			0.51				
IFC →	**IFC2**			0.53				
IFC →	**IFC3**			0.76				
IFC →	**IFC4**			0.85				
INC →	**INC1**				0.72			
INC →	**INC2**				0.91			
INC →	**INC3**				0.93			
INC →	**INC4**				0.77			
ES →	**ES1**					0.68		
ES →	**ES2**					0.82		
ES →	**ES3**					0.85		
ES →	**ES4**					0.83		
ES →	**ES5**					0.93		
ES →	**ES6**					0.89		
ES →	**ES7**					0.91		
EP →	**EP1**						0.84	
EP →	**EP2**						0.82	
EP →	**EP3**						0.91	
EP →	**EP4**						0.83	
FP →	**FP1**							0.90
FP →	**FP2**							0.81
FP →	**FP3**							0.90
FP →	**FP4**							0.89
SDT →	**FP**							-0.06
FA →	**FP**							0.11
FS →	**FP**							-0.02

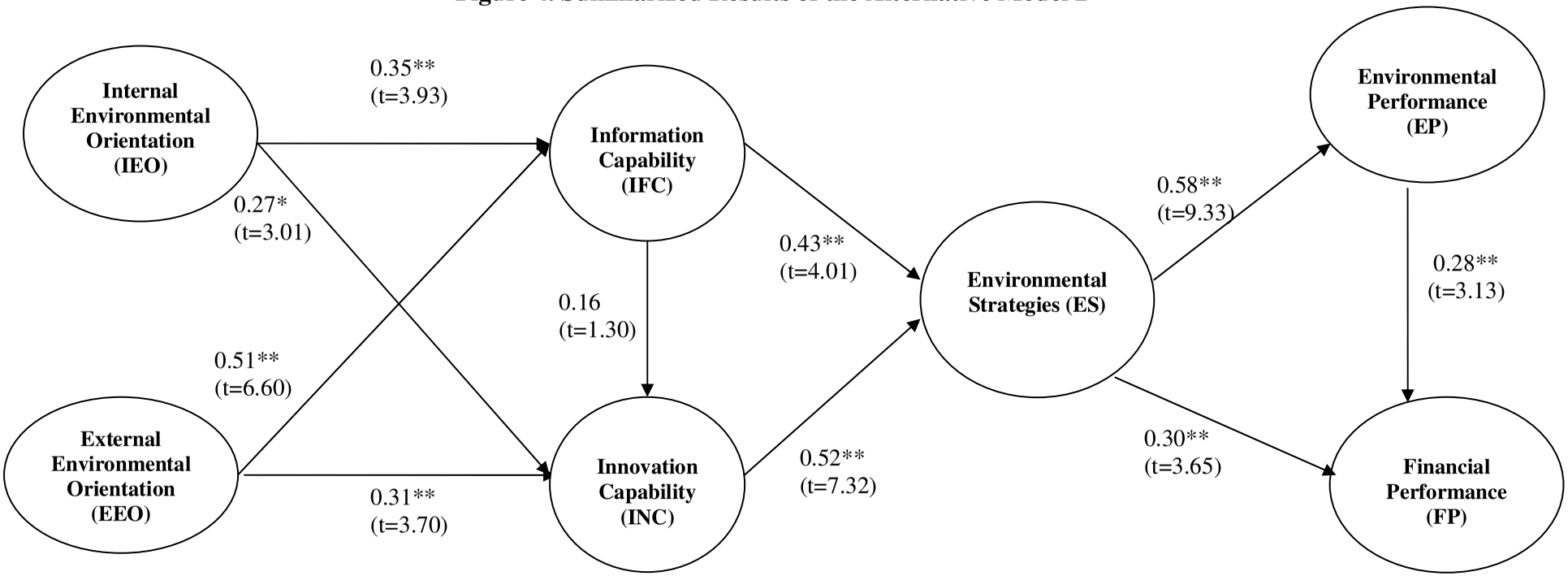
Notes:
Internal Environmental Orientation=IEO; External Environmental Orientation=EEO; Information Capability= IFC; Innovation Capability=INC; Environmental Strategies= ES; Environmental Performance: EP; Financial Performance; SDT= Social Desirability Test; FA= Firm Age; FS= Firm Size.

The results of Alternative Model 2 were similar to Alternative Model 1. Alternative Model 2 did not fit the data better than our proposed model, as revealed from the chi-square values (χ^2 = 827.271, d.f. = 463) as well as fit indices NFI (0.87), CFI (0.91) and RMSEA (0.07). Figure 4 and Table 24 show the estimated standardized path coefficients of the Alternative Model 2. The coefficient of the added path (IFC to INC) was not significant, i.e. $\beta = 0.16$ ($p > 0.05$). This result demonstrated that information capability would not positively influence the innovation capability of firms.

The coefficients of the other structural paths, like the internal environmental orientation to information capability ($\beta = 0.35$, $p < 0.01$) as well as the internal environmental orientation to innovation capability ($\beta = 0.27$, $p < 0.05$) were depicted in Figure 4.

Besides, the coefficients of the other paths were as follow: external environmental orientation to information capability ($\beta = 0.51$, $p < 0.01$), external environmental orientation to innovation capability ($\beta = 0.31$, $p < 0.01$), information capability to environmental strategies ($\beta = 0.43$, $p < 0.01$) and innovation capability to environmental strategies ($\beta = 0.52$, $p < 0.01$). The remaining paths also produced significant and positive relationships, including environmental strategies to financial performance ($\beta = 0.30$, $p < 0.01$), environmental strategies to environmental performance ($\beta = 0.58$, $p < 0.01$) and finally environmental performance to financial performance ($\beta = 0.28$, $p < 0.01$). t values for all the significant paths ranged from 3.13 to 9.33.

Figure 4. Summarized Results of the Alternative Model 2



Notes:
Summary of overall model fit indexes: $\chi^2 = 835.001$; Degree of freedom (d.f.) =463, $p<0.05$.
NFI=0.89; CFI=0.93; RMSEA=0.05.
*Estimated standardized path coefficient significant at $p<0.05$; **Estimated standardized path coefficient significant at $p<0.01$.
t-statistics exceeded the critical value (1.96) for the 0.05 significant level as well as for the 0.01 significance level.

Table 24. Path Estimates of Constructs and Items (Alternative Model 2)

Constructs/Items			Path Estimates						
IEO	→	**IEO1**	0.85						
IEO	→	**IEO2**	0.88						
IEO	→	**IEO3**	0.79						
IEO	→	**IEO4**	0.51						
EEO	→	**EEO1**		0.54					
EEO	→	**EEO2**		0.72					
EEO	→	**EEO3**		0.80					
EEO	→	**EEO4**		0.79					
IFC	→	**IFC1**			0.52				
IFC	→	**IFC2**			0.53				
IFC	→	**IFC3**			0.78				
IFC	→	**IFC4**			0.85				
INC	→	**INC1**				0.80			
INC	→	**INC2**				0.93			
INC	→	**INC3**				0.97			
INC	→	**INC4**				0.78			
ES	→	**ES1**					0.70		
ES	→	**ES2**					0.85		
ES	→	**ES3**					0.85		
ES	→	**ES4**					0.86		
ES	→	**ES5**					0.95		
ES	→	**ES6**					0.87		
ES	→	**ES7**					0.92		
EP	→	**EP1**						0.84	
EP	→	**EP2**						0.81	
EP	→	**EP3**						0.97	
EP	→	**EP4**						0.86	
FP	→	**FP1**							0.89
FP	→	**FP2**							0.87
FP	→	**FP3**							0.90
FP	→	**FP4**							0.90
SDT	→	**FP**							-0.07
FA	→	**FP**							0.13
FS	→	**FP**							0.04

Notes:
Internal Environmental Orientation=IEO; External Environmental Orientation=EEO; Information Capability= IFC; Innovation Capability=INC; Environmental Strategies= ES; Environmental Performance: EP; Financial Performance; SDT= Social Desirability Test; FA= Firm Age; FS= Firm Size.

After testing the two alternative models, the results showed that our proposed model offered the best results in terms of various fit indices (Table 25). For instance, CFI, NFI, and RMSEA for full model were 0.90, 0.95 and 0.05 respectively, whereas the CFI, NFI, and RMSEA for Alternative Model 1 were 0.89, 0.93 and 0.05 respectively. Finally, the CFI, NFI, and RMSEA

for Alternative Model 2 were 0.87, 0.91 and 0.07 respectively. Hence, it is believed that our proposed model has offered the best explanation for the situations of corporate environmentalism in the PRD.

Table 25. Path Estimates of Constructs and Items for All the Models

	Full Model	Alternative Model 1[a]	Alternative Model 2[b]
Chi-square	841.574	835.001	827.271
Degree of freedom	464	463	463
Chi-square/degree of freedom	1.81	1.80	1.78
NFI	0.90	0.89	0.87
CFI	0.95	0.93	0.91
RMSEA	0.05	0.05	0.07
IEO→ IFC	0.38**	0.35**	0.32**
IEO→ INC	0.34*	0.27*	0.26*
EEO→ IEO	—	—	0.09
EEO→ IFC	0.52**	0.51**	0.50**
EEO→ INC	0.35**	0.31**	0.33**
IFC→ INC	—	0.16	—
IFC→ ES	0.49**	0.43**	0.39**
INC→ ES	0.51**	0.52**	0.49**
ES→ EP	0.57**	0.58**	0.52**
ES→ FP	0.39**	0.30**	0.30**
EP→ FP	0.29**	0.28**	0.27**

Notes:
IEO=Internal Environmental Orientation; EEO= External Environmental Orientation; IFC=Information Capability; INC=Innovation Capability; ES=Environmental Strategy; EP=Environmental Performance; FP= Financial Performance; RSI=Regulatory Stakeholder Influence, SDT=Social Desirability Test.
[a] Structural Model with additional structural path from EEO to IEO
[b] Structural Model with additional structural path from IFC to INC

6.4.3 Moderating Effect

A final set of analysis was conducted to study the possible moderating effect of regulatory stakeholder influence (RSI) on the structural relationships identified previously. Though some studies involving "intervally-coded" or "continuous moderators" have applied multiple-group comparison to examine the moderating effects (e.g. Babin & Darden, 1995; Chiou, 2000), it may cause the loss of critical information due to artificial splitting of the whole sample into two sub-groups based on the median value of the moderator. Herein, the "conventional regression analysis approach" was adopted to test the moderating effect of RSI. With regard to the mathematical expression of Hair et al. (2006), six regression models were developed to analyze the moderator. The six models read as:

Model 1: $IFC=b_0 + b_1IEO+ b_2 RSI + b_3$ (RSI x IEO)

Model 2: $IFC=b_0 + b_1EEO+ b_2 RSI + b_3$ (RSI x EEO)

Model 3: $INC=b_0 + b_1IEO+ b_2 RSI + b_3$ (RSI x IEO)

Model 4: $INC=b_0 + b_1EEO+ b_2 RSI + b_3$ (RSI x EEO)

Model 5: $ES=b_0 + b_1IFC+ b_2 RSI + b_3$ (RSI x IFC)

Model 6: $ES=b_0 + b_1INC+ b_2 RSI + b_3$ (RSI x INC)

where b_0 = intercept

b_1 to b_3 = regression coefficients

Analyses from models 1-6 were directly related to the test of Hypotheses 6a to Hypotheses 6f. Regression analyses based on all six models were conducted to get more insight into how regulatory stakeholder influence (RSI) might moderate the relationship between environmental orientations (IEO, EEO) and environmental capabilities (IFC, INC), as well as the relationship between environmental capabilities (IFC, INC) and environmental strategies (ES).

Variance inflation factor (VIF) and collinearity diagnostics were performed to test for the effects of multicollinearity and the recommended VIF values were below 10 (Nunnally, 1978). The VIFs in this study showed no threat of multicollinearity, with values ranging from 1.03 to 2.24. Besides, the moderated regression models also applied the mean centering technique to remove potential multicollinearity between the predictors and the interaction terms (Aiken & West, 1991).

The results are shown in Table 26.

Table 26. Analysis of the Moderating Effects of Regulatory Stakeholder Influence (RSI)

Dependent variables	Model 1 IFC			Model 2 IFC			Model 3 INC			Model 4 INC		
Control variables												
SDT	0.17**	0.15**	0.15**	0.15**	0.13*	0.13*	0.01	0.00	0.04	0.11**	0.05	0.06
FA	0.09	0.05	0.04	0.20**	0.15**	0.17**	0.20**	0.09	0.09	0.19**	0.09	0.05
FS	0.14**	0.11	0.05	0.13*	0.11*	0.11*	0.19**	0.07	0.08	0.13**	0.01	0.10
Independent variables												
IEO		0.53**	0.56**					0.50**	0.47**			
EEO					0.47**	0.49**					0.51**	0.52**
IFC												
INC												
Moderator variable												
RSI		0.12*	0.15**		0.15**	0.17**		0.14**	0.15**		0.20**	0.29**
Interactive effect												
IEO X RSI			0.16**						0.05			
EEO X RSI						0.10*						0.23**
IFC X RSI												
INC X RSI												
Model F	21.40**	41.81**	37.84**	24.61**	45.62**	38.97**	17.85**	33.82**	28.33**	20.03**	41.02**	35.67**
Adjusted R^2	0.21	0.46	0.49	0.23	0.48	0.50	0.18	0.47	0.47	0.19	0.43	0.45
Δ Adjusted R^2		0.25**	0.03**		0.25**	0.02*		0.29**	0.01		0.24**	0.02*

Notes:
SDT= Social Desirability Test; FA= Firm Age; FS= Firm Size; Internal Environmental Orientation=IEO; External Environmental Orientation=EEO; Information Capability= IFC; Innovation Capability=INC; Environmental Strategies= ES; Regulatory Stakeholder Influence= RSI.
The computed VIF values of models 1 to 6 ranged from 1.03 to 2.42 and far below the acceptable threshold of 10, thus ruling out any serious threat of multicollinearity.
Figures corresponding to independent variables are standardized regression coefficients.
*Significant at $p<0.05$, **Significant at $p<0.01$.

(Cont'd). Analysis of the Moderating Effects of Regulatory Stakeholder Influence (RSI)

Dependent variables	Model 5 Environmental Strategies			Model 6 Environmental Strategies		
Control variables						
SDT	0.07	0.05	0.07	0.02	0.04	0.05
FA	0.04	0.03	0.02	0.05	0.05	0.07
FS	0.23**	0.19**	0.20**	0.24**	0.20**	0.22**
Independent variables						
IEO						
EEO						
IFC		0.53**	0.55**			
INC					0.41**	0.45**
Moderator variable						
RSI		0.19**	0.24**		0.21**	0.23**
Interactive effect						
IEO X RSI						
EEO X RSI						
IFC X RSI			0.19**			
INC X RSI						0.01
Model F	31.61**	64.90**	56.10**	31.61**	54.54**	47.13**
Adjusted R^2	0.29	0.57	0.59	0.29	0.54	0.54
Δ Adjusted R^2		0.28**	0.02*		0.25**	0.00

Notes:
SDT= Social Desirability Test; FA= Firm Age; FS= Firm Size; Internal Environmental Orientation=IEO; External Environmental Orientation=EEO; Information Capability= IFC; Innovation Capability=INC; Environmental Strategies= ES; Regulatory Stakeholder Influence= RSI.
The computed VIF values of models 1 to 6 ranged from 1.03 to 2.42 and far below the acceptable threshold of 10, thus ruling out any serious threat of multicollinearity.
Figures corresponding to independent variables are standardized regression coefficients.
*Significant at $p<0.05$, **Significant at $p<0.01$.

