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How Should Companies Implement
Environmental and Social Policies?

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Why Should Companies Implement Environmental and Social Policies?

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Following the publication of the Report of the World Commission on Environment and Development in 1987, many managers, researchers, and investors have questioned how and why companies should address environmental and social concerns. This article empirically investigates how environmental and social policies strengthen organizational capabilities, and how organizational capabilities subsequently affect competitive benefits. In the energy and utilities industry, we found that social policies have significant positive relations with investments in one particular organizational capability. In the manufacturing and non-manufacturing industries, however, we could not find significant positive relations between environmental and social policies and investments in organizational capabilities, indicating that managers are not implementing these policies in a way that strengthens organizational capabilities. We also found that the pathways that connect organizational capabilities and competitive benefits differ across industries. This study suggests that managers should consider industry characteristics carefully while investing in organizational capabilities in order to make effective use of these investments.

***Key Words**: environmental policy, social policy, organizational capability, competitive benefits*

1. INTRODUCTION

In 1987, the Report of the World Commission on Environment and Development was published, calling for countries, companies, and international communities to deal with environmental concerns and pursue sustainable development. Since then, many managers, researchers, and investors have questioned how and why companies should address environmental and social concerns. In order to respond to these questions, many management scholars have tried to clarify the linkage between social responsibility and financial performance.

In the extant literature, the relationship between social responsibility and financial performance is controversial. Aupperle and Hatfield (1985)[1)], using an elaborate, forced-choice instrument administered to CEOs, could not find any relationship between social responsibility and profitability. They went so far as to say, "Perhaps this issue, whether or not corporate social responsibility is related to profitability, will never be completely resolved" (Aupperle and Hatfield 1985: 462)[1)].

On the other hand, an increasing number of researchers have found a positive relationship between social responsibility and financial performance. McGuire et al. (1988)[2)] analyzed the relationship between firms' perceptions of their social responsibility and measures of their historical economic performance, and they found greater positive correlation between them. Porter and van der Linde (1995)[3)] argued that properly designed environmental regulations trigger innovations that reduce costs or improve product value, allowing companies to use resources more productively and to become more competitive. Therefore, they insisted that how an industry responds to environmental problems might be a major indicator of its overall competitiveness.

With increasingly more researchers recognizing the positive relationship between social responsibility and financial performance, scholars have started to focus on the role of environmental management. Klassen and McLaughlin (1996)[4)] proposed a model that links

environmental management with financial performance and empirically demonstrated that strong positive stock returns were measured for strong environmental management. Hart (1995)[5] theoretically predicted that innovative environmental strategies could lead to the development of firm-specific capabilities that could be sources of competitive advantage. His theory added a resource-based perspective to the model provided by Klassen and McLaughlin (1996)[4].

This study follows Sharma and Vredenburg (1998)[6]. They empirically demonstrated that companies with proactive environmental strategies develop organizational capabilities and gain competitive benefits, such as operational innovations, cost reductions, and improved reputations. Sharma and Vredenburg (1998)[6] focused on the Canadian oil and gas industry and conducted their research through a mail survey and regression analysis. Using a straightforward model, they illustrated the importance of environmental management for increasing competitive benefits in an age when an increasing number of people recognize the importance of corporate social responsibility (CSR).

Although a number of empirical CSR studies have referred to Sharma and Vredenburg (1998)[6], their research has two limitations. First, even though they sorted organizational capabilities into three different types, they used only one integrated variable for organizational capabilities in their regression analysis. Similarly, even though they identified several items that constitute competitive benefits, they used only one integrated variable for competitive benefits in their regression analysis. They did not separately consider each organizational capability and every distinct item that constitutes competitive benefits; therefore, the pathways involving proactive environmental strategy and the three organizational capabilities and those involving the three organizational capabilities and the items of competitive benefits were not examined. Second, their data was collected exclusively from the Canadian oil and gas industry. It would be of academic interest to extend their research to other industries and countries.

Following Sharma and Vredenburg (1998)[6] but making up for these two limitations, this

study separately incorporates the three organizational capabilities and the items of competitive benefits in an attempt to empirically reveal the pathway of how environmental and social policies strengthen the three organizational capabilities, and how these organizational capabilities then affect the items of competitive benefits. This research explores the significant correlations—but not the causal relations—between environmental and social policies and organizational capabilities as well as those between organizational capabilities and competitive benefits. This method would enable managers to determine the priority of their environmental management practices to gain competitive benefits effectively. We use global company datasets covering firms in every industry during the period 2005–2013.

