Firm Characteristics and its Adaptive Capacity in Response to Environmental Requirements: An Empirical Study of Vietnam’s Textile and Garment SMEs

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Abstract

This paper investigates the relationship between the characteristics of textile and garment small and medium sized enterprises (SMEs) in Vietnam and their adaptive capacity. A scoring method was applied to measure each firm’s adaptive capacity based on 6 criteria that measured internal capacity, strategies for adapting and the actual level of adaptation. Multiple linear regression analysis was employed to test four hypotheses which were developed based on the findings of current literature. Three out of four hypotheses are supported by the analysis, which shows a positive correlation between firm size, operation type, firm age and its adaptive capacity. The ownership type does not have a statistically significant relationship with a firm’s adaptive capacity. The results are strongly supported by qualitative results and field observations. Despite a number of limitations, the study is a first contribution to the literature providing insights on the adaptive capacity of SMEs in Vietnam’s textile and garment industry.

Key words: firms’ characteristics, firms’ adaptive capacity, SMEs, textile and garment, Vietnam

1. Introduction

The increasing pressure on firms to be more environmentally oriented has triggered the demand to examine firms’ adaptive capacity in response to environmental requirements. How firms adapt their management and production systems to meet global industrial environmental standards and what firms’ characteristics influence their adaptive capacity are questioned.


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There is almost no study focusing on the environmental adaptation process in the East Asian context (Nguyen et al., 2012). Furthermore, most of the adaptation studies do not focus on SMEs as a specific target group (Nguyen et al., 2014b) though they are now under high pressures to improve their environmental practices (Clemens, 2006) and they are also the group that have the greatest problems of adaptation and least awareness of and information on the situation (Hillary, 2000).

This paper aims to narrow this knowledge gap by examining empirically the relationship between the characteristics of textile and garment small and medium sized enterprises (SMEs) in Vietnam and their adaptive capacity in response to environmental requirements. We focus on four main characteristics of a firm, including ownership type, operation type, size, and age and consider environmental adaptive capacity as a firm’s ability to respond to environmental requirements from the government or from the customers. Results of the study can be used as a basis for understanding the environmental adaptive capacity of SMEs in developing countries.

As this is the first study looking into the adaptive capacity of Vietnamese SMEs, the study is constrained by the immaturity of a rapidly growing industrial sector, governance systems, the difficulty of accessing firms, and the gap between regulatory policy and practice previously reported (Jennifer, 2008, Steve et al., 2010, Suhardiman et al., 2013). However, it provided some insights on the adaptive capacity of SMEs from a developing country. Implications are drawn for theory and practice, and suggestions are made for ongoing research.

2. Hypotheses Development

Current literature provides little empirical evidence on the influence of the characteristics of SMEs on their adaptive capacity in response to environmental requirements in developing countries. However, significant global efforts have been made to understand the relationship between a firm’s characteristics and its performance in general (Bhushan, 1989, Boardman and Vining, 1989, Kang, 1996, Majumdar, 1997, Elizabeth and baines, 1998, Moen, 1999, Joakim et al., 2005, Ghabadian and O'Regan, 2006, Lee, 2009, Bowen et al., 2010). Many studies have also examined the influence of a firm’s characteristics on environmental policy and environmental disclosure (Hackston and Milne, 1996, Choi, 1999, Johnson and Greening, 1999, Gray et al., 2001, Patten, 2002, Tan, 2002, Cui et al., 2012, Dam and Scholtens, 2012, Galani et al., 2012, Vo et al., 2013). From these studies we developed four hypotheses on the relationship between the characteristics of Vietnam’s textile and garment SMEs and their adaptive capacity in responding to environmental requirements.

2.1 Size

Most studies shared the same conclusion that firm size greatly influenced its performance (Joakim et al., 2005, Nguyen and Bryant, 2004, Gerhart et al., 2000, Peng and Luo, 2000, Moen, 1999, Sebastian and Malte, 2010, Lee, 2009, Kipesha, 2013). The diverse capabilities and formal procedures of larger companies frequently made their operations more effective (Penrose, 1959, Majumdar, 1997). With a few exceptions, the relationship between firm size and environmental disclosure were positive (Choi, 1999, Hackston and Milne, 1996, Cormier and Gordon, 2001, Mahadeo et al., 2011). The main reason was firstly larger firms tend to disclose more information on their environmental management because of visibility (Henriques and Sadorsky, 1996, Cormier and Gordon, 2001, Patten, 2002). Secondly, gathering and disclosing environmental information could be a financial burden for small firms (Da Silva Monteiro and Aíbar-Guzmán, 2010). With a few exceptions, the relationship between firm size and environmental disclosure were positive (Choi, 1999, Hackston and Milne, 1996, Cormier and Gordon, 2001, Mahadeo et al., 2011). The main reason was firstly larger firms tend to disclose more information on their environmental management because of visibility (Henriques and Sadorsky, 1996, Cormier and Gordon, 2001, Patten, 2002). Secondly, gathering and disclosing environmental information could be a financial burden for small firms (Da Silva Monteiro and Aíbar-Guzmán, 2010).