Analyses from Model 1 and Model 2 in Table 26 showed that RSI exerted a positive moderating influence on the relationships between IEO and IFC ($\beta = 0.16$, $p<0.01$) as well as between EEO and IFC ($\beta = 0.10$, $p < 0.05$). Besides, analyses from Model 3 and Model 4 revealed that RSI did not exert a positive moderating effect on EEO and IFC ($\beta = 0.05$, *n.s.*) but had a positive moderating effect on EEO and INC ($\beta = 0.23$, $p<0.01$).

Furthermore, analyses from Model 5 revealed that RSI exerted a positive moderating influence on the relationship between IFC and ES ($\beta = 0.19$, $p < 0.01$). However, RSI was not found to exhibit any significant moderating influences on the relationship between INC and ES ($\beta = 0.01$, *n.s.*) in Model 6.

To explore further the nature of moderating (interaction) effects of RSI, Schilling and Steensma's (2001) approach was followed to plot the significant interactions using one standard deviation above and below the means of the interacting variables (Figures 5-10). The interaction plots showed that environmental orientations (IEO and EEO) in Figure 5 and Figure 6 had positive influences on information capabilities (IFC). Such influences were stronger when RSI was high (as demonstrated by the much steeper regression slope). Overall, the plots suggested that as RSI increases, the relationships of IEO-IFC (Figure 5), EEO-IFC (Figure 6), EEO-INC (Figure 7) and IFC-ES (Figure 8) were strengthened. Finally, Figure 9 and Figure 10 revealed that RSI exerted no detectable influence on the relationship between IEO on INC as well as INC on ES. The overall test results of all the hypotheses are summarized in Table 27.

Figure 5. Interaction Effects of Internal Environmental Orientation (IEO) x Regulatory Stakeholder Influence (RSI) on Information Capability (IFC)

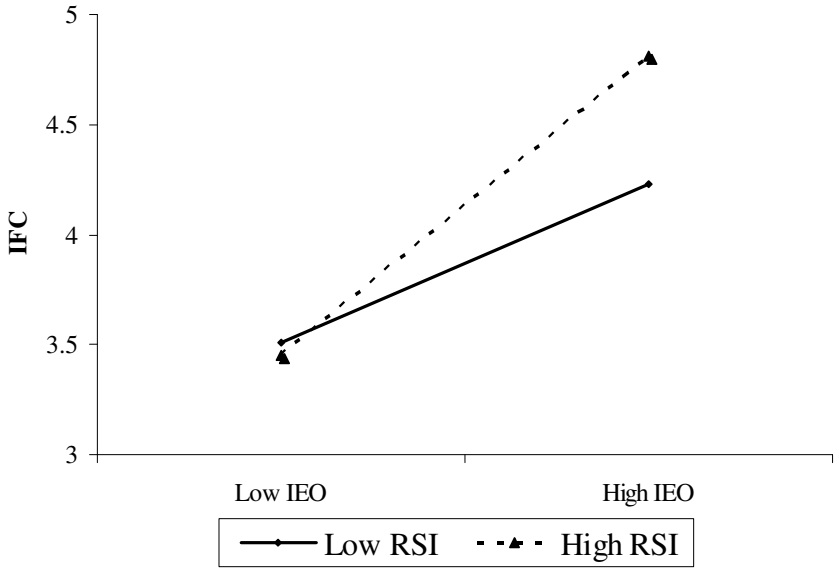


Figure 6. Interaction Effects of External Environmental Orientation (EEO) x Regulatory Stakeholder Influence (RSI) on Information Capability (IFC)

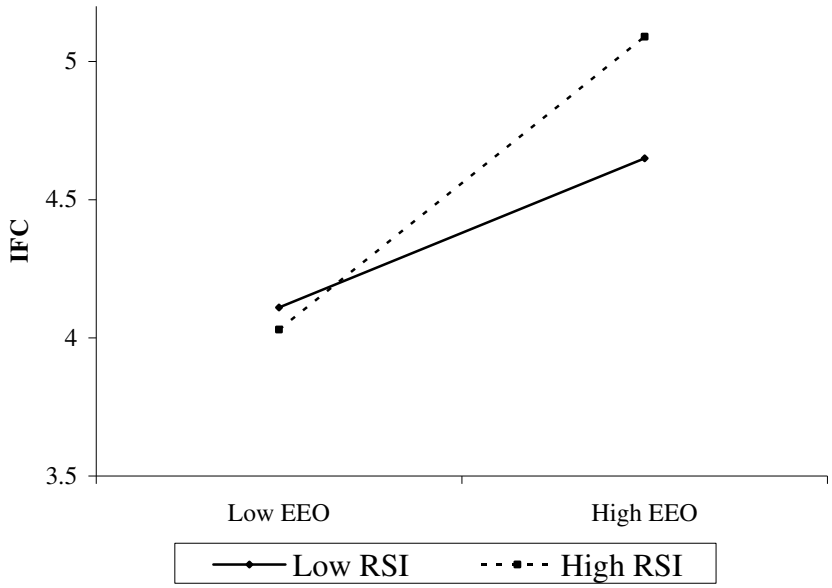


Figure 7. Interaction Effects of External Environmental Orientation (EEO) x Regulatory Stakeholder Influence (RSI) on Innovation Capability (INC)

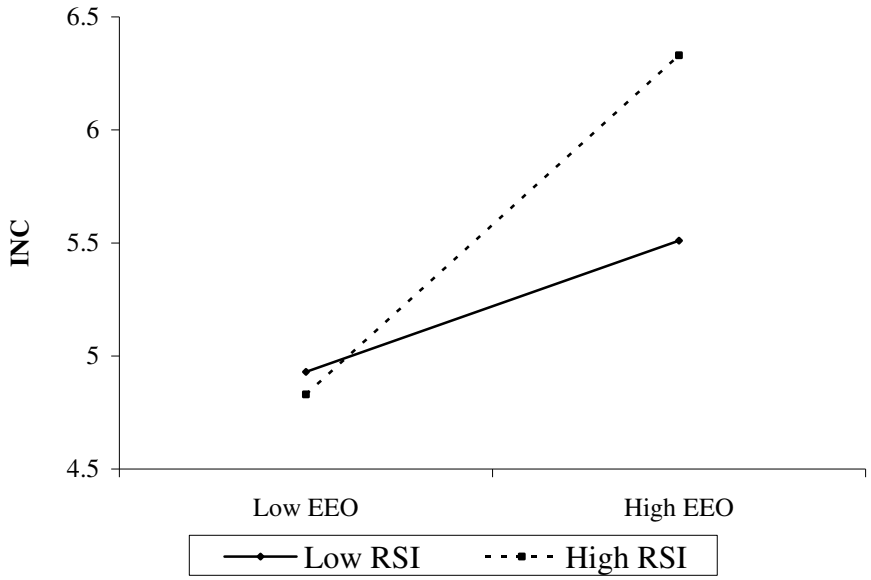


Figure 8. Interaction Effects of Information Capability (IFC) x Regulatory Stakeholder Influence (RSI) on Environmental Strategies (ES)

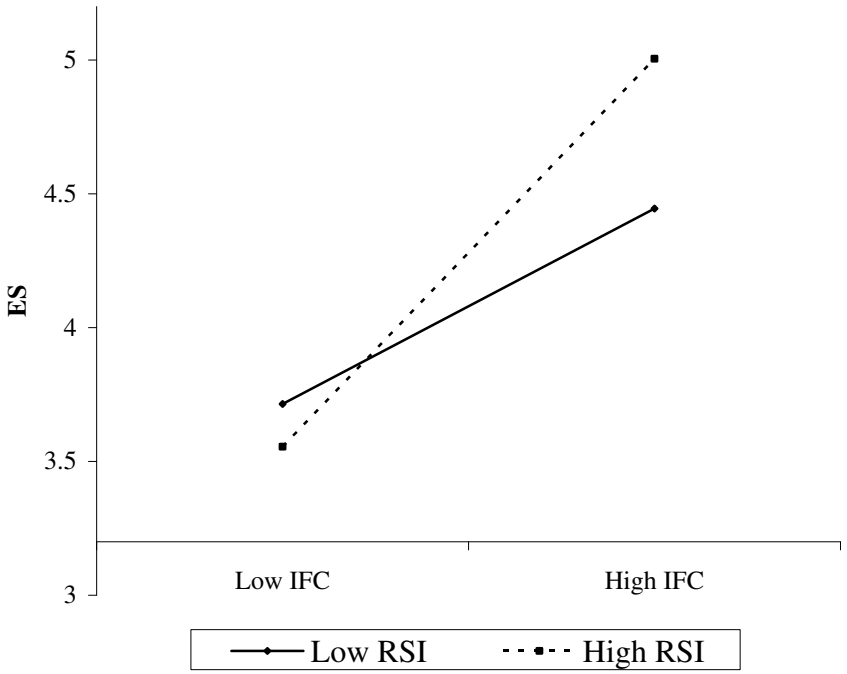


Figure 9. Interaction Effects of Internal Environmental Orientation (IEO) x Regulatory Stakeholder Influence (RSI) on Innovation Capability (INC)

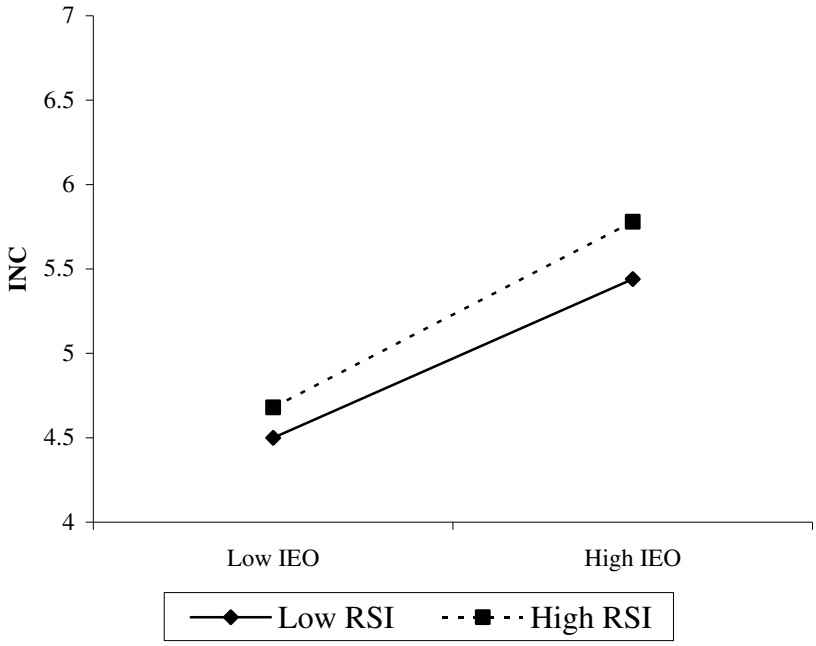


Figure 10. Interaction Innovation Capability (INC) x Regulatory Stakeholder Influence (RSI) on Environmental Strategies (ES)

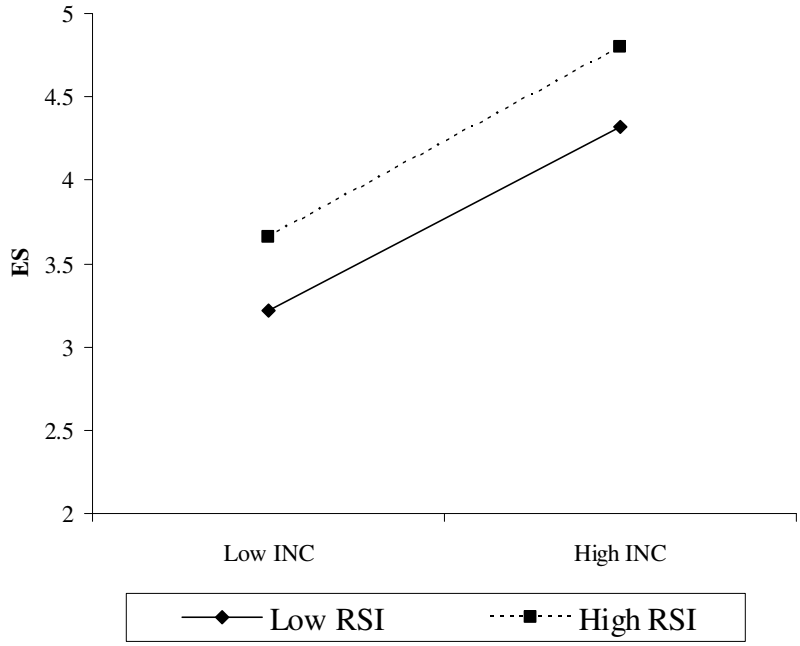


Table 27. Summarized Results of the Hypothesis Testing

Hypotheses	Findings	Conclusion
H1a*: A firm's level of* ***internal environmental orientation*** *is positively related to the extent to which it develops* ***information capability.***	Positive Relationship	H1a Supported
H1b: *A firm's level of* ***internal environmental orientation*** *is positively related to the extent to which it develops* ***innovation capability***.	Positive Relationship	H1b Supported
H2a: *A firm's level of* ***external environmental orientation*** *is positively related to the extent to which it develops* ***information capabilit****y.*	Positive Relationship	H2a Supported
H2b: *A firm's level of* ***external environmental orientation*** *is positively related to the extent to which it develops* ***innovation capability***.	Positive Relationship	H2b Supported
H3a: *A firm's level of* ***information capability*** *is positively related to the extent to which it practices* ***environmental strategies***.	Positive Relationship	H3a Supported
H3b: *A firm's level of* ***innovation capability*** *is positively related to the extent which it practices* ***environmental strategies***.	Positive Relationship	H3b Supported
H4a: *The extent to which a firm practices* ***environmental strategies*** *is positively related to its* ***financial performance***.	Positive Relationship	H4a Supported
H4b: *The extent to which a firm practices* ***proactive environmental strategies*** *is positively related to its* ***environmental performance.***	Positive Relationship	H4b Supported
H5: *A firm's* ***environmental performance is*** *positively related to its* ***financial performance***.	Positive Relationship	H5 Supported
H6a: *Regulatory stakeholder influence positively moderates the relationships between* ***internal environmental orientation*** *and* ***information capability***.	Positive Relationship	H6a Supported
H6b: *Regulatory stakeholder influence positively moderates the relationships between* ***external environmental orientation*** *and* ***information capability***.	Positive Relationship	H6b Supported
H6c: *Regulatory stakeholder influence positively moderates the relationships between* ***internal environmental orientation*** *and* ***innovation capability***.	Not Significant	H6c Not Supported
H6d: *Regulatory stakeholder influence positively moderates the relationships between* ***external environmental orientation*** *and* ***innovation capability***.	Positive Relationship	H6d Supported
H6e: *Regulatory stakeholder influence positively moderates the relationships between* ***information capability*** *and* ***environmental strategy***.	Positive Relationship	H6e Supported
H6f: *Regulatory stakeholder influence positively moderates the relationships between* ***innovation capability*** *and* ***environmental strategies***.	Not Significant	H6f Not Supported

Notes:

Hypotheses 1a- 5 were tested by structural equation modeling and the figures denote the relevant estimated standardized path coefficients.

Hypotheses 6a - 6f were tested by regression analysis and the figures denote the estimated standardized regression coefficients of the relevant interaction terms.

*Significant at $p<0.05$.