Our results partly support the findings of Sharma and Vredenburg (1998)[6]. For example, our regression results conducted for the energy and utilities industry clarify the pathway between social policies and one particular organizational capability and that between organizational capabilities and competitive benefits. The pathway between environmental and social policies and organizational capabilities, however, is less clear than what was expected; in the manufacturing and non-manufacturing industries, there are no significant positive relations between these policies and organizational capabilities.

The next section presents a detailed explanation of our model and data. This paper then describes the results of the regression model and ends with conclusion and a discussion of the implications.

2. MATERIALS AND METHODS

(1) Model

The regression model used in Sharma and Vredenburg (1998)[6] has two steps. In the first step, the model predicted that companies that were ranked higher on environmental strategy would develop higher organizational capabilities. Organizational capabilities are divided into three groups: capability for stakeholder integration, capability for higher-order learning, and

capability for continuous innovation. The capability for stakeholder integration involves the ability to establish good relationships with stakeholders. The capability for higher-order learning involves the ability to develop different interpretations of new and existing information and to deal with ambiguities and lack of information. The capability for continuous innovation involves the ability to continuously generate a stream of innovations, such as changes in organizational activities, processes, specifications, inputs, and products. The second step of the model predicted that companies that developed higher organizational capabilities would get higher levels of competitive benefits.

The regression model in Sharma and Vredenburg (1998)[6] is as follows:

$$CAPABLTY = \beta_0 + \beta_1 ENVSTRGY + e \quad (1)$$

$$BENEFIT = \beta_0 + \beta_1 CAPABLTY + e \quad (2)$$

where *ENVSTRGY*, *CAPABLTY*, and *BENEFIT* denote environmental responsive strategy, organizational capability, and competitive benefits, respectively, and e denotes an error term. Equation (1) describes the first step of the regression model, and equation (2) describes the second step.

Similar to the model used in Sharma and Vredenburg (1998)[6], the model used in this study has two steps. In the first step, the model examines how environmental and social policies affect the three organizational capabilities (**Fig. 1**). We decided to examine environmental policies because these policies reflect the environmental practices of companies. We also add social policies to the model in order to measure the overall social responsibility of companies. In the second step, the model examines how each organizational capability affects competitive benefits (**Fig. 2**). In this study, the transparency, profitability, and market value of firms serve as indicators of competitive benefits. The three indicators of competitive benefits correspond to the

competitive benefits from three different perspectives: transparency is specifically beneficial for society, profitability is specifically beneficial to the company itself, and market value is specifically beneficial for outside investors.

The first step of the regression model used in this study is as follows:

$$\left.\begin{matrix} lnCmSpe \\ lnETCst \\ lnR\&DEx \end{matrix}\right\} = \beta_0 + \beta_1 EPolicy + \beta_2 SPolicy + \beta_3 Controls + \alpha_t + \alpha_i + e \quad (3)$$

where α_t and α_i denote the fixed effects of firm t and year i respectively, and e denotes the error term. *EPolicy* indicates the degree of implementation of environmental policies and *SPolicy* indicates the degree of implementation of social policies. The dependent variables represent the investments in organizational capabilities: *lnCmSpe* denotes investments in community-building activities, which are related to the capability for stakeholder integration; *lnETCst* denotes investments in employee training, which is related to the capability for higher-order learning; and *lnR&DEx* denotes investments in R&D activities, which are related to the capability for continuous innovation. *Controls* denotes the control variables that control for firm-specific characteristics.

The sign of *EPolicy* is expected to be positive for investments in community-building activities, employee training, and R&D activities. In implementing environmental policies, the company has incentives to make the members of the local community aware about these activities and to establish a good image for the company, which would enable the company to pursue its business more smoothly. Moreover, environmental policies involve employee training for effectively achieving the targets described in the policies. In addition, implementing environmental policies forces a company to operate more efficiently, thereby increasing the investments in R&D activities. The sign of *SPolicy* is also expected to be positive for the three investments in organizational capabilities because each social policy is related to employees,

and companies that place importance on their employees spend more money on employee training and on the local communities where their employees live. Moreover, social policies attract competent employees, thereby facilitating innovative activities.

The second step of the regression model used in this study is as follows:

$$\left.\begin{matrix} Score \\ ROA \\ Tobinq \end{matrix}\right\} = \beta_0 + \beta_1 lnCmSpe + \beta_2 lnETCst + \beta_3 lnR\&DEx + \beta_4 Controls + \alpha_t + \alpha_i + e \qquad (4)$$

The dependent variables represent the items of competitive benefits used in this study—transparency, profitability, and market value of firms. Disclosure score (*Score*), Return on Assets (*ROA*), and Tobin's q (*Tobinq*) serve as the corresponding indicators of the three items of competitive benefits.