Studies on the impacts of firm size on environmental performance have mixed results. Roy et al. (2001) suggested that larger firms tended to be more structured than small firms in their environmental responses. Moore (2001) and Toms (2002) concluded that large firms had the ability and resources to maintain their reputation. Other authors, for example McGuire et al. (1988) and Rojšek (2001) claimed that firm size had no significant impact on a firm’s environmental orientation.
This study focuses on small and medium sized enterprises that have 300 employees or less. It is hypothesized that there is a relationship between firm size and a firm’s adaptive capacity in response to environmental requirements. Formally, hypothesis 1 is: There is a relationship between firm size and its adaptive capacity in response to environmental requirements in Vietnam’s textile and garment sector.

2.2 Ownership Type

Previous studies on the relationship between ownership type and firm’s performance were guided by theories such as organizational theory (Geeraerts, 1984), the theory of firms (Boardman and Vining, 1989) or agency theory (Kang, 1996, Khan et al., 2005). Some organizational theorists suggested that different forms of ownership did not affect firm’s strategy or performance (Geeraerts, 1984). They relied on the assumption that all investors had the same investment goals and therefore would behave in the same way with regard to corporate outcomes. However, Chen et al. (2009) argued that different types of owners had different objectives and motivations and this difference would affect how they exercised their control rights over the firms they invested in. Many other studies supported this argument and confirmed that ownership type had a significant impact on firm performance (Chaganti and Damanpour, 1991, Johnson and Greening, 1999, Peng and Luo, 2000, Tan, 2002).

The theory of firm suggests that public enterprises should perform less efficiently and profitably than private enterprises. Boardman and Vining (1989) tested this theory and found out that large mixed-enterprises and state-owned enterprises performed substantially worse than similar private corporations, but in terms of sales, there was no substantial difference among companies of different types of ownership. Earnhart and Lizal (2006) indicated that an increase of state ownership actually improved environmental performance relative to all other ownership types. Chen et al. (2009) also contended that private firms were not necessarily superior to certain types of state ownership. Dam and Scholtens (2012) shared the same opinion when stating that firms owned by individuals were associated with relatively poor corporate social policies.

The situation in Vietnam is complex with a mix of enterprise types that extend from government-owned enterprises to private enterprises. Along this continuum, there are a number of combinations such as joint stock or joint venture companies. The government dominates key industries such as telecommunication, airlines, natural gas and railroads and is a dominant player in large firms which are natural monopolies such as utilities, security and national defence (Vo et al., 2013). Small and medium sized state-owned enterprises in less strategically important economic sectors were privatised (Vo et al., 2013). This process of privatization began in mid-1980s and still continues until now. It aims to restructure the public sector and improve the performance of state-owned companies.

Most of the theoretical arguments for privatization predict that privatization is supposed to bring about positive organizational changes. Vo et al. (2013) supported this prediction by concluding that privatized firms with less state ownership performed better than those with more state ownership. Tran et al. (2015) reached the same conclusion stating that the shift from state or collective ownership to private ownership could consistently enhance the performance of switchers in terms of profitability.

Our second hypothesis is: Private companies in Vietnam are achieving better environmental performance than other types of companies.

2.3 Operation Type

In this study a company can be exporting or exclusively domestic. Majumdar (1997) stated that there was no specific theory which linked the export-orientation of firms to performance. Clerides et al., (1998) found that exporting firms in the US differed from non-exporting firms in many aspects and that the bulk of exports were driven by only a small number of firms. Bernard and Jensen (1999) confirmed that in the US economy exporting firms were superior to non-exporting firms, particularly in terms of productivity. Pöschl et al. (2009) provided evidence on the systematic differences between exporting and domestic firms in the Austrian economy. In general, most studies

1 Decree 56/2009/ND-CP defines SMEs as the ones who either 1) have 300 employees or less; or 2) whose total capital is VND 100 billion or less.
concluded that exporting companies were performing better than non-exporting ones because exporters were normally larger, more productive, more capital intensive, and more technology intensive (Arnold and Hussinger, 2005, Bernard and Jensen, 1999).