**Significant at $p<0.01$.

6.4 Summary

In this chapter, the findings indicated that the major hypotheses, i.e. Hypotheses 1a to Hypotheses 5, were supported. The results revealed that the internal and external environmental orientations of firms would facilitate the development of their information and innovation capabilities, which in turn would help them develop proactive environmental strategies. Positive environmental and financial performance would be achieved eventually. In addition, the external regulatory pressures imposed positive moderating effect on the environmental information capability but not on the environmental innovation capability. In Chapter 7, the theoretical, managerial as well as the regulatory implications are discussed in detail.

CHAPTER 7

DISCUSSION AND IMPLICATIONS

7. Introduction

Several findings derived from the analyses merit further discussion. First of all, the implications of natural-resource-based view of the firm (NRBV) as well as the regulatory stakeholder influence in the context of the study of corporate environmentalism are presented. Then the rationales for the differences between local and non-local enterprises in practice of environmental management are followed. At the end of the chapter, the theoretical, managerial and governmental implications are discussed in detail.

7.1 The Implications of Natural-resource-based view of the Firm (NRBV)

The model presented in this study provides important insights into corporate environmentalism from the NRBV perspective. By applying structural equation analysis, this study has invoked the NRBV as a key theoretical anchor and revealed the positive influence of "firm-specific resources" on the implementation of environmental strategies through environmental capabilities. In the following, every construct of the NRBV perspective will be discussed in detail.

First of all, both the internal environmental ethics (IEO) and the managerial perception of the need to respond to external stakeholder demands (EEO) were positively influence the information capability (IFC) and innovation capability (INC).

In terms of internal environmental orientation, once the companies have developed their environmental cultures, environmental initiatives will be embedded in the entire companies (Jenkins, 2006). The control of environmental impacts can be regarded as the responsibility of all staff, who are called on to integrate these issues into their daily activities. Companies try to promote the spirit of seeking for new information and knowledge for adopting green practices, like the detection of pollution, the organization of emergency circumstances and the development of precautionary activities (Boiral, 2002). The culture of encouraging the acquisition of green information within a company constitutes the information capability of the firms.

In addition, Netherwood (1998) points out that if organizations develop shared green culture/orientation, they will conduct continuous internal evaluation of the green targets and help push themselves towards achieving greater green efficiency by searching for innovative ways to improve its environmental performance. Provided that companies have missions to protection the environment, they will be more likely to design environmentally sound technologies to minimize their environmental impacts.

On the other hand, for external environmental orientation, managers'

perception of the need to respond to stakeholders' interests will lead to the development of environmental capabilities. Managers continually face the demands from different stakeholders to dedicate resources to environmental aspects. These pressures come from customers, employees, suppliers, community groups, governments and some other stakeholders, especially the institutional stakeholders (Delmas & Toffel, 2004).

de Bakker (2004) contends that if the stakeholders are important, primary or considered salient, they can exert additional pressure on managers in various aspects, like improving the firms' environmental performance. To improve their environmental performance, firms will have to obtain knowledge and information about the functioning of ecosystems, the meaning of environmental quality, and the impacts of their activities on economic security and environmental prospect for the future generations (Sharma & Starik, 2004). Firms will also try to obtain environmental-related information from various channels if they consider that the stakeholders' green requirements will have an effect on their business operations. Sharma and Vredenburg (1998) assert that by opening up their mind to ideas from the stakeholders such as local communities and environmental groups, firms will be able to find ways of achieving the objectives of these groups while making improvement within their organizations.

Besides, if managers perceive the substantial influence of stakeholders on the firms' environmental practices, they will drive radical innovations and organizational transformation required to meet the challenges of sustainable development (Mulder, 2007). The capability of

firms to innovate is not confined to a specific operation in the functional areas, but appears to be a pervasive part of the organizational culture. Firms will provide an organizational context to support experimentation and the search for opportunities at the business/natural environment interface in an efficient and effective manner. This context encourages the staff to respond to these external influences, resulting in changing environmental philosophies and the emergence of the innovative capability.

As both IEO and EEO influenced corporate greening, these findings supported the argument of Bansal and Roth (2000) that firms could be characterized by mixed motivations for initiating environmental practices.

While the results showed that IEO and EEO were found to positively influence IFC, EEO exerted a more significant influence on IFC ($\beta_{EEO \rightarrow IFC} = 0.52$) than IEO ($\beta_{IEO \rightarrow IFC} = 0.38$). One possible reason is that if managers are subjected to more intensive external pressures, they tend to be more aware of the external environmental-related information, such as the information about the change in government environmental regulations, the pollutant discharge standards, the environmental tax policies, etc. (Buil-Carrasco, Fraj-Andres, & Matute-Vallejo, 2008). The gathering of green information is to legitimize the organizations to external stakeholders.

Besides, environmental capabilities (IFC and INC) were found to positively influence the environmental strategies (ES). In other words, IFC and INC constituted essential inputs for the development of environmental strategies. Many management scholars infer a relationship between the

environmental strategy of a firm and its capabilities (Hart, 1995; Christmann, 2000). Darnall and Edwards (2006) believe that in the absence of capabilities, the adoption of advanced environmental strategies will be more costly.

In the age of global competition, speed and verity of managerial decisions are essential. Zander and Kogut (1995) comment that information and knowledge acquired by firms will fundamentally determine what they can do. Information can be facts or theories. It is codifiable and thus easily communicated, and is relatively more static in nature (Kogut & Zander, 1992; Winter, 1987). Regarding the information capability, if organizations are embedded with systematic information like how to minimize wastes, eliminate pollution and enhance energy efficiency, it will be more likely for them to develop more advanced environmental management processes (Zeng, Tam, Tam, & Deng, 2005). To make good environmental decisions, information is used extensively as an input into the strategy formulation and implementation process (Tregoe & Tobia, 1990). In reality, those big multinational information technology companies, such as Sony and Dell, all have their regulations about environmental products. The majority of firms which operate in the information technology industries in Taiwan have established their production lines in China, and they need a "communication platform" to combine various information. Consequently, a company with good information capability is constantly made ready for implementing proactive environmental strategies (Cousins, Lamming, & Bowen, 2004)).

Besides, Hung, Kao and Chu (2008) argue that the embedded

capabilities of an organization with innovation capability may facilitate the development of more advanced management strategies. Innovation capability can be regarded as more dynamic in nature. Firms with this capacity can "integrate, build and reconfigure internal and external elements" to address the environmental issues. Actually, capabilities are complex bundles of skills that are exercised through the organizational process (Kogut & Zander, 1992). The process through which capabilities emerge can be vague and difficult to reconstruct, because it is often based on trial and error and is the productive know-how built inside the firms (Collins & Porras, 1994; Makadok, 2001). Innovation capability is a key and advanced capability for the adaptation and adjustment of green processes, technologies and/or products to reduce the environmental impacts caused by firms' business activities (Claver, Lopez, Molina, & Tari, 2007).

To compare the two kinds of environmental capabilities, we believe that innovation capability (INC) is more likely to enable firms to shift from a passive approach to a more proactive assessment of the environmental problem. Some of the proactive environmental strategies, like the application of clean production technologies as well as the utilization of clean energy and raw materials, require innovative capabilities (van Dijken, Prince, Wolters, et al., 1999). Effective eco-product development outlines typically involve the participation of cross-functional teams that bring together different sources of expertise. These sources of expertise are essential for superior products. Alternatively, other green practices like the

preparation and release of environmental reports require mainly the information capability (Ngamkroeckjoti & Johri, 2000). Mahoney and Pandian (1997) suggest that firms' unique capabilities in terms of technical capabilities are an important source of heterogeneity that may lead to sustainable competitive advantage.

Thirdly, our results supported the premise that sound environmental practices could help firms achieve better business performance (e.g. Klassen & McLaughlin, 1996; Shrivastava, 1995b). Our results indicated that environmental strategy (ES) positively influenced the environmental performance (EP) and financial performance (FP). Environmental performance (EP) also positively influenced the financial performance (FP). These results in fact supported the previous research that a positive relationship existed between environmental strategies and organizational performance, as well as between environment performance and financial performance (McGuire, Sundgren, & Schneeweis, 1988; Russo & Fouts, 1997; Sharma & Vredenburg, 1998). As mentioned before, the formulation of the hypotheses were based on the assumption that better environmental performance would improve company image, which would ultimately bring about more consumer spending (Russo & Fouts, 1997). As a result, firm's financial performance would eventually be improved. Actually, with better environmental management, pollution and wastes could be reduced or eliminated, and corporate competitiveness can be strengthened.

Moreover, Russo and Fouts (1997) conclude that environmental and economic performances are correlated, and that managers will assemble the

resources to capitalize on opportunities arising from the rise in the importance of environmental concerns. This study evaluated the environmental and financial performance of self-reported measures, as researchers like Melnyk, Sroufe and Calantone (2003) argue that this kind of information is extremely hard to obtain. With this in mind, academics like Judge and Douglas (1998) agree that self-reported measures of environmental and financial performance are widely acceptable.

This research pays attention to the logical links among resources, capabilities, strategies and competitive advantage, which are a problem area in the RBV (Grant, 1991). The research also provides a research methodology for testing the theoretical foundation of the NRBV perspective and offers quantitative support for this perspective. Obviously, further empirical studies need to be carried out.

In general, the abovementioned empirical results supported Hypotheses 1a to 5 and provided further evidence for the external validity of the NRBV perspective.

7.2 The Implications of Regulatory Stakeholder Influence (RSI)

Organizational management evolves concurrently with the external environment (Levinthal & Myatt, 1994; van den Bosch, Volberda, & de Boer, 1999). While the majority of the relevant NRBV studies have stressed the issues internal to firms, the current findings remind researchers the importance of taking into account both internal and external factors when addressing corporate environmentalism.

Levy and Rothenberg (2002) describe a number of mechanisms by which "institutionalism" can encourage variations among firms. Firstly, they claim that various managers perceived institutional pressures differently. The institutional forces are filtered and clarified by the managers in accordance with the company's unique background. Secondly, they explain how an "institutional field" may have different institutional forces that require managers to prioritize them.

Managers facing uncertain general business environment tend to be more proactive, take more risks and adopt more innovative practices than those in less turbulent situation (Miles & Snow, 1978; Milliken, 1987). Aragon-Correa and Sharma (2003) assert that if firms face higher levels of ecologically-related state uncertainty, they will be more active in translating intangible resources into developing environmental strategies to cope with the situation. The regulatory framework for environmental protection in China has long been criticized for its complication and chaotic situations due to the participation of a mixture of governmental officials (Baldinger, 2000; Stover, 2000). Another uncertainty for companies to operate in China is the incompatible infrastructural support for firms to operate according to the regulatory requirements.

In the environmental management literature, researchers have paid relatively limited attention to the moderating influence of regulators on corporate environmental management (Rothenberg, 2007). This research provides a new insight into the study of corporate environmentalism by

incorporating the moderating effect of regulatory stakeholder influence (RSI).

From the regression analysis, the significant interaction terms revealed RSI's positive moderating influences on the relationship IEO→IFC, EEO→ IFC, EEO→ INC and IFC→ ES. This moderating influence demonstrated the critical role of regulatory stakeholder in urging firms to move towards corporate environmentalism.

However, the results did not support Hypothesis 10c and Hypothesis 10f. The regulatory stakeholder influence did not significantly moderate the relationship between internal environmental orientation and innovation capability ($\beta_{IEO}\rightarrow\beta_{INC}$ = 0.05, p > 0.05). One plausible reason is that innovation capability is closely related to interior experiences and has path-dependency in nature (Gu & Ma, 2003; Teece, Pisano, & Shuen, 1997). As mentioned before, innovation itself is a broad process of learning within firms that enables the implementation of innovative ideas, products or processes. This capability is built and "embedded" in the firm (Makadok, 2001). It is argued that effective product development (e.g. the development of new green products) typically involves the interaction of different experts within firms (Helfat, Finkelstein, Mitchell, et al., 2007; Imai, Ikujiro, & Takeuchi, 1985).

Besides, regulatory stakeholder influence did not moderate the relationship between innovation capability and environmental strategy significantly ($\beta_{INC}\rightarrow\beta_{ES}$ = 0.01, p > 0.05). One reason may be that the innovative capability is related to the "openness to new ideas" as "firm

culture" (Hurley & Hult, 1998). In order to develop innovative capabilities, managers try to create an innovative culture and connect webs of collaborations among the various parts of a firm to generate new and synergistic abilities to solve the environmental problems (Eisenhardt & Martin, 2000). Effective green product development processes also involve routines which ensure that team members will accumulate concrete skills, such as working together to fix specific problems or participating in brainstorming sessions (Eisenhardt & Martin, 2000; Nelson & Winter, 1982; Zehir, Zafer, & Tanriverdi, 2006). This kind of innovation capability rests on ongoing commitment of firms (Marcus, 2005). Unlike information capability, the relationship between innovation capability and environmental strategy is less probable to be affected by the external pressure. George (2005) suggests that firms with information capability exhibit stronger abilities to learn from other external stakeholders. They can integrate "external information" and transform it into "firm-embedded knowledge".

7.3 Differences between Local and Non-local Enterprises

In Chapter 6, we have identified the differences in environmental strategies ($F = 21.17$, $p < 0.01$), financial performance ($F = 21.17$, $p < 0.01$) and regulatory stakeholder influence ($F = 8.44$, $p < 0.01$) between the local and non-local enterprises operating in the Pearl River Delta region. The mean scores for environmental strategies, financial performance and regulatory stakeholder influence were 3.96, 3.89 and 5.56 for local Chinese enterprises and 4.63, 4.41 and 5.91 for non-local Chinese enterprises respectively

Firstly, one possible reason for the difference in environmental strategies between the two types of firms is the environmental practice of the foreign companies, especially those multinational corporations (MNCs). Drezener (2000) discusses that there is an increasing trend for MNCs to standardize their environmental policies and practices across their worldwide operations. They do this by transferring more advanced environmental standards from their operations in the developed nations to those in the developing nations. Hence, it is believed that their environmental strategies will be more proactive than the local corporations. Also, foreign enterprises are relatively large in size and have more resources to implement appropriate environmental controls than the local enterprises (Tremayne & de Waal, 1998). Due to the standardization of environmental strategies and their size of operation, foreign companies may be more inclined to adopt proactive environmental strategies than the local enterprises.

Secondly, the significant difference in financial performance between local and non-local Chinese enterprises may be due to the acquisition of better production capabilities, managerial skills and international expertise by the foreign enterprises than the local enterprises. With those competitive advantages, foreign enterprises will have better financial performance eventually (Letchumanan & Kodama, 2000; Luo, 2002).

Thirdly, the inconsistency in enforcing environmental standard among the different firms in China may explain the different perceptions

of the influence of regulatory stakeholders. The empirical findings from the study of Rowe and Guthrie (2009) show that the enforcement of the State environmental standard is not uniform among companies. The experience of foreign investors in China reveals that in general, foreign organizations are more stringently regulated than their local counterparts. Ferris and Zhang (2002) comment that Chinese regulators have the perceptions that foreign companies have access to more sophisticated technologies, and should therefore operate at a higher environmental standard than their counterparts in China. Parter and van der Linde (1995) also claim that stricter environmental regulations induce firms to move towards cleaner and more innovative products and production process (Porter & van der Linde, 1995). Since the non-local enterprises in China are subjected to stricter control from the government, it will be more likely for them to implement appropriate environmental controls.

