Empirical Study on the Relationship between Environmental Responsibility and Enterprise Competitiveness of Textile and Garment Enterprises

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Keywords: Environmental responsibility, Corporate competitiveness, Textile and garment enterprises.

Abstract. The natural environment is deteriorating. As one of the main consumers of resources, enterprises should be aware of the importance of environmental responsibility to society and itself. Based on this background, this paper analyzes the status quo of textile and garment enterprises fulfilling their environmental responsibilities, and selects twenty domestic listed textile and garment enterprises, which disclose the net assets return rate, environmental protection investment, operating income, number of technicians, R&D invested in five data sources and collected, and analyzed that the environmental responsibility of the company has a positive impact on the competitiveness of the company. Enterprises should strengthen their emphasis on the natural environment and assume their own environmental responsibilities.

Introduction

With the rapid development of the economy, people's quality of life has greatly improved. Along with the ever-increasing level of industrial development, the environmental problems brought about by production have become more apparent. This paper takes textile and garment enterprises as the research object, analyzes the relationship between corporate environmental responsibility and enterprise competitiveness through case and data, and explores the importance of enterprises to assume their own environmental responsibility for their development, which causes enterprises to pay attention to environmental responsibility.

In the study of corporate environmental responsibility and corporate competitiveness, some scholars start to derive competitiveness from environmental responsibility and corporate performance. Zhang Shiyuan and Liu Li (2001) believe that the company is not responsible for environmental responsibility and profit. Contradictory, the two are mutually influential relationships. Feng Simiao (2014) concludes that the company actively fulfills its social responsibilities while operating, and its performance will be relatively improved, thus improving the competitiveness of the company. Some scholars include environmental responsibility in social responsibility and analyze the relationship between corporate social responsibility and corporate competitiveness. Huang Man (2018) believes that there is a close relationship between the fulfillment of corporate social responsibility and the core competitiveness of enterprises. Enterprises can take social responsibility while gaining benefits, and they can be better recognized by the society.

Analysis of the Status Quo of Environmental Responsibility of Textile and Garment Enterprises

There are many ways for textile and garment enterprises to fulfill their environmental responsibilities. This paper summarizes the behaviors of enterprises in the development and use of environmental technologies, the selection of green raw materials, supply chain management, energy
conservation and emission reduction. Through these environmental behaviors, we study the current status of companies in fulfilling their environmental responsibilities.

**Salt-free Dyeing**

The salt-free dyeing process of reactive dyes is a new dyeing process. It uses a chemical to treat the fabric first and dyes it by electron attraction. This method reduces the energy consumption of water and salt compared with the traditional process. The dye is less, the dyed color is more vivid, and the structure of the fabric itself is not damaged. Lutai Group Lufeng Weaving & Dyeing Co., Ltd. and relevant printing and dyeing enterprises have set up relevant groups to research and apply the “Key Technology of Salt-Free Dyeing of Reactive Dyes”.

**Recycled Fiber**

Recyclable is a kind of permanent recycling for the use of fabrics. Recycling of discarded fabrics, special treatment, and continued use in new clothes, so as to reduce the recycling of raw materials, thereby reducing The consumption of natural resources and the demand for nature.

In 2016, the materials of the Rio Olympics award-winning clothing that Anta cooperated with the Chinese Olympic Committee were made from recycled fiber products, including recycled fiber made from recycled Coke bottles, recycled fiber produced from corn, and so on. Figure 1.

![Figure 1. Anta Olympics awards suit.](image)

**Coffee Carbon Fiber**

The coffee fiber, that is, the coffee grounds are processed and decomposed into yarn fibers, and then woven into a fabric to make a garment. Coffee carbon fiber has high dependence. Because of its unique advantages, coffee carbon fiber has its own antibacterial function. At the same time, coffee carbon yarn does not need to be carbonized at high temperature like other raw materials in the process of production, so it will greatly reduce carbon dioxide emissions. It can also reduce the consumption of energy such as water and electricity.

**Electronic Label**

The La Chapel Group has been committed to technological innovation and developed electronic tags and supporting equipment based on radio frequency identification technology. This label records the details of each product's own model, color, etc., and the company can learn about this specific label. Information for each item. The introduction of electronic tags not only greatly improved the management efficiency of the company, but also brought certain benefits to the environment or society.

**Energy Saving and Emission Reduction**

In recent years, Lutai Group has been paying attention to the development of green environmental protection technology and the use of green raw materials. The company has developed
environmentally friendly textiles and technologies such as easy-to-clean technology and self-decontamination technology. The company also implemented a low-carbon energy-saving project. By running the project, the sulfur dioxide emission concentration was reduced by 37.9% in 2017 compared with 2016; the nitrogen oxide emissions were reduced by 5%; and the sludge produced by the production was also fully incinerated.