However, the literature does contain conflicting results on the influence of international trade on pollution levels (Scott, 2015). According to Copeland (1994), trade liberalization can lead to an increase or decrease in pollution depending on how incomes differ across countries that liberalize trade. Cui and Qian (2013) found out that in some industries such as Chemistry or Allied Products, exporters achieved better environmental performance than non-exporters but exporters in other industries (for example Printing and Publishing) appeared to have higher emission intensity than non-exporters. Other studies found a negative correlation between exporting status and emission intensity (Cui et al., 2012, Scott, 2010, Batrakova and Davies, 2012, Forslid et al., 2010). These studies suggest that a productive firm is more likely to export and most productive exporters are likely to adopt environmentally friendly technology.

In Vietnam’s textile and garment industry, customers play a key role in influencing SME’s adaptive capacity in response to environmental requirements (Nguyen et al., 2014c). However, only some overseas customers have strict regulations on environmental management and environmental protection, the domestic customers only care about the price and design (Nguyen et al., 2014a). Our third hypothesis is: In Vietnam’s textile and garment industry, exporting companies have higher adaptive capacity in response to environmental requirements than non-exporting companies.

2.4 Age

Firm age may influence firm performance in general and firm’s environmental performance in particular. One stream of research suggests that older firms perform better because: (i) firm age indicates firm experience which has a positive impact on efficiency and sustainability (Stinchcombe and March, 1965, Kipesha, 2013); (ii) firm age is an indicator of perceived stability of the firm (Liu and Anbumozhi, 2009); and (iii) firm age represents the level of maturity and reputation which can become more valuable to the firm (Roberts, 1992). Another stream of literature suggests that older firms are less capable in adapting to changes (Marshall, 1920) and less productive and experience greater costs than young firms in pollution abatement (Shadbegian and Gray, 2006). Elijido-Ten (2007) saw age as an indicator of perceived stability, but argued against age as an intervening variable. Majumdar (1997) found that older firms in India were more productive but less profitable.

In Vietnam Quynh Anh (2015) classified old firms, middle-aged firms, and new firms as the ones that were established before 1990, between 1990 and 2000, and after 2000 respectively. Of these three the middle-aged firms were more likely to be ISO 14001 certified. The other two ranges did not have an impact on environmental performance.

In this study, firms are categorized into 3 ranges: less than 5 years old, between 5 and 10 years old and more than 10 years old. Our fourth hypothesis is: There is a positive or negative relationship between firm age and firm’s adaptive capacity in response to environmental requirements among Vietnam’s textile and garment SMEs.

3. Data and Methodology

3.1 Data Collection

The study focuses on textile and garment SMEs around Ho Chi Minh City in Vietnam. We use the definition on SME which is specified in Decree 56/2009/ND-CP: “Small and medium-sized enterprises are business establishments that have registered their business according to law and are divided into three levels: very small, small, and medium according to the sizes of their total capital (equivalent to the total assets identified in an enterprise’s accounting balance sheet) or the average annual number of labourers”. Table 1 further explores this definition for each sector of the economy.

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2 Decree 56/2009/ND-CP dated 30 June 2009 stipulated supporting measures for SMEs (replacing Decree 90/2001/CP-ND)
Table 1
Definition of SMEs in Vietnam

<table>
<thead>
<tr>
<th></th>
<th>Very small enterprises</th>
<th>Small sized enterprises</th>
<th>Medium sized enterprises</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of labourers</td>
<td>Total capital</td>
<td>Number of labourers</td>
</tr>
<tr>
<td>Agriculture, forestry and</td>
<td>10 persons or fewer</td>
<td>VND 20 billion or less</td>
<td>Between 10 persons and 200 persons</td>
</tr>
<tr>
<td>fishery</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industry and construction</td>
<td>10 persons or fewer</td>
<td>VND 20 billion or less</td>
<td>Between 10 persons and 200 persons</td>
</tr>
<tr>
<td>Trade and service</td>
<td>10 persons or fewer</td>
<td>VND 10 billion or less</td>
<td>Between 10 persons and 50 persons</td>
</tr>
</tbody>
</table>

Source: Decree 56/2009/CP-NĐ

In this study, we use the criteria for the number of employees to select the textile and garment enterprises for interviews. In other words, SMEs in this study are the ones that have 300 or less employees.

A list of enterprises was taken from the data file of the Environmental Management Division within the People’s Committees and the Management Boards of Industrial Parks. A hundred (100) textile and garment SMEs were randomly contacted and 35 were willing to respond (35%). This access required contacts with persons who were agents of influence, government agencies, NGOs who had contacts with industry, local regulatory authorities, and direct contact with some firms. Such complexity of accessing to firms limited sample size and demonstrated an issue that will have to be overcome to facilitate research of this nature in Vietnam.