7.4 Theoretical Implications

By reviewing the previous research, Tsai (2002) comments that one can easily recognize the urgency of theory building in the field of environmental management and business strategy. Research on corporate environmentalism is still emerging, and the "theoretical frameworks, measurement and empirical methods" have not yet been well developed (Paton & Siegel, 2005). Thus, it appears that the field of corporate environmental responsibility provides a fruitful ground for developing new theories and conducting empirical analyses.

One of the main problems encountered by the researchers who study the business-natural environment interface is that to a large extent, management theories have ignored the natural environment and its interaction with business operations (Shrivastava, 1995c). The study of organization-natural environment interface requires a consideration of the systemic consequences of each action throughout the entire value chains of firms (Sharma & Aragon-Correa, 2005). The NRBV perspective can reveal the significance of environmental resources and environmental capabilities in facilitating the formulation of strategies that lead to superior firm performance. It helps us understand the fundamental change in corporate operations arising from their interaction with the natural environmental, as well as their impact on financial performance and competitive advantage (Aragon-Correa, Hurtado-Torres, Sharma, & Garciaa-Morales, 2008).

Besides, empirical studies on capabilities have begun to fill the research gap of the "internal mechanisms" of applying NRBV to study the environmental management and the competitive advantage of firms. According to the literature review, one important issue is to study the nature of capabilities which can complement the premise of the NRBV perspective (Eisenhardt & Martin, 2000; Liu, Mol, & Chen, 2005; Nath, Nachiappan, & Ramanathan, 2008; Teece, 2007; Teece et al., 1997; Wang & Amhed, 2007). Newbert (2007) also comments that the investigation of the nature of capabilities will contribute to the understanding of a company's competitive advantage. Previous researchers, such as Aragon-Correaa, Hurtado-Torresa, Sharma and Garcıa-Moralesa (2008), Aragon-Correa and Sharma (2003),

Chan (2005), Claver, Lopez, Molina and Tari, (2007), Darnall and Edwards (2006), Judge and Douglas (1998), Marcus and Anderson (2006), McEvily and Marcus (2005), Russo and Fouts (1997), Sharma and Vredenburg (1998), etc., have conducted empirical studies on capabilities in the context of corporate environmentalism. However, the majority of them have highlighted the generic types of capabilities like the "organizational capabilities", "environmental issues integration capabilities", "complementary capabilities" and "general dynamic capabilities". Instead of focusing on the generic types of capabilities, our research pays attention on the nature of environmental capabilities leading to corporate environmental strategies. Hence, it can make academic contribution to the study of corporate environmentalism.

Specifically, from our in-depth interviews, it is found that information and innovation capabilities currently received much attention from the manufacturing enterprises. Information capability consists of knowledge that can be easily acquired. It resides in the standard operating procedures, documentation, information systems and rules. There is a higher chance for information capability to be built outside the firm. For instance, green idea and information are readily available from various external sources (Roy & Therin, 2008). Firms can acquire external knowledge about environmental issues and build a "knowledge base" that will allow them to meet the new environmental challenges. On the other hand, innovation capability is mainly built from within and is often characterized as unique, as it emerges from path-dependent histories of firms (Teece et al., 1997).

Since innovation capability comprises technological known-how and production competencies that are valuable and difficult to be imitated by competitors, it may lead to competitive advantage of firms. Possession of innovation capabilities will enable the firms to assess and select the appropriate technological solutions, and to acquire and adopt the technologies effectively. As such, companies can implement proactive environmental practices effectively through the exercise of innovation capabilities.

Furthermore, we have mentioned in the previous chapters that solely applying the NRBV to study corporate environmentalism is considered to be far from comprehensive, as it undermines the pivotal roles that various external stakeholders often play in shaping the firm's environmental strategies. Researchers like Delmas and Toffel (2004) purport that the external stakeholders certainly exert institutional pressures on the firms' environmental management practices. Schroeder (2002) claims that the strategic implications of responding to and adjusting changes in the environment related ethical issues can be considered as demands made by our society on firms and may affect the achievement of firms' objectives. There is an urgent need to relate more than one theory to explore the greening practices of firms, rather than to analyze through the lens of a single perspective (Starik & Markus, 2000).

More specifically, the NRBV researchers need to pay more attention to the incorporation of moderating conditions by applying this theory. Armstrong and Shimizu (2007) assert that the NRBV perspective can be

advanced by further interaction among theoretical refinements. From this study, we believe that by adding the regulatory stakeholder influence as a moderator, we can provide more insights for researchers who are going to study corporate environmentalism or apply the NRBV to study similar issues. Empirically, our theoretical model and empirical study indicate that by combining the insights gained from the NRBV and the role of external institutions (institutional theory), a holistic framework for studying corporate environmentalism can be developed and a full explanation of the greening phenomenon can be attained.

7.5 Managerial Implications

Recent trend shows that firms are spending more resources on environmental protection practices and are seeking for proactive ways to reduce the environmental impacts of their actions (Banerjee, 2001). Corporate environmentalism can no longer be ignored by firms because of the changes in the global business environment. In the in-depth interviews, we noticed that firms operating in the PRD, China had begun to respond to the worsening environmental concerns. The respondents commented that the ideas of corporate environmental management had permeated into all areas of their firms' activities, and the ability to take a coherent, systematic and strategic approach might be crucial to the success of any environmental strategy. Since it is the cultural norm in China to shift decision-making responsibility towards either an individual or the top management group, those top executives with strong environmental values are more likely to

regard environmental issues as opportunities. Actually, Berry and Rondinelli (1998) advocate that worldwide cutting-edge firms are now adopting comprehensive environmental strategies. The widespread consequences of environmental issues may far exceed those of any other corporate issues (Schmidheiny, 1992; Shrivastava, 1995c). While an increasing number of enterprises are devoted to improve their competitive advantage through the implementation of corporate environmental management, and a positive relationship between environmental strategies and financial as well as environmental performance can be found in our study, firms should recognize that similar gains can be obtained from the same implementation by other firms.

Besides, the scores of proactive environmental strategies of the respondents ranged from $\bar{X}$ = 4.23 to $\bar{X}$ = 4.46. These results pointed out that generally, the companies had adopted proactive environmental strategies, but did not seem to take them as a top priority. In order to transform a company into a sustainable one, Shrivastava (1995c) emphasizes that cultural change of the firms is a necessary condition. Recognizing the necessity of environmental protection will constitute the initial stage of cultural change. Specifically, to nurture the environmental culture within a firm, environmental protection principles must be integrated into the corporate decision-making and day-to-day operations. A clear mission statement can demonstrate the attention paid by corporations to environmental protection activities. Apart from mission statements, managers should also develop more detailed guidance documents to set

forth the requirements clearly. This applies to any enterprise in almost any place in the world, no matter in the developed or developing countries.

The model presents in this research acknowledges that the "leaders' personal perceptions" play an unquestionable role in catalyzing corporate environmentalism. Practically, if a firm desires to make environmental aspect a priority, it may try to hire managers who respond positively to environmental issues. A company may also offer financial bonuses or other rewards to individuals who undertake practices conducive to the preservation of the natural environment. Nevertheless, managers should realize that it is critical to adopt a long-term, consistent strategy that fosters continuous co-operation by stakeholders so as to reduce the complexity and state the uncertainty of conflicting environmental issues.

This study is also relevant to the managers who are facing external environmental pressures in shaping their firm's environmental strategies. In particular, the results of this study remind them of the significance of effective management of the stakeholders' environmental demands. The results from the interviews reveal that with the increasing global pressures from the various stakeholders like the government, customers, competitors, etc, firms operating in the PRD will have to implement green management practices to reduce the environmental impacts of their products. In response to the significant impacts of environment, the Chinese government has stepped in by enacting laws and acts on environmental protection, as well as closing down numerous firms with obsolete technology and setup (Zeng, Tam, Tam, & Deng, 2005). To meet the needs of external environmental

stakeholders, firms can formulate a "systematic mechanism" with the intention of keeping track of the environmental needs of the external stakeholders. Since environmental scanning provides information needed for strategy formulation (Karami, 2007), it is advised that firms should set up an environmental scanning system to record valuable or useful information about the stakeholders' requirements, like the new environmental laws or regulations, which will affect their business operations. The system should always be updated with the ever-changing stakeholders' expectations. Furthermore, it is better for firms to conduct formal or informal surveys amongst the strategic stakeholders so as to determine the stakeholders' opinions on the environment.

Other than the commitment from top management, since the environmental management practices should involve the whole organization, a team or network of green committee can help in setting up and spreading environmental concepts within firms. Effective employee engagement is an integral part of success in environmental management. This is particularly important in times when companies are heading to a new direction and changing the way they do business.

With regard to the results of our research, information and innovation capabilities are essential for proactive environmental strategies. First of all, firms should recognize the value of new, external green information, understand it, and apply it during operations. In addition, Sharma and Vredenburg (1998) identify a basic dynamic process in which the opening up of an organization to new information from external

constituents sparks organizational learning, thus enabling the adoption of proactive environmental strategies. Only obtaining information is not sufficient for the effective adoption of brand new environmental strategies. The communication of green ideas within a company through intranet, broadcast, monthly/quarterly team briefing, ongoing meetings between staff and team leaders/managers, toolbox talks and suggestion boxes is necessary for companies pursuing corporate environmentalism. Lopez-Gamero, Claver-Cortes, & Molina-Azorin (2008) advocate that employees' green knowledge has a significant positive impact on the formulation of a pioneering proactive environmental strategy. It can explain the rationale that the investment in "employee training and education" is usually high. The training is to adjust the knowledge of the employees to the changes in the production processes due to the introduction of new environmental improvements (Govindarajuru & Daily, 2004).

Furthermore, innovative capabilities are also essential for adopting corporate environmental strategies. Researchers like D'Este (2002) provide verification that a firm's innovative capability enables it to transform internally and respond rapidly to the latest market demands. In order to strengthen the innovation capability, companies can set up mechanisms to encourage and reward inventiveness and creativity. Companies can also highlight the relevance of green research and development in their corporate plans, invest more on the research and development of new green products and establish protocols such as design for green manufacturing.

The responses from the survey also show that proactive environmental strategies can lead to both positive environmental and financial outcomes. Companies can benefit from cost reduction and saving resulting from waste minimization, recycling and reduction in the consumption of electricity, water, gas and raw materials. Also, the amount of fines that companies pay will be reduced due to compliance with legislation, regulations and guidelines. Furthermore, the corporate image will be improved by being portrayed as an "environmental-friendly organization", thus leading to improved and better relations with customers, the community and other stakeholders. This is beneficial to the whole company.

7.6 Governmental Implications

This study has some important implications for government agencies and regulators. As mentioned previously, the environmental consciousness of enterprises is indispensable in environmental protection. The government should play an important role to promote the concepts of corporate environmentalism. For instance, it should arrange courses and seminars on environmental-related aspects for the enterprises to increase the environmental awareness and environmental knowledge of managers.

To facilitate the enterprises to perform their environmental management in a more predictable environment and reduce the uncertain business setting, the Chinese government is advised to spend more effort to modulate its current environmental laws and regulations as well as to

improve the related infrastructural support. In order to reduce the perceived uncertainties of enterprises and accelerate their implementation of environmental strategies, an established regulatory system and a consonant infrastructure to assist their compliance with the regulatory standards are critical. The capacity of the government to facilitate these practices can increase the levels of confidence at which firms rely on government and make commitment to the adoption of proactive environmental strategies.

In China, regulatory stakeholders, especially the Chinese government, help promote new environmental guidelines and practices among the firms. The governmental sector has shouldered most of the responsibility for environmental protection, or to have full enforcement of environmental laws and regulations. In order to ensure the companies' compliance with environmental policies, stricter administrative orders and control mechanisms are necessary (Scott, 1994).

In the countries where the patterns of policy networks are described to be with close interaction between the government and business sectors, individual firms are more likely to perceive less uncertainty. Furthermore, academics like Chen, Li and Otto (2002) argue that the enforcement problem in China is actually very serious. China's inability to enforce its environmental laws is, for instance, due partly to a weak central agency and partly to the desire for economic growth. The government and regulators should make effort to tackle this enforcement problem in order to provide a stable business environment for the firms to do business.

7.7 Summary

In this chapter, the general situations of corporate environmental management in the Pearl River Delta region have been reviewed. It is noticed that firms which operate in China have begun to respond to the worsening environmental conditions. Managers with strong environmental mindsets are more likely to perceive environmental issues as opportunities rather than threats. The implications of the NRBV and the stakeholder perspectives have also been discussed. Furthermore, the implications for business managers on how to improve corporate environmental management are given. In next chapter, a summary of the main findings is provided, and the limitations as well as suggestions for future research are discussed.

CHAPTER 8

CONCLUDING REMARKS

8. Introduction

Environmental management is a relatively young discipline. The study in this field lack rigorous empirical and theoretical focus (Sharma & Aragon-Correa, 2005). Particularly, fragmented academic theories are grounded in various theoretical disciplines with few coherent theories on corporate environmentalism. Nevertheless, the natural-resource-based view of the firm (NRBV) and the institutional theory each provide distinct insights into the investigation of corporate environmentalism. This research is believed to be an original and important contribution in advancing the theory of corporate environmentalism that has to date been disconnected.

This research tested the research model in the context of an East Asian developing country (China's Pearl River Delta) in contrast to the majority of previous research that focused on Western highly industrialized economies (Barakat, 2006). The environmental sustainability, which is a critical issue in China, further enhances the relevance of the findings of this research for business managers as well as governmental agents in China.

8.1 Environmental Management in China

In the 1980s, countries with low levels of environmental regulations, like China, became the production sites for "pollution intensive industries", or so-called the "pollution heavens" (Walter, 1982). China's economy

continues to grow rapidly. This growth follows the "extensive growth model". It demands vast resource inputs and generates huge outputs. This is particularly true in the heavy industry (Hu, 2008). Unfortunately, this growth model generates severe pollution problems. For instance, air pollution causes dramatic reduction in visibility in the Pearl River Delta region (Olivia, 2010). da Silva and Teixeira (2006) argue that in the developing countries, the issues of environmental management systems are not regarded as critical as in the more developed countries. However, the recent enactment of a variety of pollution-related laws and regulations in China has demonstrated that she has the determination to act more proactively in solving her ecological problems (Liu & Diamond, 2005). Environmental factors can seriously affect not only the PRD region, but also China's overall future trajectory. How well companies address these environmental issues will affect their destinies in one of the most important growth economies in the world.

8.2 Summary of the Results

The in-depth interviews of our study indicated that in general, firms attempted to link environmental responsibility with business strategies. They had taken actions beyond the compliance of laws. They were aware of the ecological issues in operations. They considered that the environmental objectives of firms and the stakeholders' expectations were complementary. One major finding was that the pollution level of the industries would to a certain extent influence the corporate environmental responsibility of firms.

Firms from polluting industries would proactively obtain the necessary environmental-related information and acquire innovation skills to implement corporate environmental strategies. They would achieve desirable benefits like the reduction of pollution, improvement of company reputation and creation of new business opportunities, etc. The present study acknowledges that polluting firms would perceive greater pressures from the external stakeholders, not only from the government but also from their current and future customers.

The results from the questionnaire survey supported the fundamental proposition of the NRBV perspective that resource availability (both internal environmental orientation and external environmental orientation) significantly influenced the development of organizational capabilities (i.e. information and innovation capabilities) and eventually the pursuit of corporate environmentalism. It revealed that incorporating environmental concerns into the strategic planning process was essential for superior business performance. Firms' internal values and ethical standards regarding the level of commitment towards the environment could encourage the whole organization to embrace the opportunities to gain more environmental-related information and innovative skills for the development of green strategies. The adoption of green strategies could ultimately lead to positive financial and environmental performance. Hence, these results empirically supported Hypothesis 1a to Hypothesis 5. Specifically, while an increasing number of companies are eager to enhance their competitive advantage through the pursuit of environmental strategies in the context of

developed economies (Hart, 1997; Lindell & Karagozoglu, 2001; Porter & Linde, 1995; Russo & Fouts, 1997), similar benefits can be obtained from the pursuit of environmental strategies in emerging economies.