Empirical Analysis of the Relationship between Corporate Environmental Responsibility and Its Competitiveness

Selection of Dependent Variables
In terms of corporate competitiveness research, Wang Baolun and Lu Hongyan (2007) believe that the ability of enterprises to survive and develop is more reflected in the profitability of enterprises, so the profitability of enterprises is regarded as the primary indicator for evaluating the competitiveness of enterprises. Ma Yuqing (2017) uses the profit index to measure the competitiveness of enterprises, and believes that the return on net assets is the most representative indicator to measure the profitability of enterprises.

This paper believes that enterprise competitiveness is the ability of an enterprise to achieve long-term stable development and its business capability exceeds its peers in its industry. Profitability is the most important and intuitive manifestation of enterprise competitiveness, so it is profitable. Judging competitiveness, using ROE as a measure of competitiveness.

Independent Variable Selection
This paper believes that the environmental responsibility of an enterprise is its responsibility in environmental protection in its production and operation activities. The fulfillment of environmental responsibility is more reflected in its daily environmental protection behavior. Therefore, the relevant environmental protection and other related inputs disclosed in the annual report of the enterprise are selected. Information to judge the environmental responsibility of the company.

Because the information disclosed by each company in the annual report is different, the company has divided into three categories in terms of environmental protection investment. The first category is the company that discloses the specific environmental protection investment amount or the waste disposal amount, and the second category is not disclosed in the annual report. The specific amount invested in environmental protection, but there are companies that record some environmental behaviors during business activities, such as the development of environmental protection projects, the implementation of waste disposal measures, etc. The third category is in the annual report. The company did not disclose the specific amount invested in environmental protection, nor did it disclose the specific environmental behavior of the company. For the first category of companies, this article directly uses the amount of money invested as a measure, that is, environmental protection investment; for the second category and In the third category, this paper adopts a method of hierarchical assignment. A company with specific behavior, that is, a second-class company, assigns a value of 1000; a company without specific behavior, that is, a third-class company, assigns a value of 100.

There are many factors that have an impact on the strength of corporate competitiveness. This article focuses on operating income, number of technical personnel, and R&D investment, so these three indicators are selected as control variables.

Sample Selection and Description
The research object selected in this paper is 20 domestic textile and garment enterprises listed. This paper collects the net assets return rate, environmental protection investment, operating income, technical personnel and R&D investment of each company in 2017. All data All of them are from the contents disclosed in the 2017 annual report or social responsibility report of each company.
Among them, 12 companies that disclose specific environmental protection investment or sewage treatment amount, 6 companies with no specific amount of environmental protection behavior, the value is 100; 2 no specific A company with an environmentally friendly behavior, assigned a value of 100. The data is shown in schedule1.

<table>
<thead>
<tr>
<th>Name</th>
<th>Roe(%)</th>
<th>Environmental protection investment (yuan)</th>
<th>Operating income (yuan)</th>
<th>Number of technicians (person)</th>
<th>R&amp;D investment (yuan)</th>
</tr>
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<tr>
<td>Xingye Leather Technology</td>
<td>1.92</td>
<td>50859800.00</td>
<td>2112745711.07</td>
<td>642.00</td>
<td>58420256.18</td>
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<td>Huafu Fashion</td>
<td>11.05</td>
<td>5112839.25</td>
<td>1259639031.75</td>
<td>984.00</td>
<td>205467766.2</td>
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<td>Zhejiang Jiaxin Silk Co., Ltd.</td>
<td>8.42</td>
<td>13000000.00</td>
<td>2773166625.53</td>
<td>228.00</td>
<td>31315750.2</td>
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<td>Zhejiang Furun Co.,Ltd.</td>
<td>7.22</td>
<td>9931800.00</td>
<td>1927233695.71</td>
<td>588.00</td>
<td>35356462.9</td>
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<td>Bros Eastern Co.,Ltd.</td>
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<td>68780000.00</td>
<td>5952213875.26</td>
<td>739.00</td>
<td>175160672.65</td>
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<td>Fujian Fynex Textile Science &amp; Technology Co., Ltd</td>
<td>3.56</td>
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<td>821179833.14</td>
<td>123.00</td>
<td>14321877.71</td>
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<tr>
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<td>19521500.00</td>
<td>2312138516.9</td>
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<td>63850946.85</td>
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<tr>
<td>Luthai Textile Co.,Ltd.</td>
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<td>6409224044.97</td>
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<tr>
<td>联发集团</td>
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<td>15000000.00</td>
<td>4003621033.77</td>
<td>875.00</td>
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<td>20000000.00</td>
<td>883285616.26</td>
<td>108.00</td>
<td>28978432.52</td>
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<td>Shanghai Red Bean Group Co.,Ltd</td>
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<td>Zhejiang Hangmin Co.,Ltd.</td>
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<td>118518546.36</td>
<td>3495787997.08</td>
<td>732.00</td>
<td>112109621.45</td>
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<tr>
<td>Shanghai Shenda Co.,Ltd.</td>
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<td>1000.00</td>
<td>11125998826.26</td>
<td>678.00</td>
<td>148410287.24</td>
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<tr>
<td>Shijiazhuang ChangShan BeiMing Technology Co.,Ltd</td>
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<td>1000.00</td>
<td>1125467684.79</td>
<td>1256.00</td>
<td>203972798.74</td>
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<td>Henan Xinye Textile Co.,Ltd.</td>
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<td>1000.00</td>
<td>5195202111.76</td>
<td>1970.00</td>
<td>162430520.00</td>
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<tr>
<td>Anhui Huamao Textile Company</td>
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<td>1000.00</td>
<td>2342871186.07</td>
<td>575.00</td>
<td>57520371.21</td>
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<td>Baoxiniao Holding Co.,Ltd.</td>
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<td>Jiangsu Sunshine Co.,Ltd.</td>
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<td>2150841213.13</td>
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<tr>
<td>SEPTWOLVES</td>
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<td>100.00</td>
<td>3084894272.85</td>
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<td>72046924.60</td>
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</table>