Among 35 SMEs interviewed, fifty-four percent (54%) were Vietnamese private companies, twenty eight percent (28%) were foreign owned companies, nine percent (9 %) were joint ventures between local and foreign partners, three percent (3 %) were state owned and six percent (6 %) were joint stock companies. The types of operations were 61% exporting and 39% non-exporting. Firm size ranged from 5 to 300 employees and firm age ranged from newly established to over ten years old. In the sample, the greatest number of SMEs investigated was Vietnamese private companies, foreign private companies were second and other ownership types only account for a small number. These can be considered as representatives of different types of ownership because 84.27% of the companies in the industry are private ones, foreign-owned and state-owned companies account for only 14.64% and 1.09% respectively (GSO, 2012). State-owned enterprises and joint ventures in this industry are usually large and therefore they fall outside the definition of SMEs used in this study.

As reported by Nguyen et al. (2014c), research on environmental adaptation by SMEs in Vietnam is still in its infancy and consequently, companies are not accustomed to research approaches. Therefore, it was necessary to conduct face-to-face interviews to inform interviewees of the purpose of the work and reassure them of confidentiality. Nineteen chief executive officers (54%), twelve factory managers (35%) and four human resource managers who are in charge of environmental issues for the companies (11%) were interviewed. The interviews contained both qualitative and quantitative components. Typically a question which had a direct quantitative answer was often followed by a question that sorted an explanation for the answer.

Data collection also includes an observational study by the author who kept detailed notes of the nature of enterprises and their behaviours. Wherever possible these notes were derived from recorded interviews, however this was not always possible and in such cases notes were visited and details were added as soon as possible after the interviews.
3.2 Variables

3.2.1 Firm’s Adaptive Capacity

In this study, environmental adaptive capacity is considered as a firm’s ability to respond to environmental requirements from the government or from the customers. We focus on three main components of adaptive capacity which were identified by Schindehutte and Morris (2001), including internal capacity to adapt, the strategy for adapting, and the actual amount of adaptation that occurs.

Firm’s internal capacity can be related to its human resources (staff and their skills and experiences) (Lengnick-Hall et al., 2011, Misener and Doherty, 2009), financial resources such as cash and credits (Brody et al., 2010), physical and material resources such as buildings, land and machines (Honadle, 1981), and information resources (Honadle, 1981). Due to the constraints in time and data access, this study assesses a firm’s internal capacity based on only two criteria: (1) whether the firm has sufficient and qualified staff working on environmental management; and (2) whether the firm has sufficient budget for environmental management activities.

Strategies for adapting concern specific ways in which the firm makes adjustments (Schindehutte and Morris, 2001). In this study, firms were asked about steps and procedures for responding to an environmental requirement. In addition, we also asked whether the firm had any official document such as a proposal, a report, a strategy, or a plan on environmental protection and environmental management.

The actual amount of adaptation that occurs involves the degree of modification in key aspects of the business (Schindehutte and Morris, 2001). In this study, the actual level of adaptation was measured by the degree of change in both management and production systems that the firms have been making in order to respond to environmental requirements. The degree of change was rated from “no change” to “a great deal of change”.

Table 2 shows 6 criteria from 3 dimensions of the characteristics of a firm’s adaptive capacity. In this study, firms’ adaptive capacity is considered as a dependent variable.

### Table 2

<table>
<thead>
<tr>
<th>Characteristics of Adaptive Capacity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Internal Capacity:</strong></td>
<td></td>
</tr>
<tr>
<td>Staff working on environmental management</td>
<td>Does the firm have any staff taking responsibilities for environmental management? If yes, is he or she a full-time or a part-time staff?</td>
</tr>
<tr>
<td>Training on environmental management</td>
<td>Expertise and/or knowledge of the staff on environmental management.</td>
</tr>
<tr>
<td>Budget for environmental management activities</td>
<td>Financial capacity of the firm, whether the firm has allocated any funding for environmental management activities from its annual budget, or whether the firm is able to pay the costs of environmental management activities when it is required.</td>
</tr>
<tr>
<td><strong>Strategy for adapting:</strong></td>
<td></td>
</tr>
<tr>
<td>Rules and procedures to comply with environmental requirements</td>
<td>Whether the firm has official rules and procedures to implement environmental requirements, and whether these rules are comprehensive or simple.</td>
</tr>
<tr>
<td>Strategy document on environmental management or environmental management plan</td>
<td>Whether the firm has strategy documents on environmental management, and whether these documents are comprehensive or simple.</td>
</tr>
<tr>
<td><strong>Actual level of adaptation:</strong></td>
<td></td>
</tr>
<tr>
<td>Degree of change in management and production system to respond to environmental requirements</td>
<td>Has the firm made a great deal of change, little change, or no change in their management and production systems to respond to environmental requirements?</td>
</tr>
</tbody>
</table>