The sign of *lnCmSpe* is expected to be positive for the three benefit indicators (disclosure score, ROA, and Tobin's q). This is because companies have an incentive to disclose information about community-building activities in order to improve firm image. Moreover, if a company has established a trust-based collaborative relationship with a community, the company can pursue its business more easily and efficiently, which is a positive factor for investors as well. The sign of *lnETCst* is also expected to be positive for the three benefit indicators because companies have an incentive to disclose information about employee training to improve firm image and because employee training improves the ability of each employee and strengthens the company's overall competitiveness. The sign of *lnR&DEx* is also expected to be positive for the three benefit indicators because investments in R&D activities facilitate the company's innovation, making its operation more efficient; moreover, companies have an incentive to disclose this information in order to let investors perceive the possibility for future growth.

We first conduct the regression analysis for all the industries together and then for the three

industry categories separately: energy and utilities industry, manufacturing industry, and non-manufacturing industry. Each regression test includes only ONE independent variable; this is primarily intended to increase the observation numbers.

(2) Data

This study uses the global firm dataset from the Bloomberg professional service. The number of observations in the original dataset is 49,915 for the 2005–2013 period. Depending on the variable, the number of observations in each specification of the regression model varies from 389 to 24,115.

Epolicy and *SPolicy* are the total number of environmental policies and social policies, respectively, implemented by a company out of all the policies included in the dataset. **Table 1** and **Table 2** present the types and definitions of environmental and social policies. Each item is a dummy variable; therefore, if a company has implemented five of the seven environmental policies in the dataset, the company's *EPolicy* score is five.

In order to measure the investments in community-building activities, employee training, and R&D activities, we use the logs of community spending (*lnCmSpe*), employee training cost (*lnETCst*), and R&D expenditure (*lnR&DEx*), respectively.

To measure the three benefit indicators (transparency, profitability, and market value), we use disclosure score (*Score*), Return on Assets (*ROA*), and Tobin's q (*Tobinq*), respectively. The disclosure score we use is Bloomberg's proprietary ESG Disclosure Score based on the extent of a company's environmental, social, and governance disclosure. To calculate ROA and Tobin's q, we divide earnings before interest and taxes (EBIT) and enterprise value (calculated as market cap plus preferred equity, debt, and minority interest, minus total cash and cash equivalents), respectively, by the total assets. Due to data constraints, we use enterprise value instead of market cap and total liabilities for calculating Tobin's q. Therefore, our Tobin's q is a little lower than the true one would be.

The control variables in this study are the log of the total assets representing the size of firms (*Size*), the log of capital labor ratio (*lnKL*), and the log of labor efficiency (*lnLEFF*). To calculate capital labor ratio and labor efficiency, we divide net fixed assets and revenue, respectively, by the number of employees. **Table 3** and **Table 4** present the descriptive statistics and correlation table, respectively.[1]

3. RESULTS AND DISCUSSION

(1) Regression Results

Table 5 to **Table 8** present the detailed regression results. **Table 9** summarizes the results, showing the coefficients that are important to this study. The '+' symbol indicates positive coefficients at a statistically significant level, and '−' indicates negative coefficients at a statistically significant level. If a coefficient is not statistically significant, the column is left blank.

The result of the analysis involving all the industries together (**Table 5**) shows that the coefficient of *EPolicy* is statistically significant from zero and positive for *lnCmSpe* in the first step. Contrary to our expectations, the effects of environmental and social policies for *lnETCst* and *lnR&DEx* are non-significant. In the second step, the coefficient of *lnCmSpe* is statistically significant from zero and positive for all the three benefit indicators (*Score*, *ROA*, and *Tobinq*). Further, the coefficient of *lnETCst* is statistically significant from zero and positive for *ROA* and *Tobinq*.

Table 6 shows the regression results for the energy and utilities industry. In the first step, the coefficient of *SPolicy* is statistically significant from zero and positive for *lnCmSpe* and is statistically significant from zero and negative for *lnR&DEx*. This implies that implementing

[1] Note that as shown in **Table 3**, the dataset could include some outliers, especially in terms of ROA and Tobin's q.

social policies takes money away from the R&D division in this industry. In the second step, the coefficient of *lnETCst* is statistically significant from zero and positive for *Score* and *ROA*, indicating that employee training may have an important role in this industry. The coefficient of *lnCmSpe* is statistically significant from zero and positive for *Score* but is non-significant for *ROA* and *Tobinq*. None of the three capabilities measures improves Tobin's q at a statistically significant level in this industry. This finding indicates that investors are skeptical about the energy and utilities industry because they tend to associate this industry with environmental destruction, as Klassen and McLaughlin (1996)[4] suggested.