Besides, scholars have constantly argued that regulatory influence is the key motivating factor for encouraging environmental protection among the firms (Gunningham, Kagan, & Thornton, 2003). In this study, we took into account the regulatory influence as the moderator in order to develop a more complete picture when addressing the issue of corporate environmentalism. The results revealed significant moderating influences on the process of achieving ecological sustainability, i.e. Hypothesis 6a, Hypothesis 6b, Hypothesis 6d, and Hypothesis 6e were substantiated. It was also worth noting that external regulatory pressures did not have significant influence on the environmental innovation capability. In view of the fact that companies which develop innovative skills in the greening of production processes have to devote substantial time and energy within the firms in training, educating and developing the employees. This may be one of the reasons why innovation capability is not significantly affected by the external regulatory forces. Future research should focus on this specific area.

8.3 Limitations and Future Research

We expect that the findings and limitations of the current work will stimulate significant future research. Regarding the limitations of this study, any potential bias introduced by the use of a single respondent per company cannot explicitly be ruled out. However, previous studies have used a single respondent per company to examine the issue of corporate environmentalism. For instance, those studies conducted by Judge and Douglas (1998), Klassen and Whybark (1999), Melnyk, Sroufe and Calantone, (2003) and Rao, O'Castilla, Intal and Sajid (2006) have shown consistent and reliable results. Nonetheless, it is preferable that the future research should include multiple respondents in order to increase the validity of the study.

Besides, this study is cross-sectional. Although the model developed from the theory implies certain causal relationships, the causality cannot be confirmed with our cross-sectional research design. A longitudinal study will be beneficial for confirming the "directionality" of the relationships identified in our results. For instance, a longitudinal research that investigates the environmental practices and firm performance in different periods of time can mitigate the causality problem. In particular, the pursuit of corporate environmentalism in China is still in the initial stage. A longitudinal study will enable the researchers to explore this important phenomenon more thoroughly. In other words, it will allow researchers to investigate the dynamic effects on cost advantage of adopting proactive environmental strategies.

Furthermore, regardless of the theoretical and practical insights that can be obtained from this research, its main focus is on the manufacturing industries that operate in the Pearl River Delta region (PRD), which is regarded as a more developed Chinese province. The generalizability of the results may be hampered. With the foundation laid by this study, future studies can test further the proposed model in other areas of China. A more broadly-based and random sample study across China will also provide a better understanding of corporate environmentalism which is emerging from all over China, not only in the PRD. Moreover, it will be worthwhile for researchers to perform a comparative study of corporate environmentalism in both the Western and Eastern countries. This kind of cross-cultural research can help the researchers gain more complete knowledge about the situations of corporate environmentalism.

Environmental consideration is no longer regarded as a short-term fantasy, but is a part of everyday's reality of industrial enterprises. The central point of environmental task of enterprises has shifted from reactive actions at operational level in the earlier period to become an essential instrument in strategic decision-making processes (Singh, Murty, Gupta, & Dikshit, 2008). How enterprises actually respond to the environmental challenges will undoubtedly have a significant influence on their own business performance. The environmental challenges call for the firms to set aside their reactive mode of actions, which used to confine them to treat pollution and work for environmental improvements only after damage had

been done. Instead, they must be proactive and far-sighted. Preventive measures should be taken in their core business activities, and their efforts should not be devoted in a piecemeal manner. As noted, ecologically responsive practices can improve long-term profitability of firms. The benefits include reduction in energy consumption and better waste management, which lead to a higher output with the same input (Bansal & Roth, 2000). Hence, it is valuable to study the benefits that enterprises may obtain from the pursuit of corporate environmentalism.

This study is an empirical application of the theoretical foundations of the NRBV from strategic management as well as the institutional theory from political science. Our study has the potential to provide a solid platform for future research and uncover the roles that resources, capabilities and regulatory stakeholder play in the creation of competitive advantage and superior performance with proactive environmental strategies.

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Appendix 1. Summary of Environmental-related Studies

Authors	Variables	Samples	Major Findings	Qualitative/ Quantitative	Theories
hrivastava (1995b)	Financial performance, environmental technologies, environmental policy, conservation programs	3M Corporation	At the industry level, environmental technologies provide a way of fundamentally altering the profitability dynamics of industries	Case study	Theory of competitive advantage
Hart and Ahuja (1996)	Return on asset, return on equity, return on sales, emission reductions based on toxic release inventory (TRI) from the Corporate Environmental Profile data	127 US firms in SIC listed in S&P 500 with SIC codes below 5000	Pollution prevention activities have a positive influence on financial performance within 1-2 years: Return on equity takes longer to be affected	Survey	Environmental management theory
Klassen and McLaughlin (1996)	Stock market returns, environmental awards in the NEXIS database, chemical/oil spills, gas leaks or explosions	US firms with environmental awards and crises	A positive relationship between financial performance (stock market performance) and positive environmental events	Case study	Social responsibility theory
Catasus, Lundgren and Rynnel (1997)	Internal demands, external demands (stakeholders), nature's demands	Six environmental managers in the conference in Stockholm	Environmental managers have try to incorporate the sustainability issue whenever possible	In-depth interview	Environmental management theory
Menon and Menon (1997)	Enviropreneurial marketing strategies	31 top managers in seven U.S. cities	A model was developed with the antecedents and consequences of an enviropreneurial marketing strategy	In-depth interview	Corporate environmentalism
Russo and Fouts (1997)	Environmental ratings, compliance, expenditures, waste reduction, return on asset	243 US firms	A positive relationship across a multi-sector sample, showing that the relationship was stronger in high-growth industries	Survey	Natural-resource-based view of the firm

Authors	Variables	Samples	Major Findings	Qualitative/ Quantitative	Theories
Ghobadian, Viney, Liu and James (1998)	External factors (market behavior, legal-regulatory influences, social expectation); mediating factors (style, commitment, concern, objectives); moderating factors (technology, opportunity, costs assessment, human resource availability, capital availability, organizational adaptability), environmental strategies	164 UK grossing companies	There is a need of non-sequential approach to modeling environmental policies and performance	Survey	Roome (1992) environmental management strategies
Hills and Man (1998)	Personal and organizational relationships (guanxi), environmental policy in China	Firms the industrial city in Foshan in Guangdong Province	Positive relationship between environmental regulators and industrial enterprises in China	Case studies	Institutional theory
Judge and Douglas (1998)	Integration of environmental issues into the strategic process (perceptual measures); earnings growth, sales growth, market share change (perceptual measures)	196 US firms	Positive and significant impact of environmental issue integration on financial performance	Survey	Natural-resource-based view of the firm
Merritt (1998)	Attitudes, awareness, environmental practices	143 respondents from companies in the London Borough of Croydon	Most managers profess a high level of environmental concern but they have little knowledge of developments in the field of environmental management and they have not introduced formal practices to manage the environmental performance of their businesses	Survey	Environmental management theory
Schaefer and Harvey (1998)	Stage model by Hunt and Auster (1990) and stage model by Roome (1992)	Four companies in UK water and sewerage and electricity distribution sectors	Test the two popular stage models of organizational ‘greening’ empirically and found that the models did not have very good fit with the reality; more comprehensive and interpretative explanations of organizational ‘greening’ are needed	Case study	Hunt and Auster (1990) stages of environmental strategies and Roome (1992) four stages of environmental strategies

Authors	Variables	Samples	Major Findings	Qualitative/ Quantitative	Theories
Sharma and Vredenburg (1998)	Proactive environmental strategy (perceptual measures); organizational benefits (perceptual measures)	99 Canadian firms (oil and gas) Canadian oil and gas industry (99 companies in survey; 7 companies in case studies)	Positive and significant influence of proactive practices on organizational capabilities and of the latter on organizational benefits	Case studies and survey	Natural-resource-based view of the firm
Stanwick and Stanwick (1998)	Financial performance (level of profitability); environmental performance (level of pollution emissions), corporate social performance (quality of management, quality of products or services, innovativeness, long-term investment value, financial soundness, ability to attract, develop and keep talented people, wise use of corporate assets and responsibility to the community and the environment)	Data of the firms which listed in the Fortune Corporate Reputation Index from 1987-1992	Corporate social performance is a multi-faceted construct which is impacted by various organizational variables; firms should not only focus on financial performance, but also the environmental performance	Secondary data analysis	Social responsibility theory
Agle, Mitchell and Sonnenfeld (1999)	Stakeholder attributes of power, legitimacy, urgency and salience, CEO values and corporate performance	80 CEOs of the large U.S. firms	Strong support for the attribute-salience relationship and some significant relationships among CEO values, salience and corporate performance but found no support for a salience-financial performance link	Survey	Stakeholder theory
Hoffman (1999)	Federal lawsuits concerning environmentalism	The US chemical industry (federal legal cases and trade journal of Chemical week)	Conceptual environmental management moved through four stages from 1960 to 1993	Longitudinal study	Institutional theory
Klassen and Whybark (1999)	Environmental technology portfolio, manufacturing performance measures (objective and perceptual)	69 US firms in the furniture industry	Moderate environmental practices may generate important competitive and environmental improvements if associated with other management changes	Survey	Resource-based view of the firm

Authors	Variables	Samples	Major Findings	Qualitative/ Quantitative	Theories
Petts, Herd, Gerrard and Horne (1999)	Attitudes of individuals, perceptions of the effectiveness of regulation	389 responses in SMEs in UK	The environment is important to individuals and the environmental compliance is regarded as 'the right thing to do'	Survey	Ecological theory
Tilley (1999)	Resistance forces and driving forces of influencing the environmental attitudes and behavior of small firms	60 in-depth interviews with mechanical engineering and business service small firms located in the city of Leeds, West Yorkshire	The typical small firm, in both the manufacturing and service sectors, still has a problem associating its business practices directly with environmental damages	In-depth interviews	Theories of attitudes and behaviors
Bansal and Roth (2000)	Leadership corporate values, legislation, stakeholder pressures, economic opportunities, ethical motives	53 firms in the UK and Japan	Three motivations of the companies go green: competitiveness, legitimation and ecological responsibility	Interviews	Stakeholder theory, competitive theory, institutional theory
Christmann (2000)	Environmental management 'best practices', use of pollution prevention technology (PPT), innovation of proprietary PPT and early timing, cost advantage (perceptual measures)	88 US chemical companies	Only positive and significant effect of pollution prevention technology innovation	Survey	Theory of competitive advantage
Cordano and Frieze (2000)	Pollution prevention attitudes, subjective norms for environmental regulations, perceived behavioral control, past source reduction activity, behavioral preference for source reduction activity	295 environmental managers at manufacturing facilities in the USA	Attitudes and other social psychological variables do influence environmental managers' preferences	Survey	Ajezen's theory of planned behavior
Egri and Herman (2000)	Values of environmental leaders, types of organizations, behaviors of environmental leaders, organizational context	73 leaders of nonprofit environmentalist and for-profit environmental product and service organizations	Nonprofit environmentalist organizations were highly receptive contexts for transformational leadership, whereas for-profit environ-mental organizations were at least moderately receptive	Survey	Transformational and transactional leadership behaviors
Forte, Hoffman, Lamont and Brockmann (2000)	Costs, services offered, operating slack, organizational performance	235 hospitals in the state of Florida	A fit between environmental contingencies and organizational form relates to superior performance	Survey	Miles and Snow's (1978) strategic types

Authors	Variables	Samples	Major Findings	Qualitative/ Quantitative	Theories
Gilley, Worrell and El-Jelly (2000)	Two types of environmental initiatives: 39 process-driven and 32 product-driven	71 announcements of corporate environmental initiatives	No significant effect of greening on performance	Survey	Process-driven and product-driven environmental initiatives
Sharma, 2000	Managerial interpretations, environmental strategy, employee performance evaluation, issue legitimation	99 firms in the Canadian oil and gas industry	Differences in managerial interpretations were influenced by certain factors in the organizational context	Survey	Environmental strategies
Slater and Angel (2000)	Proactive environmental regulations among main concerns, strategic behavior, reactive environmental regulations among secondary concerns	30 locally controlled companies in Malaysia	Increased environmental awareness originated from increased company internationalization	Survey	Strategic management of firm
Angel del Brio, Fernandez, Junquera and Jose Vazquez (2001)	Judgment of the environmental tools, advantages and difficulties	373 industrial companies with more than 50 workers that operate in Spain	If companies advance in their environmental behavior, they will attach more importance to this area in their organizational structure	Survey	Strategic management of firm
Banerjee (2001)	Corporate environmental orientation, corporate environmental strategies	7 US firms in 4 cities	Corporate environmentalism ultimately follows the economic bottom line; corporate environmental orientation and corporate environmental strategy focus are two themes of corporate environmentalism	Interview	Environmental strategy of firms
Branzei, Vertinsky, Takahashi and Zhang (2001)	Criterion Variables (Emdeddedness, capability, responsibility); Predictor Variables (Individual values, socio-economic context); Control variables (age, environmental training, gender, education, position, sector, sales, employment, assets)	Top or environmental managers 224 Chinese, 193 Japanese	The study investigates the influence of national culture, environmental values and socio-economic contexts upon firm-level greening in both countries	Survey	Cultural theory, corporate greening theory and social issues theory
Johnston and Smith (2001)	Corporate environmental performance indicators	The environmental reports of water service companies in England and Wales	Water company indicators must become more sophisticated and less focused on external reporting	Secondary data analysis	Environmental management theory

Authors	Variables	Samples	Major Findings	Qualitative/ Quantitative	Theories
Karagozoglu (2001)	Environmental orientation, environmental innovativeness, environmental competitive advantage and financial returns	83 U. S. manufacturing companies and 85 manufacturing companies in Turkey	The overall compatibility of environmental management practices of Turkish companies with their American counterparts, in the real of a shift toward a more proactive environmental management paradigm	Survey	Environmental management theory
King and Zeithaml (2001)	Causal ambiguity, competencies, firm performance (return on assest, return on invested capital, return on sales)	224 managers of 17 organizations in textile manufacturing and hospitals	Top executives should work to develop resources that have high characteristic ambiguity and low linkage ambiguity	Survey	Resource-based view
Lindell and Karagozoglu (2001)	Management environmental orientation, resources, innovative actions in response to environmental problems, competitive advantage, financial performance,	83 companies from USA and 83 from Nordic countries	US managers perceive government laws and actions to be more stringent than Nordic managers do; managers both in the US and Nordic considered themselves to be ahead of their competitors in environmental actions	Survey	Natural-resource-based view of the firm, competitive theory, environmental management theory
Margolis and Walsh (2001)	Social performance, financial performance	95 empirical studies in academic journals from database (ABI/Inform)	To make conclusion of the argument “a positive relationship exists between social performance and financial performance”, we must pay attention to 1. The connection between the underlying social performance construct and efforts to measure it, 2. Validity of the measures, 3. The direction and mechanisms of causation	Review of empirical studies	Management theory