Schedule 1. Model data.

**Model Construction**

Establish a double logarithmic model as follows:

\[ \ln(Y) = \beta_1 \ln(X_1) + \beta_2 \ln(X_2) + \beta_3 \ln(X_3) + \beta_4 \ln(X_4) + \mu \]

Among them: Y: return on net assets, X1: environmental investment, X2: operating income, X3: number of technical personnel, X4: R&D investment, using Eviews software for regression analysis, the final result is shown in Figure 2:
Analysis of regression results: The P value of the model is 0.015118 less than 0.1, and the P value of each variable is less than 0.1. Therefore, the model tests that the corporate environmental responsibility and operating income have a significant impact on the competitiveness of the enterprise.

Model Conclusions

**Environmental Protection Investment.** The results of the above model are available. The P value of the variable environmental protection input (x1) is less than 0.1. The environmental protection investment has a significant impact on the company's return on net assets, and there is a positive correlation between the two variables.

It shows that the environmental responsibility of enterprises has a certain influence on the competitiveness of enterprises. Therefore, although the implementation of environmental responsibility by enterprises will increase the expenditure of enterprises to a certain extent, it will also enhance the competitiveness of enterprises in the industry.

**Operating Income.** The results of the above model are available. The P value of operating income (x2) is less than 0.1. The operating income also has a significant impact on the return on net assets of the enterprise. The two variables have a positive correlation, so the operating income of the enterprise is also Will bring a certain degree of impact to the competitiveness of enterprises.

Countermeasures and Suggestions

**Government Aspects**

**Improve the Policy System Related to Environmental Protection.** The government should establish and improve the corresponding rules and regulations as well as the reward and punishment system. Enterprises are required to indicate the specific disclosures when disclosing information about environmental protection, so that the information disclosed by the company is more clear and contributes to the environmental protection information of enterprises. Observe the statistics.

**Increase Support for Corporate Environmental Protection Work.** The government should encourage enterprises to pay attention to the construction of environmental protection at all times. It can provide some technical support as assistance to help enterprises to carry out R&D and design in environmental protection, and provide some financial support, which will reduce the consumption of enterprises because they are worried about environmental protection. A large amount of money and abandoned environmental protection work.

**Corporate Aspects**

**Develop Green Textiles and Strengthen Management of Textile Supply Chains.** The use of new materials not only reduces energy use, improves the environment, but also promotes corporate brands and increases corporate visibility. At the same time, enterprises should also pay attention to some environmental awareness and behaviors in supply chain management when fulfilling their environmental responsibilities.

**Increase Investment in Environmental Protection Funds and Strengthen the Construction of Environmental Protection Facilities.** Enterprises should continuously increase the intensity of environmental protection investment within their own scope, actively introduce advanced technology, rectify and recycle waste equipment, not only achieve environmental protection, but also improve the production efficiency of enterprises, so that enterprises can do Long-term normal operation and development.
Acknowledgement

This project is supported by Research on the Cultivation of Beijing Residents’ Awareness of the Green Consumption Concept and Related Educational Approaches (SZ20171001209), which funding 2017 Beijing Social Science Fund Project and Key Projects of the Social Science Programmer of the Beijing Education Committee.

This project is supported by Cooperative Development Research on Used Clothing Recycling and the Resource Utilization System in the Beijing-Tianjin-Hebei Region (PXM2016_014216_000022), which funding Construction of the Service Capability of Scientific and Technological Innovation-Transformation of Scientific and Technological Achievements- Promotion Plan Project on.

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