Table 7 presents the regression results for the manufacturing industry. In the first step, the environmental and social policies have no significant relations with any of the three capability indicators. In the second step, the coefficient of *lnCmSpe* is statistically significant from zero and positive for *ROA*, and the coefficient of *lnETCst* is statistically significant from zero and positive for *ROA* and *Tobinq*. These results indicate that employee training may have an important role in this industry.

Finally, **Table 8** shows the regression results for the non-manufacturing industry. In the first step, the coefficient of *EPolicy* is statistically significant from zero and negative for *lnETCst*. This indicates that implementing environmental policies takes money away from employee training in this industry. In the second step, while the coefficient of *lnCmSpe* is statistically significant from zero and positive for *ROA* and *Tobinq*, the coefficients of *lnETCst* and *lnR&DEx* are both statistically significant from zero and negative for *ROA*. This indicates that employee training and R&D activities do not differentiate one company from another in the non-manufacturing industry, and the expenditure on such activities simply leads to loss of profitability.

4. CONCLUSION

Managers have increasingly begun to recognize the importance of a firm's environmental and social responsibility, but they are yet to realize how environmental and social management can lead to competitive benefits. Following the empirical model of Sharma and Vredenburg (1998)[6], which used data from the Canadian oil and gas industry, this study empirically examines how environmental and social policies improve the three organizational capabilities and subsequently affect the items of competitive benefits.

Our results partly support the findings of Sharma and Vredenburg (1998)[6]. The results of the analysis of all the industries together show that environmental policies have significant positive relations with community spending; subsequently, community spending has significant positive relations with the disclosure score. Similarly, the results of the analysis of the energy and utilities industry show that social policies have significant positive relations with community spending; subsequently, community spending has significant positive relations with the disclosure score. Sharma and Vredenburg (1998)[6] examined the Canadian oil and gas industry; therefore, our results strengthen their findings in the context of this industry.

The pathways that connect environmental and social policies and organizational capabilities, however, are quite limited. Contrary to our expectations, these policies have significant positive relations only with community spending in the regression results in two contexts only—involving all the industries together and in the energy and utilities industry. This finding suggests that even though companies implement environmental and social policies, they are not doing so in a way that strengthens organizational capabilities.

The pathways that connect organizational capabilities and competitive benefits differ from industry to industry. For example, in the manufacturing industry, investments in employee training are effective in increasing ROA and Tobin's q, while in the non-manufacturing industry, investments in community-building activities are effective in increasing them. In the energy and utilities industry as well as the manufacturing industry, investments in employee training are

effective in increasing ROA. However, in the non-manufacturing industry, investments in employee training actually have a negative impact on ROA. These results suggest that managers should carefully examine the industry characteristics and determine how policies could improve organizational capabilities and competitive benefits most effectively.

Surprisingly, R&D expenditure does not positively affect any of the three benefit indicators at a statistically significant level. This implies that companies do not spend money on R&D activities in a way that increases the transparency, profitability, and market value of the firms. In the non-manufacturing industry, R&D expenditure actually has a significant negative association with ROA, which implies that there is almost no room for investments in R&D activities in this industry.

A significant implication for increasing corporate competitiveness based on the results of this study is that managers should consider industry characteristics while spending money on community-building activities, employee training, and R&D activities. For example, in the energy and utilities industry, investments in employee training would be effective in improving the firm's transparency and profitability. Therefore, managers in this industry should take a longer-term perspective specifically in the case of employee training for strengthening organizational capabilities. Further, in some industries, managers can strategically implement environmental and social policies to facilitate community-building activities.

This research has several limitations. Due to constraints of data availability, we examined only community spending, employee training costs, and R&D expenditure as indicators of investments in organizational capabilities. Other indicators that reflect the three organizational capabilities more precisely would produce results that are more reliable. In addition, because our model is based on a one-way approach, the direction of causality is not examined. For example, we found that community spending is positively associated with ROA at a statistically significant level; however, it is possible that companies with higher ROA increase community spending.