Authors	Variables	Samples	Major Findings	Qualitative/ Quantitative	Theories
Rojsek (2001)	Attitudes towards driving forces of environmental concerns, the hierarchy of business goals and perceived conflict between environmental and other business goals, perception of barriers to the environmentally responsible behavior	60 companies which were most environmentally unfriendly industries in Slovenia (i.e. paper, chemical, food, pharmaceutical, packaging, rubber, galvanization and plastics industry)	Environmental protection is at the bottom of the hierarchy of business goals even though the companies surveyed belong to the environmental-degrading industries; government is perceived as a very important source of environmental pressure; absent of effective enforcement may continue to tempt companies to ignore environmental costs in order to reduce production costs	Survey	Stakeholder theory
Roy, Boiral and Lagace (2001)	Environmental commitment (environmental plan, environmental policy, EMS); manufacturing practices (inventory systems, layout, quality control, maintenance, quality standard); stakeholder management (health and safety programs, training programs, suppliers relations, participatory management); competitive performance (production costs)	250 managers of the manufacturing companies in Quebec	There is a positive relationship between environmental commitment and the variables associated with competitiveness; good relations with both employees and suppliers, participatory management and total quality management programs appear to be intimately correlated with the existence of an environmental policy	Survey	Environmental management theory
Banerjee (2002)	Environmental orientation scale, environmental strategy focus, industry characteristics	311 managers in USA	The constructs of corporate environmentalism provide a self-assessment tool that can enable firms to set benchmarks; this study contributes to the emerging literature in the field by developing formal constructs of corporate environmentalism	Survey	Environmental management theory

Authors	Variables	Samples	Major Findings	Qualitative/ Quantitative	Theories
Branzei and Vertinsky (2002)	Eco-sustainability orientation (embeddedness, capacity and responsibility)	224 Chinese firms and 193 Japanese firms	Chinese firms, especially the proactive ones, are mainly responsive to 'best practices' endorsed by regulatory agencies; Japanese firms, especially the reactive ones, are more sensitive to the influences of their trade associations	Survey	Institutional theory
Halme (2002)	Environmental learning	Semi-structured interviews with 42 people from UPM	Generate a deeper understanding of the phases and essential factors of environmental learning in business firms	Case study with interview	Environmental management theory
Tan (2002)	Different forms of ownerships	201 Chinese managers from four types of companies in China: state-owned, collectively-owned, privately owned, and foreign joint venture	Results support the central notion that each ownership type exhibits a distinct environment-strategy configuration, which in turn has important performance implications for the firms	Survey	Strategic management of firm
Tyteca, Carlens, Berhout, Hertin, Wehrmeyer and Wagner (2002)	Environmental performance indicators (physical- energy and water inputs, waste generation, heavy metals emissions to water); business/management – certification ISO 14001/EMAS, disclosure of environmental investment, number of non-compliance events and impact indicators- emissions of ozone depleting substances to air)	MEPI Project (Measuring Environmental Performance of Industry) of six industrial sectors within six European countries 280 European companies and 430 production sites	EMAS certification is consistent with better environmental performance	Case study	Strategic management of firm
Wagner, Van Phu, Azomahou and Wehrmeyer (2002)	Environmental index integrating SO_2 emissions, NOx emissions and COD emissions	37 firms in the European paper industry (Germany, Italy, UK, Holland)	No evidence of significant impact of any economic performance variable on environmental performance	Survey	Porter hypotheses
Zyglidopoulos (2002)	International reputation side effects, foreign stakeholder salience	Shell and Greenpeace over the Brent Spar	Multinational corporations face levels of environmental and social responsibility higher than their national counterparts, because of international reputation side effects, and foreign stakeholder salience	Case study	Stakeholder theory

Authors	Variables	Samples	Major Findings	Qualitative/ Quantitative	Theories
Banerjee (2003)	Public concern, regulatory forces, competitive advantage, top management commitment, internal environmental orientation, external environmental orientation, environmental corporate strategy, environmental marketing strategy	243 managers in North America	Corporate environmentalism is related to public concern, regulatory forces, competitive advantage and top management commitment and the industrial type moderated the relationships	Survey	Competitive theory, strategic management of firm
Fryxell and Lo (2003)	Environmental knowledge, managerial actions and behavior, managerial values, gender, age, education	158 enterprise personnel from Beijing and 164 managerial personnel from Guangzhou	Environmental knowledge and environmental values do influence Chinese managers' behavior in their organization; Chinese managers support environmental initiatives if given an appropriate opportunity; business education needs to incorporate environmental knowledge and environmental values among present and future managers	Survey	Environmental values and knowledge
Jiang and Bansal (2003)	Reasons for adopting EMS, outcomes of EMS	16 Canadian managers from pulp and paper industry	Task visibility and environmental impact opacity lead to differences in a firm's approach to ISO 14001 certification in the absence of coercive pressures	Case study	Task visibility and environmental impact opacity
Lee and Ball (2003)	Top-level responsibility, environmental policy, strategic planning, stakeholder involvement, environmental performance, environmental report, environmental management system, environmental standards, records of fines and penalties, environmental liability, eco-products	15 companies in the Korean chemical industry	Three strategies are identified: lagging companies, defensive compliance, and proactive catalyst	Case study	Miles and Snow's theory of strategy

Authors	Variables	Samples	Major Findings	Qualitative/ Quantitative	Theories
Lo and Fryxell (2003)	Enforcement style dimensions, external and organizational support	Officials in environmental protection bureaus (EPBs) in Guangzhou, Dalian and Chengdu	Public support appears to promote several dimensions of enforcement style in Guangzhou and Chengdu however, in Dalian the influence of government was greater than that of public support	Survey	Institutional theory
Margolis and Walsh (2003)	Social initiatives, corporate social performance, financial performance.	127 studies investigate the relationship between corporate social performance (CSP) and corporate financial performance (CFP)	Half of the studies found a positive relationship between CSP and CFP; little evidence of a negative relationship between CSP and CFP	An analysis of previous empirical studies	Stakeholder theory
Melnyk, Sroufe and Calantone (2003)	State of the environmental management system (EMS): no formal EMS, formal certified EMS, 17 environmental options (environmental performance); 10 corporate performance perceptual measures	1222 manufacturing firm managers	Positive and significant impact of EMS state on the ten corporate performance measures; positive and significant impact of EMS state on environmental options	Survey	Environmental management system
Rhee and Lee (2003)	Environmental strategies; what companies saying and what they are doing	2 Korean companies in Paper and pulp industry	There is a gap between the rhetoric (what companies saying) and reality (what companies are doing) and it constantly changes over time depending on specific internal and external influences	Case study approach, longitudinal case study	Rhetoric and reality environmental strategies
Wong (2003)	Urgency of the China's environmental problems, urgency of global environmental problems, opinions of environmental protection efforts and policies	350 university students in Beijing	Students were conscious about the seriousness of the environmental problems; the students were ambivalent about dividing priorities between economic growth and environmental protection	Survey	Perception theory
Aragon-Correa, Matias-Reche and Senise-Barrio (2004)	Environmental commitment, managerial discretion	105 firms in Spain	The environmental commitment associates with specific executives being responsible for environmental matters	survey	Miles and Snow's theory of strategy

Authors	Variables	Samples	Major Findings	Qualitative/ Quantitative	Theories
Branzei, Ursacki-Bryant, Vertinsky and Zhang (2004)	Ecological values, regulatory pressure, environmental performance	360 Chinese firms located in Shanghai	Top executives who champion new strategic initiatives monitor early success or failure, and adjust their efforts to match early performance feedback	survey	Control theory, goal theory, escalation of commitment
Gago and Antolin (2004)	Top management participation, strategic planning, employee training, specialization, advising, internal information, external information, control of pollution, environmental impacts, quality	277 environmental managers in Spanish manufacturing industries	A positive relationship between the company's attitude regarding the environment and the proactivity reached in environmental commitment	Survey	Strategic management of firms
Simpson, Taylor and Barker (2004)	Competitive advantage, environmental legislation, financial cost, increase in revenue and cost savings, customer satisfaction	63 companies in South Yorkshire conduct the survey; 15 companies by telephone interviews, site visits	Most organizations surveyed believed environmental issues to be issues affecting their business; the meeting of these requirements was seen as a cost that was not transferable to customers in terms of added benefits and few organizations could show that it led to a competitive advantage	Survey and case study	Competitive theory, Environmental responsibility
Wagner and Schaltegger (2004)	Environmental shareholder value, environmental competitiveness, environmental performance	135 companies in UK and 166 in Germany	The analysis finds that for firms with shareholder value-oriented strategies the relationship between environmental performance and different dimensions of economic performance is more positive than for firms without such a strategy	Survey	Corporate environmental strategy
Watson, Klingenberg, Polito and Geurts (2004)	Financial performance (P/E Ration, M/B Ratio, Profit Margin, Operating Margin); EMS strategies	10 firms in USA	Findings suggest that implementation of an EMS strategy does not negatively impact a firm's financial performance	Survey	Cost of quality framework
Chan (2005)	Firm-specific resources, organizational capabilities, the adoption of environmental strategies, environmental performance, financial performance, perceived environmental uncertainties of the natural environment,	332 foreign invested enterprise in China (48% were located in Guangdong, 11% in Jiangsu, 15% in Fujian, 15% in Shanghai and 8% in Shangdong)	Natural-resource-based view of the firm is applicable in China	Survey	Natural-resource-based view of the firm; perceived environmental uncertainties

Authors	Variables	Samples	Major Findings	Qualitative/ Quantitative	Theories
Child and Tsai (2005)	Strategy and institutional constraints, regulations/laws/policies, law enforcement mechanism, non-governmental organizations, suppliers, contractors, competitors, mission, culture	Three large MNCs and 2 Chinese and 2 Taiwanese companies in the chemical sector in China and Taiwan; formal and informal regulators	The study offers new insights into 1) the processes that lead to conformity in corporate environmental practices, 2) the need to extend the normal purview of institutional theory and 3) the contribution of a political perspective that allows for MNC proactivity	Case study	Institutional theory
Del Rio Gonzalez (2005)	Environmental technologies adopted, reasons for adopting those technologies, barriers to adoption, impacts from adoption	46 technical managers of the pulp and paper industry in Span	The empirical study shows that clean technology adoption decisions are the result of an interaction between 18 factors, often involving contradictory signals for the potential adopter	Interview	Economic, instructional and social theories
Dias-Sardinha and Reijnders (2005)	Strategic objectives, performance references, performance evolution, performance status	13 Portugal companies	Three categories of environmental strategies were found: compliance with the law while emphasizing pollution control, pollution prevention and eco-efficiency	Interview	Environmental strategies
Khandekar and Sharma (2005)	Human resource management practices, HR and job capabilities, organizational performance, sustainable competitive advantage,	300 managers from foreign global organizations and Indian global organizations	The significant relationship between human resource capability and organizational performance are consistent with the resource based view of the firm	Survey	Resource-based view of the firm, competitive theory
Lee and Rhee (2005)	Attitudes and response of environmental issues	Korean pulp and paper industry; 27 in-depth case studies, 50 surveys	Korean companies have progressed from the ignorance end-of-pipe approach to a preventive approach; pollution preventive approach results in a better environmental performance than an end-of-pipe approach	Content analysis of industry journal, survey and interview	Environmental management theory
Marshall, Cordano and Silverman (2005)	Individual drivers (managerial attitudes, subjective norms); institutional drivers (local institutional networks, regulations)	16 interviews of the managers in US wine industry	A conceptual model was built; drivers at the individual and institutional levels are important to proactive behavior, but there is a noticeable difference in the relevance and relative importance of these drivers	Interview and focus group	Institutional theory, theory of reasoned action

Authors	Variables	Samples	Major Findings	Qualitative/ Quantitative	Theories
Russo and Harrison (2005)	Toxic release inventory (TRI), environmental management system, ISO 14001 certified facility, product innovation, compensations	169 electronic plants in US	Only a link between plant manager compensation and environmental performance reduced emissions	Survey	Congruence theory
Tien, Chung and Tsai (2005)	Implementation motivation, environmental strategies, environmental design implementation, business competitive advantages, industry group and enterprise scale	289 Taiwanese firms	Internal motivation for environmental design has a significant effect on environmental design implementation	Survey	Combined theories of motivations and environmental design
Ulhoi and Madsen (2005)	Stakeholders, impacts areas, areas for initiatives and improvements	300 Danish industrial companies	The results demonstrated that the rate of adoption of environmental management des not seem to be convincing	Survey	Stakeholder theory
Elsayed (2006)	Environmental performance, available resources, firm size	674 UK firms	The amount of resources available to the firm and firm size will determine its organizational capacity in applying the appropriate environmental initiatives and then its environmental performance	Survey	Corporate environmental strategy
Rao, O'Castilla, Intal and Sajid (2006)	Environmental performance indicators (raw material efficiency, packaging to output ratio, energy consumption ratio, water consumption ratio, total waste to output ratio); environmental management (environmental investment, yearly operating cost of environmental protection); Environmental performance (reduction of solid/liquid waste, reduction of emissions, recycling, improvement of environmental compliance)	126 SMEs in six industry sectors (furniture industry, the automotive parts industry, the fashion accessories industry, food and beverage industry, the hotel and restaurant industry, the electroplating industry) in Philippines	Environmental indicators correlate significantly with the environmental performance of SEMs in Philippine	Survey	Corporate environmental performance

Authors	Variables	Samples	Major Findings	Qualitative/ Quantitative	Theories
Gouldson and Sullivan (2007)	Substantive dimensions of corporate environmentalism, sulphur dioxide and benzene amount, GDP per capita, unemployment, population density	9 companies within the oil and gas sector listed in UK	Corporate reports are of very limited value when seeking to compare and contrast levels of environmental performance at the site level; significant variations in corporate environmental performance across the US and the EU	Case study	Corporate environmental performance
Cummings (2007)	Age, attitudes towards environmental management issues	236 Australian respondents, 204 Chinese respondents and 238 Indonesian respondents from both the management student and manager set	Chinese respondents exhibited a tendency toward centralization with respect to environmental attitudes, favoring national control over environmental regulations, and Australian respondents were the least prominent in supporting most of the environmental attitudes, Indonesian respondents favored tighter restrictions on corporations	Survey	Stakeholder theory
Zhu, Sarkis and Lai (2007)	Environmental performance, economic performance and operational performance, green supply chain management implementation	171 respondents from four typical manufacturing industrial sectors in China, namely, power generating, chemical/petroleum, electrical/ electronic and automobile	The electrical/electronic industry has relatively higher levels of green supply chain management implementation and achieves better performance outcomes than the other three manufacturer types	Survey	Green supply chain management
Aragon-Correaa, Hurtado-Torresa, Sharma and Garcıa-Moralesa (2008)	Environmental strategies, organizational capabilities, financial performance	108 SMEs in the automotive repair sector in Southern Spain	SMEs undertake a range of environmental strategies from reactive regulatory compliance to proactive pollution prevention and environmental leadership; firms with the most proactive practices exhibited a significantly positive financial performance	Survey	Resource-based view of the firm