3.2.2 Firm’s Characteristics

Table 3 describes the firms’ characteristics which are selected on the basis of the literature review presented in section 2. It also presents the expected relationship between firms’ characteristics and firms’ adaptive capacity. In this study, firms’ characteristics (size, ownership type, operation type, and age) are independent variables.
### Table 3

Firm Characteristics and the Expected Relationship between Firms’ Characteristics and Firms’ Adaptive Capacity.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
<th>Hypothesis</th>
<th>Expected Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>Firm size, measured by total number of employees.</td>
<td>H1</td>
<td>+/-</td>
</tr>
<tr>
<td>Ownership</td>
<td>Ownership type: 2 if it is a private company (both foreign-owned Vietnamese-owned); and 1 if it is other types of company.</td>
<td>H2</td>
<td>+</td>
</tr>
<tr>
<td>Operation</td>
<td>Operation type: 2 if it is an exporting company; and 1 if it is a non-exporting company.</td>
<td>H3</td>
<td>+</td>
</tr>
<tr>
<td>Age</td>
<td>Firm age: 3 if it is more than 10 years old, 2 if it between 5 and 10 years old, and 1 if it is less than 5 years old.</td>
<td>H4</td>
<td>+/-</td>
</tr>
</tbody>
</table>

The +/- signs indicate the direction expected from previous research.

### Table 4

Measurement of Firm’s Adaptive Capacity

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Line of Evidence</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal Capacity:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staff working on environmental management</td>
<td>Full-time</td>
<td>2</td>
</tr>
<tr>
<td>Part-time</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Training on environmental management</td>
<td>Have qualification on environmental management</td>
<td>2</td>
</tr>
<tr>
<td>Have attended training course(s) or workshop on environmental management</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Budget for environmental management activities</td>
<td>Budget for environmental management is allocated from annual budget of the firm</td>
<td>2</td>
</tr>
<tr>
<td>Budget for environmental management is not allocated from annual budget but can pay the costs of environmental management activities from other budget lines if it is required</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Cannot afford paying the costs of environmental management activities</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Strategy for adapting:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rules and procedures to comply with environmental requirements</td>
<td>Comprehensive rules and procedures on environmental management</td>
<td>2</td>
</tr>
<tr>
<td>Simple rules and procedures on environmental management</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>No rules and procedures on environmental management</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Strategy document on environmental management or environmental management plan</td>
<td>Comprehensive strategy on environmental management or environmental plan</td>
<td>2</td>
</tr>
<tr>
<td>Simple strategy on environmental management or environmental plan</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>No strategy or policy document on environmental plan</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Actual level of adaptation:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degree of change in management and production system to respond to environmental requirements</td>
<td>A great deal of change</td>
<td>2</td>
</tr>
<tr>
<td>Little change</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>No change</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>
3.3 Methodology

3.3.1 Measuring Firm’s Adaptive Capacity

As described in the previous section, firm’s adaptive capacity consists of 3 dimensions (its internal capacity, its strategy for adapting, and the actual level of adaptation) and 6 criteria (staff, expertise and knowledge of staff, budget, rules, strategy, and the degree of change). These dimensions and criteria are not independent of each other. For example, if a firm has a qualified staff on environmental management but it does not have sufficient budget for environmental management activities, it is still impossible for the firm to respond to new environmental requirements. Or if a firm has a very good and comprehensive environmental plan but it does not have qualified staff and sufficient fund, it is also impossible for the firm to implement such environmental plan. In other words, these dimensions and criteria are interrelated. So, in order to measure firm’s adaptive capacity, we have to combine the evidence of all the criteria.

Scoring is the simplest method to weight a variable that requires the integration of various lines of evidence before conclusions may be reached (Linkov et al., 2009). This method has been widely used to evaluate environmental assessment (e.g. McDonald et al. (2007)) or assess institutions’ adaptive capacity (e.g. Gupta et al. (2010)).

This study applies the scoring method to perform the integration of evidence for all 6 criteria of a firm’s adaptive capacity. Table 4 further explains how a firm’s adaptive capacity is measured using this method.

As can be seen in Table 4, in all criteria, 2 represents a high level of adaptive capacity, 1 and 0 represents a medium and low level of adaptive capacity respectively. Total score of all criteria would be the adaptive capacity of a firm.