Authors	Variables	Samples	Major Findings	Qualitative/ Quantitative	Theories
Buil-Carrasco, Fraj-andrés and Matute-Vallejo (2008)	Influence of external forces; environmental orientation; corporative and marketing strategies; size; macro-sector and, the environment department	81 personal interviews with firms in the final consumer product sector in Spain	Firms have not integrated environmental issues within their culture and strategic planning process, there are companies that present a positive attitude towards the environment; these firms perceive that customers' and society's interest in this problematic requires a transformation of its economic activities, and have acted in consequence, carrying out several changes in their orientation and in their ecological strategies	Interviews	Stakeholder theory
Delmas and Toffel (2008)	Adoption of ISO 14001, environmental compliance records, institutional pressures	500 polluting facilities in US	External constituents - including customers, regulators, legislators, local communities, and environmental activist organizations - who interact with influential corporate departments are more likely to affect facility managers	survey	Institutional theory
Singh, Murty, Gupta and Dikshit (2008)	Environmental strategies, Environment Performance Indicators (EPIs)	Representatives from various steel companies and consultants with several years of experience	Industry needs to develop robust methodology to monitor Environment Performance Indicators (EPIs) and perform benchmarking with competitors, conduct environmental risk assessment, improve their hazardous waste management practices, and make environmental investments on regular intervals	interviews	Environmental management theory
Delmas and Montiel (2009)	Adoption of ISO 14001, information asymmetries	3,152 automotive suppliers located in the United States, Canada, and Mexico over the 2000–2003 period	Suppliers with highly specialized assets, as well as younger suppliers, suppliers headquartered in Japan, and those reporting to the Toxic Release Inventory, are more likely to respond to their customers' pressures to adopt the certified management standard ISO 14001	Secondary data analysis	Transaction cost and information theories

Authors	Variables	Samples	Major Findings	Qualitative/ Quantitative	Theories
Pataki (2009)	Technological Eco-Modernism, organization culture, performance	A Hungarian chemical firm	A case study of a Hungarian chemical firm is presented in order to point to the practical limits of ecological modernization as an uncontested, conflict-free way towards sustainability	Case study	Ecological modernization, critical organization studies

Appendix 2. Protocol of In-depth Interviews

In-depth Interview Questions
1. 贵企业环境管理 / 环境保护工作遵循的原则及概念是什么？ What is/are the principles and concepts adopted by your company in your environmental management or environmental protection measures? What is/are your company's environmental policy/environmental orientations?
2. 高层管理人员对环境管理的态度如何? /什么驱使企业进行环境保护工作? What is the attitude of your company's top management towards environmental management? What initiates the companies to adopt environmental strategies?
3. 请问贵公司有没有什么能力或优势执行环境管理措施/策略?若有,请详述之. Does your company have any capabilities to implement environmental management strategies? If yes, please describe them in detail.
4. 请问贵企业有没有执行什么环境管理措施/策略? 而贵企业怎样把环境保护的理念体验到生产的工序中? Has your company implemented the Environmental Management System/Environmental Strategies? And how does these environmental strategies/environmental values being incorporated into your daily production processes?
5. 请简述各机构 (例如: 当地政府. 当地的环境保护局, 环境保护组织, 顾客, 传媒, 主要竞争对手, 行业协会等)对贵企业的环境管理的影响。 Please elaborate the institutional influences towards the environmental management of your company. (Institutions: local governments, local environmental protection bureau, environmental protection organizations, customers, media, competitors, trade associations, etc.)
6. 在生产过程的管理中加入了环保元素后, 贵企业在那一些方面创造了效益?。 In which area of the environmentally-friendly production management has your company achieved benefits? (e.g. cost savings, financial performance, employee commitment, financial institutions, government regulators, customers)

Appendix 3: Examples of Coding of In-depth Interviews

Quotations	Coder 1 Themes/Keywords	Coder 2 Themes/Keywords
1. Environmental Orientation/Visions		
"One of our corporate values is to ensure a safe and healthy workplace and achieve a good citizen status on environmental affairs through continuous sustainable improvement. In fact, our top management group has the environmental mentality and would like to spread the ideas of environmental protection within our factory." **(Company 5)**	- Internal values - Environmental orientations - Environmental mentality	- Overall corporate values concern the environmental affairs
This environmental value does not only exist internally. We are also committed to social and environmental responsibility and care for our external parties like our customers and business partners. Furthermore, we concern our environment by preventing contamination and minimizing resource consumption. In order to promote environmental awareness within the factory, the corporate environmental policy is printed in the employee's manuals, and our employees will receive training regarding the environmental issues of our company and society." **(Company 5)**	- Visions include external parties	- The environmental values exist externally, i.e. focus on the external stakeholders
"Our company vision is to minimize the environmental impact of our operations. We perceive that this kind of business philosophy, i.e. to take into consideration the physical environment in business operations, is the characteristics of the manufacturing industry nowadays. There are seven guidelines highlighting the environmental strategies of our company. To enhance the environmental awareness of our staff, these environmental guidelines are displayed in our factory and distributed to our employees through email or during the training sessions. I believe that our employees also think that environmental protection is a must, and environmental ethics have been embedded in every aspect of our company." **(Company 7)**	- Vision → minimize the environmental impacts of the operations	- Take into consideration of physical environment in business operations in company vision

Quotations	Coder 1	Coder 2
1. Environmental Orientation/Visions		
Our environmental guidelines cover all parties in our society. We have incorporated the consideration of stakeholders in our operations, which do not simply focus on profits." **(Company 7)**	- Environmental ethics have been embedded in every aspects - Environmental guidelines cover different parties/stakeholders	- Incorporate all the stakeholders in the environmental guidelines
"Nowadays, doing business is not merely to achieve or maintain good profits. We are fully committed to our responsibility for the environment and promote the environmental responsibility as part of our overall organizational philosophy. In order to ensure the effectiveness of our environmental commitment for everyone, we provide various opportunities for our employees to update their environmental skills and encourage them to become environmentally friendly." **(Company 12)**	- Overall organizational philosophy → environmental-related	- Fully committed to the environment - Provide opportunities for employees to learn about environmental philosophy of this company
We try to demonstrate to our stakeholders that our formal environmental management system is designed to meet their needs for clean living environment. We put effort to promote the importance of environmental protection in China by cooperating with the industrial association, which is one of our stakeholders." **(Company 12)**	- The environmental orientations meet the needs of stakeholders	- Formally put stakeholders' needs in environmental values
"We would like to be a pioneer in green manufacturing, as we think that green manufacturing is not an option but a must towards sustainability. Especially, we incorporate the concept of environmental protection into part of our corporate culture and treat it as one of our core values. We would like to see every one of our employees to have the initiatives to work in an environmentally friendly manner." **(Company 17)**	- Incorporate the concept of environmental protection into corporate culture	- Corporate culture incorporate environmental issues

Quotations	Coder 1	Coder 2
1. Environmental Orientation/Visions		
"We should pay attention to and act according to the needs of all the external stakeholders in our business environment. For instance, in last year, we contacted the European Union (EU) to discuss the issues about 'the Restriction of Hazardous Substances Directive (RoHS)' in China. Our top management is committed to corporate social responsibility by helping not only our own company but also the whole industry, including our suppliers and even our competitors, understand this important green regulation." **(Company 17)**	- Company values → pay attention to different stakeholders	- Top management committed to the environmental issues and set company values with the needs of different stakeholders

Quotations	Coder 1	Coder 1
2. Environmental Capabilities		
"We always adopt new methods and technologies in the manufacturing processes, and we believe those are our capabilities. As we are concerned about the environmental issues, we are more sensitive towards the development and usage of innovative skills in our operations. As an example, we have developed new electronic products that are produced from recycled materials and packaged with recycled packaging materials using our eco-product design skills and competence. These new products show our ability of continuous improvement on reduction of pollution during the production process. Furthermore, energy is being used efficiently by installing new technological devices with our innovative capabilities. " **(Company 12)**	- New technologies - Innovative skills to reduce pollution	- New methods and technologies in operation - Have skills to develop products from recycled materials - Eco-product design
"Our company has incorporated the concept of corporate environmental responsibility in our daily operations. In fact, our top management team has committed itself to environmental protection. It will proactively search for innovative ways to streamline and improve our production process in order to reduce our impact on the environment. For example, we have applied the advanced technological skills and competencies learnt from our headquarters in Japan to treat our waste water. Our treated effluent is clean enough for growing fish. We believe this is one of our capabilities in environmental management. " **(Company 14)**	- Search for innovative ways to streamline and improve production processes	- Innovation - Advanced technological skills

Quotations	Coder 1	Coder 1
2. Environmental Capabilities		
"We have more than ten operating factories in the PRD, and different factories are strong in different aspects. For instance, some of them have specialized knowledge in Chinese environmental laws and regulations, some are specialized in environmental auditing and reporting, and some are specialized in environmental management. Different factories focus mainly on areas in which they have competitive edge, and they teach and share experiences with those 'green-born' and less experienced factories. We can therefore describe this kind of green information sharing as our company's capability." **(Company 17)**	- Specialized environmental knowledge - Sharing green information	- Environmental knowledge - Shared knowledge among different factories
"Our director always emphasizes the importance of including environmental considerations in operation. As we are the subsidiary of a French company, our headquarters considers environmental protection, health and safety as our top priority in operation. Hence, we actively collect environmental-related data from different sources, such as the Environmental Bureau, the French headquarters R&D department, our suppliers, etc. We are sure that as compared with our local competitors, we can obtain much more sophisticated, updated, key and useful information for carrying out green production. This new information and new knowledge can create more business opportunities. We regard this as our capability in operation." **(Company 16)**	- Obtain sophisticated, updated and key information - New knowledge can created business opportunities	- Environmentally-related information

Quotations	Coder 1	Coder 1
3. Environmental Strategies		
"Since our headquarters has a specialized team with experience in environmental auditing, the experts of the team will provide us the knowledge and information about how to conduct the audits. By carrying out regular audits, we are able to identify wastage of paper, plastics, cans and even inefficiency in the consumption of energy. This can help us streamline our operation processes. " **(Company 9)**	- Environmental audits - Identify the wastes - Streamline the operation process	- Comprehensive environmental audits
"Our CEO always emphasizes that our company would like to be the leader in the environmental aspects. Hence, we are very careful about our supplier selection. We have comprehensive green guidelines to assist the selection process. In reality, we learn how to implement the green procurement policy by collecting information from various sources. For instance, the manufacturer association in our industry will provide useful information about our suppliers, including whether the suppliers are ISO 14001 accredited, whether the suppliers are well established firms, etc. This information can facilitate the implementation of procurement policy." **(Company 7)**	- Green suppliers - Green procurement, very comprehensive	- Green procurement policy, well established and international accredited
"We are equipped with innovative skills, and our staff will actively search for relevant and reliable environmental-related information in order to minimize the effects of our products from concept and design through manufacturing, distribution, usage to disposal. Specifically, we have set up environmental indicators like the level of energy used, the amount of materials used, etc., in order to assess the environmental impacts of the whole product life cycle. From the assessment, it has been identified that we can further improve the efficiency of using the raw materials in production." **(Company 12)**	- Product life cycle analysis (comprehensive)	- Innovative product life cycle analysis

Quotations	Coder 1	Coder 1
3. Environmental Strategies		
"In reality, our suppliers provide us with a lot of useful information and advice about what kinds of raw materials are more cost effective and environmentally friendly. We also have a chemical list to determine what sorts of chemicals are more suitable for our production. The list will constantly be revised and updated, since we are able to obtain new information from different sources. With this information, our research team is able to develop new technologies in order to substitute the use of 'Polyvinylchloride (PVC)' in producing electronic wires and cables. PVC is regarded as 'the poisonous plastic' and is dangerous to the environment through its entire life cycle. Since we believe that we have the responsibility to protect the environment, we shall proactively explore innovative technologies for producing environmentally friendly wires and cables. Now, we have already been selling the 'halogen-free wires and cables'. These kinds of wires and cables are safer and cleaner relative to traditional ones." **(company 10)**	- Self-developed green technologies in operation	- Proactively reduce the use of PVC by developing new advanced technologies on their own
"With our advanced and innovative capabilities, we are able to develop green technologies in various product qualification tests, like the product accuracy test, the product vibration test, etc. We shall grasp the opportunities to search for the best available technologies in the market". **(Company 12)**	- With innovative capabilities → able to develop green technologies	- Develop green technologies in various product qualification tests

Quotations	Coder 1	Coder 1
4. Stakeholders		
"The governmental bodies keep on urging us to implement various measures to reduce our environmental impact during production. We have our waste water treatment plant. Our discharged water meets the provincial standard and has been certified by Dongguan municipality government to have fulfilled its wastewater treatment requirement. Besides, the government is concerned about the emission of provincial industrial exhaust gases. To meet the standard of the local government, we have invested a few million dollars for the installation of exhaust gas treatment facilities to filter our exhaust gas. The local regulatory agencies will come to visit us on an ad-hoc basis for a few times in a year. We have to meet the standards in order to survive." **(company 1)**	- Government - Local government - Local regulatory agencies	- Government bodies - Municipality government - Local regulatory agencies
"At this moment, the government and regulatory stakeholders have definitely exerted pressure on our operations. The Chinese Environmental Protection Laws are comprehensive, although we cannot ignore the enforcement problems. As far as I remember, one of the textile companies in Dongguan was fined for about RMB$210,000 due to illegal discharge of wastewater, and it was required to pay back over $10 million of water discharge fees. We always keep in mind that we must meet the requirements of the regulations." **(company 8)**	- Government and regulatory stakeholders	- Government - Chinese Environmental Protection Laws

Quotations	Coder 1	Coder 2
4. Stakeholders		
"In order to meet the local environmental standards, we have invested over RMB$100 million in the wastewater treatment facilities. The officials from the Environmental Protection Bureau will visit us regularly and give us marks regarding our production process. The governmental bodies will undoubtedly affect our business decisions." **(company 15)**	- Environmental protection bureau (locally)	- Local Environmental Protection Bureau
"Customers, especially local Chinese customers, are not fully aware of the environmental issues." **(company 2)**	- Customers not fully aware of the environmental issues	- Chinese customers not aware of the environment
"Among all the external parties which affect our operations, business associations are less influential on us. Our company has already placed a lot of emphasis on environmental protection, and the influential power of business associations in China is generally not too strong." **(company 12)**	- Business associations are not that influential	- Not strong (Business associations in China)

Quotations	Coder 1	Coder 2
5. Performance and Outcomes		
"One of our production processes, the electrostatic spraying process, will produce wastewater. We have invested over a few million dollars in order to install the wastewater treatment plant. The treated effluent meets the discharge standard of the government. We also implement a recycling scheme in order to recycle paper, glass, bottles, clothes and plastics. This scheme can reduce the amount of wastes which we produced. "**(Company 1)**	- Reduce the amount of wastewater - Reduce solid wastes	- Wastewater treatment plants → reduce water pollution - Recycling scheme → reduce amount of wastes
"In total, we have five power generators, and we have enclosed the power generator buildings with acoustic insulation materials to reduce noise. Our neighbors have once complained the noise emitted from our power generators. However, after the implementation of our noise abatement measures, we have received no further complaint." **(Company 5)**	- Reduce noise pollution	- Nose reduction
"We have already installed energy saving devices in our plant, and we have our own solar power generator. We have also promoted the idea of energy conservation among our employees. For example, they are encouraged to switch off the light in the daytime and not to use air-conditioners as far as possible. Through these measures, our total energy consumption has been reduced by approximately 20 to 30 percent per year." **(Company 16)**	- Energy saving	- Reduce energy consumption - Energy conservation
"We have established a good public image as a result of adopting a very sophisticated and comprehensive environmental management system. Also, we believe that the award of the Green Medalist Certificate to us will give a positive green image to both our customers and suppliers that we have been engaged in green production." **(Company 10)**	- Good public image	- Good image, positive green image to the customers and suppliers

Quotations	Coder 1	Coder 2
5. Performance and Outcomes		
"In order to use the more environmentally friendly raw materials in our production process, our costs were increased initially. It was unavoidable that we suffered at the beginning. However, as our production scale is increased, we finally reap the financial benefits. The environmental benefits are long-term and prolonged." **(Company 7)**	- Reduce costs finally	- Product scale is increased, and finally get the financial benefits
"As most of our customers are renowned companies, they are conscious about the quality and environmental standards of our products. Especially, when we sell our products to the European countries, we should definitely follow the European standards, like the standards of RoHS. Since we strictly follow the recognized environmental standards (e.g. our paints do not contain any harmful substances), our customers have strong confidence in our company, and are willing to buy our products." **(Company 7)**	- Customers willing to buy the products - Customer commitment	- Customers have strong confidence and are more willing to buy the products
"Since we have implemented various waste reduction measures, we can reduce the amount of different kinds of wastes emitted during the operation process. The internal environment of our plant has been improved, and the wastes are handled with care. Our employees are happy that they can now work in a clean and safe environment. The turnover rate of our frontline employees is relatively lower than our competitors, I believed." **(Company 16)**	- Employees are happy - More loyal	- Lower turnover rate - Employee commitment increased

Appendix 4: English Version of the Questionnaire

Survey on Corporate Environmental Management of in the Pearl River Delta Region

conducted by
Department of Management and Marketing
The Hong Kong Polytechnic University

Aim of the Survey:
Enclosed is a survey of corporate environmental management in the Pearl River Delta region (PRD), and we are asking for your help with this important research project. This survey is being conducted by the Department of Management and Marketing at the Hong Kong Polytechnic University. Only manufacturing factories operating in PRD are invited to participate in this survey thus your response is very important to our research team. The results of this survey will be valuable for a better understanding of the situations of corporate environmental management in the PRD.