3.3.2 Model Development

The linear regression model employed to test the hypothesized relationship between dependent variable (firms’ adaptive capacity) and independent variables (firms’ characteristics) is presented below:

\[
FAC = b_0 + b_1OWN + b_2OPE + b_3SIZE + b_4AGE + e
\]

where

- \( FAC \) is the firms’ adaptive capacity (measured by total scores as explained in Table 4)
- \( b_0 \) is the intercept
- \( OWN \) is ownership type, a dummy variable whose value is 2 if the firm is a private company and 1 if the firm belongs to other types of companies
- \( OPE \) is the operation type, a dummy variable whose value is 3 if the firm only exports, 2 if it is both exporting and supplying products to the domestic market, and 1 if it is a non-exporting company
- \( SIZE \) is number of employees
- \( AGE \) is the firm’s age (number of years that it has been in operation), a dummy variable whose value is 3 if the firm is more than 10 years old, 2 if the firm is between 5 and 10 years old and 1 if the firm is less than 5 years old
- \( e \) is the residual error

One may argue that a sample of 35 companies is not large enough for running a regression analysis. We agree that larger sample sizes increase power and decrease estimation error. However, the practical realities of conducting research such as time, access to samples and financial costs restrict the size of samples for most researchers. In the case of Vietnam, it is extremely difficult for individual researchers to access firms. We decided to employ a linear regression model because it is an efficient way of testing the relationship between a dependent variable and independent variables. On the other hand, results on the significance and adjusted \( R^2 \) square of the model made us confident in our population value. Furthermore, the regression results would be double checked by an analysis of qualitative data as well as the observations of the researchers.

4. Results

4.1 Descriptive Statistics

Table 5 synthesizes the descriptive statistic of the firms’ adaptive capacity (dependent variable). As explained in Table 4, the highest level of adaptive capacity would be 12, which is the highest score in all criteria. However, on average, the firms in this study only obtained 4 out of 12.
Table 5
Descriptive Statics

| Firms’ adaptive capacity (total scores out of 12) |
|-----------------|-------|
| Mean            | 4.29  |
| Std. Deviation  | 1.87  |
| Min.            | 1     |
| Max.            | 7     |

In addition, the analysis of frequencies of the 6 criteria in a firm’s characteristics yields the followings:

- 94 percent of the firms have developed some forms of an environmental plan or commitment on environmental protection
- 71 percent of the firms have developed some forms of rules or procedures on environmental management
- None of the firms have a full-time staff working on environmental management. Only 31 percent of the firms have a part-time staff taking care of environmental issues.
- Only 5 percent of the firms have sent their staff to a training course on environmental management and 65 percent of the firms have assigned their staff to attend workshops which are normally organized by a non-profit-organization or by local authorities with the main aim of disseminating information on environmental management. None of the firms have a staff with qualification on environmental management.
- Only 2 percent of the firms allocate budget for environmental management activities. 80 percent of the firms don’t allocate any funding for environmental management but they can pay the costs if it is really necessary. The rest has no ability to pay environmental management costs.
- None of the firms have made a great deal of change in their management and production systems to respond to environmental requirements. 68 percent of the firms have made a little change and the rest has made no change at all.

4.2 Regression Results

The results of the multiple regression analysis are presented in Table 6.

The results statistically support the significance of the model (Sig. = 0.000) and the explanatory power of the model is also relatively high with an adjusted R square being 0.599.

Table 7 synthesizes the results of the single regression analysis of the relationship between each of the independent variables and the dependent variable.

Table 7 shows that of four independent variables proposed to test the hypotheses, three (operation type, size, and age) are statistically significant. The remaining one, ownership type, has no statistically significance.

The coefficients of operation type, size and age show that these variables are significantly positively correlated to the firm’s adaptive capacity. This means:

Table 6
The model

<table>
<thead>
<tr>
<th>R</th>
<th>R square</th>
<th>Adjusted R square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.804</td>
<td>0.646</td>
<td>0.599</td>
<td>1.185</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sum of squares</th>
<th>df</th>
<th>Mean square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>77.019</td>
<td>19,255</td>
<td>13.713</td>
<td>0.000</td>
</tr>
<tr>
<td>Residual</td>
<td>42.124</td>
<td>1.404</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>119.143</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 7  
The influence of firm characteristics on firm’s adaptive capacity

<table>
<thead>
<tr>
<th></th>
<th>Adjusted R square</th>
<th>Coefficient (B)</th>
<th>Significance level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ownership type</td>
<td>-0.12</td>
<td>-0.661</td>
<td>0.439</td>
</tr>
<tr>
<td>Operation type</td>
<td>0.261</td>
<td>1.135</td>
<td>0.001</td>
</tr>
<tr>
<td>Size</td>
<td>0.629</td>
<td>0.016</td>
<td>0.000</td>
</tr>
<tr>
<td>Age</td>
<td>0.172</td>
<td>1.080</td>
<td>0.013</td>
</tr>
</tbody>
</table>

- Exporting firms have higher adaptive capacity in response to environmental requirements than non-exporting firms.
- Larger firms have higher adaptive capacity in response to environmental requirements.
- Older firms have higher adaptive capacity in response to environmental requirements.