1. Please answer all the questions and choose the **most appropriate answers**.
2. Please be assured that all information you provide will remain strictly confidential. Your responses will be combined with those of many others and used only for statistical analysis.
3. **Please be reminded that the questionnaire can be answered by either Chief Executive Officer (CEO) or Manager in charge of the environmental management.**

Should you have any questions about this survey and our research, please do not hesitate to contact us.

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Again, thank you very much for your contribution to this important research!

Part One:

Please select from the following the most appropriate descriptions for your company.

	Strongly Disagree	Very Much Disagree	Disagree	Neutral	Agree	Very Much Agree	Strongly Agree
1. Environmental preservation is a high-priority activity in our firm.	1	2	3	4	5	6	7
2. Preserving the environment is a central corporate value in our firm.	1	2	3	4	5	6	7
3. Our firm has a clear policy statement urging environmental awareness in every area.	1	2	3	4	5	6	7
4. Most of the employees in our company did not recognize the needs of environmental protection of our firm.	1	2	3	4	5	6	7
5. The natural environment does not currently affect our firm's business activity.	1	2	3	4	5	6	7
6. Our firm has a responsibility to preserve the environment.	1	2	3	4	5	6	7
7. Environmental preservation is vital to our firm's survival.	1	2	3	4	5	6	7
8. My organization's contribution to environmental damage is small.	1	2	3	4	5	6	7
9. Our company can capture important green-related market information.	1	2	3	4	5	6	7
10. Our company can acquire green related information.	1	2	3	4	5	6	7
11. Our company can facilitate collective green learning within the firm.	1	2	3	4	5	6	7
12. Our company can develop a shared or long-range vision to incorporate environmental issues into the development of the firm.	1	2	3	4	5	6	7
13. Our company can develop new green product.	1	2	3	4	5	6	7
14. Our company can improve and/or modify of existing green products.	1	2	3	4	5	6	7
15. Our company can adopt new methods and ideas in the production/manufacturing green processes.	1	2	3	4	5	6	7
16. Our company can facilitate and/or trigger innovation within the firm (especially in green-related aspects).	1	2	3	4	5	6	7

Part Two:

Please describe the extent to which your firm is involved in the following environmental management programs and activities.

		Small extent						Large extent
1.	Participate in government-sponsored environmental programs.	1	2	3	4	5	6	7
2.	Set environmental performance objectives as part of our annual business plans.	1	2	3	4	5	6	7
3.	Prepare and release of environmental reports.	1	2	3	4	5	6	7
4.	Develop a certifiable environmental management system (e.g. ISO 14001).	1	2	3	4	5	6	7
5.	Measure key aspects of our environmental performance.	1	2	3	4	5	6	7
6.	Scientifically assess the life-cycle impact of our products.	1	2	3	4	5	6	7
7.	Make investments in clean production technologies.	1	2	3	4	5	6	7

Part Three:

Have the following parties influenced your company's environmental management

		No influence at all						Very strong influence
1.	Central Government	1	2	3	4	5	6	7
2.	The Central Environmental Protection Bureau	1	2	3	4	5	6	7
3.	The Local Government	1	2	3	4	5	6	7
4.	The local Environmental Protection Bureau	1	2	3	4	5	6	7

Part Four

Please rate your firm's performance in relation to competing firms in your industry on each of the following performance measures over the past three years.

		Much worse						Much better
1.	Profitability	1	2	3	4	5	6	7
2.	Returns on investment	1	2	3	4	5	6	7
3.	Growth in market share	1	2	3	4	5	6	7
4.	Sales growth	1	2	3	4	5	6	7
5.	Complying with environmental regulations	1	2	3	4	5	6	7
6.	Preventing and mitigating environmental crises	1	2	3	4	5	6	7
7.	Educating employees and the public about the environment	1	2	3	4	5	6	7
8.	Avoid facing stricter environmental regulations in the future	1	2	3	4	5	6	7

Part Five: Company Information

1. What is the type of ownership of your company?

[1] State-owned enterprises [2] Wholly foreign-owned [3] Joint venture [4] Privately owned
[5] Other (Please specify):_____

2. How long has your company been established?

[1] Under 5 years [2] 5 – 10 years [3] 11 – 15 years [4] 16 – 20 years [5] 21 – 25 years
[6] Above 25 years

3. The district where your firm located is:

[1] Residential [2] Industrial [3] Commercial [4] Mixed residential and industrial
[5] Mixed residential and commercial [6] Mixed commercial and industrial
[7] Mixed residential, commercial and industrial

4. Number of employees in business:

[1] Under 100 [2] 100-499 [3] 500-999 [4] 1000-4999 [5] Above 4999

5. The percentage of your company's product sold to overseas markets is:

[1] Under 10% [2] 10-20% [3] 21-30% [4] 31-40% [5] 41-50% [6] Above 50% [7] Not applicable

6. What is your primary industry? (If in more than one, indicate the one with the largest contribution to sales):

[1] Chemical [2] Paper [3] Electroplating [4] Plastics
[5] Cement [6] Electronics [7] Textiles and Dyeing [8] Others (Please specify) :_____

7. Types of International Accreditations (Can check more than one answer)

[1] ISO 14001
[2] ISO 9000, ISO9001
[3] RoHS
[4] WEEE
[5] Others_____

Part Six: Biographical Information

1. Your position in the company:

[1]General manager [2] Manager in charge of environmental management [3] Others (Please specify): _____

2. Gender:

[1] Male [2] Female

3. Education :

[1] Below post-secondary [2] Post-secondary [3] Under-graduate [4] Master's degree [5] Doctorate degree
[6] Others (Please specify): _____

4. Age (in yrs):

[1] Under 30 [2] 30-40 [3] 41 - 50 [4] above 50

5. Industry Experience (in yrs):

[1] Under 5 [2] 5 - 10 [3] 11 - 15 [4] 16 - 20 [5] 21 - 25 [6] Above 25

6. Managerial experience (in yrs):

[1] Under 5 [2] 5 - 10 [3] 11 - 15 [4] 16 - 20 [5] 21 - 25 [6] Above 25

Part Seven:
Do you agree with the following statements?

1. No matter who I'm talking to, I'm always a good listener. [1] Yes [2] No
2. I sometimes try to get even rather than forgive and forget. [1] Yes [2] No
3. I have never deliberately said something that hurt someone's feeling. [1] Yes [2] No
4. There have been occasions when I took advantage of someone. [1] Yes [2] No
5. I sometimes feel resentful when I don't get my way. [1] Yes [2] No
Comments:

End

Appendix 5. Chinese Version of the Questionnaire

中国企业环境管理情况调查问卷

主办机构

香港理工大学管理及市场学系

调查目的：

下列是一项有关中国企业环境管理情况的问卷调查，这个重要的调查是由香港理工大学管理及市场学系进行的。由于我们只会抽样访问国内企业的环境管理工作，所以你的合作对我们的研究尤为重要。由于现在无论是客户.企业甚至是政府对环保活动尤为重视，这次的调查结果对了解**珠江三角洲环境管理情况**有着很重要的价值。

1. 请您回答所有问题并尽可能选择您认为最适当的答案。
2. 此次调查的所有答卷都将严格保密，所有答卷资料仅用于综合统计分析，而不会对答卷内容进行单独的个案处理。
3. **请注意，调查问卷是可以由主管/领导人或负责环保的人员填写。**

假如阁下希望进一步地了解调查的结果，请通过下列电子邮件地址与本调查负责人联系。若您对这次调查和我们的调研有任何疑问，请与负责人联络。

最后，再次对您的参与及帮助表示衷心的感谢！

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第一部分

从以下的句子中，请选出最合适的答案:

	完全不同意	颇为不同意	不同意	中立	同意	颇为同意	完全同意
1. 环境保护是我们公司的一项首要工作。	1	2	3	4	5	6	7
2. 保护环境是我们公司的核心价值。	1	2	3	4	5	6	7
3. 我们的公司有一个清晰的政策，以推动在每一个范畴内的环保意识。	1	2	3	4	5	6	7
4. 我们公司里大部分的职员并没有意识到保护环境的需要。	1	2	3	4	5	6	7
5. 自然环境不会对我公司的商业活动造成影响。	1	2	3	4	5	6	7
6. 我们的公司有责任去保护环境。	1	2	3	4	5	6	7
7. 环境保护对我们公司的生存至为重要。	1	2	3	4	5	6	7
8. 我们公司对环境的影响是微不足道的。	1	2	3	4	5	6	7
9. 我公司能够获得重要的绿色市场信息。	1	2	3	4	5	6	7
10. 我公司能够取得有关环保的讯息。	1	2	3	4	5	6	7
11. 我公司能够促进管理层及一线员工学习环保知识的风气。	1	2	3	4	5	6	7
12. 我公司未来能够提出一个生产经营与环境保护相结合的发展方针。	1	2	3	4	5	6	7
13. 我公司有全新的绿色产品研发。	1	2	3	4	5	6	7
14. 我公司能够改进现有绿色产品。	1	2	3	4	5	6	7
15. 我公司能够在生产及制造绿色产品过程中采纳新工艺及新设计。	1	2	3	4	5	6	7
16. 我公司能够促进或激发内部的创新力（尤其在环境保护方面）。	1	2	3	4	5	6	7

第二部分

2.1 以下列出的各种项目和措施，贵公司实际参与的程度是:

	最少程度						最大程度
1. 参与政府资助的环境项目	1	2	3	4	5	6	7
2. 将环境表现目标定为我公司年度计划目标的一个部分	1	2	3	4	5	6	7
3. 编写及发布本公司的环境报告	1	2	3	4	5	6	7
4. 建立一个可供认证的环境管理系统（例如，ISO 14001)	1	2	3	4	5	6	7
5. 将对公司环境表现的评估纳入公司管理的总体评估内容	1	2	3	4	5	6	7
6. 科学地评估了产品的生命周期影响	1	2	3	4	5	6	7
7. 投资清洁生产的技术	1	2	3	4	5	6	7

第三部分

3.1 以下各方是否曾经或正在影响贵公司的环境保护措施:

	完全没有影响						极大的影响
1. 上级政府	1	2	3	4	5	6	7
2. 国家环保局	1	2	3	4	5	6	7
3. 当地政府	1	2	3	4	5	6	7
4. 当地的环保局	1	2	3	4	5	6	7

第四部分

4.1 评核在(过去)三年，自己相对于竞争对手在以下各方面的表现作出评估。

	非常差						非常好
1. 盈利能力	1	2	3	4	5	6	7
2. 投资回报	1	2	3	4	5	6	7
3. 市场占有率	1	2	3	4	5	6	7
4. 营业额增长	1	2	3	4	5	6	7
5. 遵守现行的环境保护法规	1	2	3	4	5	6	7
6. 有效地防止和减低环境危机	1	2	3	4	5	6	7
7. 广泛地教育员工和公众有关环保方面的知识	1	2	3	4	5	6	7
8. 避免政府将来实行更加严格的环保法规标准	1	2	3	4	5	6	7

第五部分:企业信息

1. 贵公司属于以下哪种类型的企业?

[1]国有企业 [2] 全外资企业 [3]合资企业 [4]私营 [5]其它(请注明):_____

2. 贵公司在现址生产营运已经有多少年?

[1]5 年以下 [2]5 - 10 年 [3] 11 - 15 年 [4] 16 - 20 年 [5] 21 - 25 年
[6]25 年以上

3. 贵公司所在的地区是属于:

[1] 住宅区 [2] 工业区 [3] 商业区 [4] 混合住宅及工业区
[5] 混合住宅及商业区 [6] 混合商业及工业区 [7] 混合住宅、商业及工业区

4. 贵公司现在共有多少名员工?

[1] 100 以下 [2] 100-499 [3] 500-999 [4] 1000-4999 [5] 5000 以上

5. 贵公司产品的出口量占总产量的百分比?

[1] 10% 或以下 [2] 11-20% [3] 21-30% [4] 31-40% [5] 41-50% [6] 50% 以上 [7] 不适用

6. 贵公司属于以下哪种类型的企业?

[1] 化工 [2] 造纸 [3] 电镀 [4] 塑料制品
[5] 水泥 [6] 电子产品 [7] 制衣及漂染 [8] 其它 (请注明): _____

7. 贵公司拥有的国际认可标准

[1] ISO 14001 (ISO 14001 环境管理体系)
[2] ISO 9000 ISO9001 质量体系
[3] RoHS 欧盟「限制电器及电子设备使用有害物质」
[4] WEEE 欧盟「废弃电器及电子设备」
[5] 其它_____

第六部分: 个人资料

1. 您在贵公司的职位:

[1]企业的管理人员 [2] 主管企业环境管理工作部门的负责人
[3] 其它 (请注明): _____

2. 性别:

[1] 男[2] 女

3. 您的教育程度是:

[1]大专以下 [2]大专 [3]本科 [4]硕士 [5]博士 [6]其它(请注明):_____

4. 年龄:

[1] 30 岁以下 [2] 30 岁 - 40 岁 [3] 41 岁 - 50 岁 [4] 50 岁以上

5. 您在本行业工作的资历:

[1] 5 年以下 [2] 5 - 10 年 [3] 11 - 15 年 [4] 16 - 20 年 [5] 21 - 25 年 [6] 25 年以上

6. 您在管理层的工作资历:

[1] 5 年以下 [2] 5 - 10 年 [3] 11 - 15 年 [4] 16 - 20 年 [5] 21 - 25 年
[6] 25 年以上

第七部分：个人观感

你是否同意以下对您的陈述?

1. 无论和谁一起聊天，我都是一个很好的聆听者。 [1]是 [2]否
2. 有时候我会尝试报复，而不是选择忘记和原谅别人。 [1]是 [2]否
3. 我从来没有刻意说出一些伤害人的说话。 [1]是 [2]否
4. 有的时候我会利用别人。 [1]是 [2]否
5. 有候如果我得不到我想要的结果，我会觉得烦恼。 [1]是 [2]否
您的建议：

谢 谢 您 的 支 持!