5. Discussion

The results presented in section 4 are strongly supported by the qualitative results and the field observations. The following sections discuss these results with more details.

5.1 Firm’s Adaptive Capacity

5.1.1 Internal Capacity of the Firms

In 2007, in order to facilitate the implementation of the Law on Environmental Protection 2005, the government of Vietnam issued Decree 81/2007/ND-CP stipulating the requirements on human resources for environmental management. However, this Decree only applies for state-owned organizations. There is no legal document about staffing on environmental management for other types of enterprises such as private companies or foreign-owned companies. In addition, Decree 81/2007/ND-CP only generally mentions that the companies have to assign staff being in charge of environmental issues (Article 10). It is not an obligation that a full-time staff position is required for environmental management. Therefore, it can be understood that having an environmental management position is only optional, depending on the specific conditions of each company. All of the companies in this study do not have a full-time environmental management position because it is costly and they don’t think it is necessary:

We cannot afford having a full-time staff working on environmental management. When we have any problem relating to environmental issues we will hire external consultants. (Surveys No. 1, No. 3, No. 7, No. 31)

It is too costly to have a full-time staff on environmental management and it is not necessary at all. We don’t have any serious environmental problem to deal with. (Surveys No. 4, No. 5, No. 9, No.10)

In some companies (31 percent of the total companies interviewed), environmental management is tasked on human resources or administrative officers. They are not provided with any training on environmental management but only act as a focal point on this issue. They are responsible for reporting to the executive directors who will make decisions on environmental management.

Most the companies in this study do not allocate funding for environmental management. However, they still can pay environmental costs if it is necessary.

We don’t allocate budget for environmental management but if it is required by the customers or the local authorities we could consider using the fund from other budget lines. It totally depends on each case. (Surveys No.1, No. 4, No. 11, No. 13, No. 14, No. 17, No. 27, No. 31, No. 34)

A company kept saying that they were a small company and did not have much capital, so they had to give more priority to business activities than environmental management activities. However, they still could invest more than 2 billion Vietnamese dong on a waste treatment plant because of the requirements from the customer. (Field Observation)

It is doubtful whether these companies do not have sufficient human resources and financial resources for environmental management because they don’t have the capacity to do so or because they don’t want to make an effort on environmental manage-
ment activities. One of the observations from the field is that although both the managers and staff of the firms are quite well aware of the importance of complying with environmental requirements, they do not consider these issues to be important or a priority for their business.

5.1.2 Strategies for Adapting

The Law on Environmental Protection 2005 and its updated version in 2014 together with relating decrees and decisions (for example Decree 29/2011/ND-CP and the Circular 26/2011/TT-BTNMT) clearly define the responsibilities of the firms for developing a proposal on environmental protection, a strategic environmental plan, an environmental impact assessment, or a commitment on environmental protection, depending on the scale and scope of their business. According to the law, the firms also have to regularly submit a report on environmental protection (twice or three or four times a year depending on the business activities of the firm).

The study shows that 94 percent of the firms developed some forms of an environmental plan. However, none of these firms could develop these environmental management documents by themselves and they had to hire external consultants to do the task (Field Observation). The quality of these reports are not good (Field Observation) and the test results of the reports are quite doubtful as the consulting firms copied a lot of information from one report and pasted them into another ones (Field Observation). These strategy documents on environmental management were only used to cope with the requirements from the local authorities (Field Observation). The companies themselves did not see the benefits of having these documents and they considered them as barriers for their business.

The law requires us to develop a proposal on environmental protection but the actual implementation is much different from what we planned. It is too hard for us to implement all the requirements from local authorities. (Surveys No.4, No. 8)

We find it annoying to submit too many reports on environmental protection. It only adds more costs that we have to pay but doesn’t help improve our environmental performance. (Surveys No. 6, No. 18, No. 35)

Regarding the rules and procedures, 71 percent of the firms developed some forms of regulations on environmental management but these regulations were very simple and mainly focused on keeping the factory clean or working safety (Observation). None of the companies followed the environmental adaption process which includes understanding, planning, implementing and monitoring and evaluation as specified by Nguyen et al. (2014b). Environmental requirements from the governments are sent directly to the director who will make a decision on the implementation. Normally the company only implements the basic items. Only when the authorities come for an inspection and make specific requirements will the company respond to further requirements.

While the firms passively react to the government legislative, they are quite proactive in responding to customers’ requirements. Customers are our first priority because they determine the survival of our business. We will always try our best to comply with their requirements. (Surveys No. 4, No. 5, No. 11, No. 14. No. 31)

Some companies have been doing very well with the 5S standard which is a requirement on tidiness, cleanliness, orderliness, standardization, and discipline from the Japanese customers (Field Observation).

These results and field observations on firms’ strategy for adapting are consistent with the results of a previous study on the governance system operating in Vietnam’s textile and garment SMEs (Nguyen et al., 2014a). Once again, it is confirmed that environmental requirements should be formulated on the basis of commercial reality. The firms would develop a strategic document on environmental management if it is a requirement from the government, but the actual implementation of environmental management activities will only happen if it relates to the survival of the companies.

5.1.3 Actual Level of Adaptation

Having considered the information discussed in the above sections it is not surprised that none of the firms made a great deal of change in their management and production systems to respond to environmental requirements. The reasons for this
come from the issues of their capacity and the problems with current governance systems.

5.2 The Influence of Firms’ Characteristics on Firms’ Adaptive Capacity

The results show that exporting firms, larger firms, and older firms have higher adaptive capacity in response to environmental requirements. This could be explained by a number of reasons. Firstly, customers are key actors influencing environmental decisions at Vietnam’s textile and garment SMEs but only big overseas customers have high demands for environmental protection, domestic customers only care about the price and product designs (Nguyen et al., 2014c). Secondly, only large companies are receiving orders from big overseas customers.

There are a lot of eligibility requirements to be a supplier of big customers such as Nike, Adidas, or Target. Small companies could not be eligible. (Surveys No. 3, No. 9, No. 10, No. 25).

Finally, newly established companies do not care much about adapting to environmental protection requirements because their top priority is to get the business running and maintaining the survival of their business. Young companies who don’t have much experience or a track record would find it hard to get orders from big overseas customers.

Our company has just been established, so there is no environmental issue to deal with. We only care about running this business and maintaining its survival. (Surveys No. 9, No. 10)

We are not experienced enough to be eligible to get big orders from the customers. We are normally sub-contracted by bigger companies. (Surveys No. 9, No. 18)

As for the ownership type, the non-significant association rejected the hypothesis that private companies have higher adaptive capacity than other types of companies. However, observations from the field show that private textile and garment SMEs in Vietnam are not doing better than others. Most of the Vietnamese textile and garment private SMEs are operating as family businesses and they only aim at short-term benefits without a strategic view on sustainable development. The foreign companies are mainly owned by Taiwanese, Korean and Japanese and they only care about profits.

6. Conclusion and Further Research

This paper has empirically studied the relationship between the characteristics of Vietnam’s textile and garment SMEs and their adaptive capacity in response to environmental requirements. The adaptive capacity of the firm is measured by its internal capacity, its strategy for adapting, and the actual level of its adaptation. Both quantitative and qualitative data are collected from interviews with the firms. Observations from the field are also used when clarification is required.

Only three out of four hypotheses are supported by the regression analysis results. The findings show that size, age and operation type of the firm have a positive relationship with firms’ adaptive capacity. This means that exporting firms, larger firms, and older firms have higher adaptive capacity in response to environmental requirements. The association between ownership type and firms’ adaptive capacity is not significantly supported, thus private ownership does not appear to be a factor influencing the level of a firm’s adaptive capacity. These analysis results are consistent with qualitative results and field observations.

The fact that the adaptive capacity of Vietnam’s textile and garment SMEs is still low can be explained by a number of reasons. Firstly, textile and garment SMEs in Vietnam are not under great pressure from the customers for complying with environmental protection requirements. Most of the textiles SMEs are currently only supplying products for the domestic market. Most of the exporters are garment companies who only do the processing work and they only have small customers who do not care much about environmental protection requirements. Secondly, it is doubtful that the companies have made other than token efforts in environmental management. Though they are aware of the importance of environmental protection, they don’t consider it as an important or priority issue for their business. Finally, the governance system in Vietnam is still weak. There are still many problems with the existing legislative system on environmental management, for example overlaps between jurisdictional and functional authorities, corruption, and insufficient support from the government (Nguyen et al., 2014a).
This study is subject to several limitations. First, because of the difficult access to the firms, only 35 companies were visited and interviewed. Although the qualitative data reached theoretical saturation, the sample should be bigger with more types of ownership. Second, the sample was selected based on number of employees and did not include other SMEs which may have more than 300 employees but have the total capital of 100 billion Vietnamese dongs or less. As textile and garment is a labour intensive industry, some companies may have a lot of employees but are still eligible to be small or medium sized. Despite these limitations, it is considered that the study has provided some insights on the adaptive capacity of SMEs from a developing country and is the first attempt to investigate the association between firms’ characteristics and firms’ adaptive capacity in Vietnam’s textile and garment SMEs.

Future research can address these limitations. In addition, more work on this field could also be carried out by extending to other characteristics of firms such as leverage, profitability, or gender of the owners. On the other hand, the investigation in this study could be revisited in the future to see whether the adaptive capacity of Vietnam’s textile and garment SMEs is changing.

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