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Table 1 Definitions of the environmental policies

	Policy Name	Definition
1	Emission reduction policy	Indicates whether the company has implemented any initiatives to reduce its environmental emissions to air.
2	Green building policy	Indicates whether the company has taken any steps towards using environmental technologies and/or environmental principles in the design and construction of its buildings.
3	Climate changing policy	Indicates whether the company has outlined its intention to help reduce global emissions of the Greenhouse Gases that cause climate change through its ongoing operations and/or the use of its products and services.
4	Environmental quality management policy	Indicates whether the company has introduced any kind of environmental quality management and/or environmental management system to help reduce the environmental footprint of its operations.
5	Biodiversity policy	Indicates whether the company has implemented any initiatives to ensure the protection of biodiversity.
6	Energy efficiency policy	Indicates whether the company has implemented any initiatives to make its use of energy more efficient.
7	Waste reduction policy	Indicates whether the company has implemented any initiatives to reduce the waste generated during the course of its operations.

Table 2 Definitions of the social policies

	Policy Name	Definition
1	Health and safety policy	Indicates whether the company has recognized its health and safety risks and responsibilities and is making any effort to improve the management of employee health and/or employee safety.
2	Equal opportunity policy	Indicates whether the company has made a proactive commitment to ensure non-discrimination against any type of demographic group.
3	Human rights policy	Indicates whether the company has implemented any initiatives to ensure the protection of the rights of all people it works with.
4	Training policy	Indicates whether the company has implemented any initiatives to train new and existing employees on career development, education or skills.
5	Fair remuneration policy	Indicates if the company has demonstrated a group wide commitment to ensure payment of a fair wage to all group employees, even in those countries that do not legally require a minimum wage.

Table 3 Descriptive statistics

variable	description	obs	mean	s.d	min	max
EPolicy	Indicates the number of environmental policies the company has implemented.	31,178	2.74	2.24	0	7
SPolicy	Indicates the number of social policies the company has implemented.	29,068	1.99	1.57	0	5
lnCmSpe	Log of community spending	11,708	13.18	3.36	0	23.19
lnETCst	Log of employee training cost	2,646	15.19	2.62	0	24.95
lnR&DEx	Log of R&D expenditure	31,068	10.83	8.17	0	23.15
Score	ESG Disclosure Score	49,915	19.65	12.68	0.82	85.12
ROA	Return on Assets	44,077	−1.69	293.19	−61,002.1	2.01
Tobinq	Tobin's q	48,412	11.56	1,694.08	−0.61	369,131.3
Control variables						
Size	Log of total assets	49,860	21.11	2.22	2.63	28.92
lnKL	Log of capital labor ratio	38,098	11.47	1.71	2.19	20.81
lnLEFF	Log of labor efficiency	38,267	12.73	1.11	1.79	19.77

Table 4 Correlation table

	EPolicy	*SPolicy*	*lnCmSpe*	*lnETCst*	*lnR&DEx*	*Score*	*ROA*	*Tobinq*	*Size*	*lnKL*	*lnLEFF*
EPolicy	1										
SPolicy	0.69	1									
lnCmSpe	0.22	0.24	1								
lnETCst	0.23	0.16	0.54	1							
lnR&DEx	0.29	0.18	0.06	0.25	1						
Score	0.78	0.72	0.39	0.37	0.28	1					
ROA	0.00	0.01	0.15	0.05	0.00	0.00	1				
Tobinq	−0.00	−0.00	0.01	−0.07	−0.01	−0.00	−0.08	1			
Size	0.34	0.34	0.60	0.62	0.16	0.47	0.04	−0.03	1		
lnKL	0.10	−0.00	0.13	−0.08	−0.12	0.12	0.01	−0.05	0.25	1	
lnLEFF	0.06	−0.01	0.16	0.02	−0.05	0.13	0.06	−0.07	0.30	0.54	1

Table 5 Regression result: All industries

	(1) *lnCmSpe*	(2) *lnCmSpe*	(3) *lnETCst*	(4) *lnETCst*	(5) *lnR&DEx*	(6) *lnR&DEx*	(7) *Score*	(8) *Score*
EPolicy	0.03*		−0.04		0.01			
	(0.01)		(0.03)		(0.01)			
SPolicy		0.00		0.02		−0.02		
		(0.02)		(0.05)		(0.02)		
lnCmSpe							0.06*	
							(0.03)	
lnETCst								0.16
								(0.10)
lnR&DEx								
Size	0.51***	0.74***	0.42***	0.51***	0.49***	0.51***	0.44**	−0.58
	(0.06)	(0.07)	(0.13)	(0.14)	(0.07)	(0.07)	(0.20)	(0.55)
lnKL	−0.06	−0.08	0.02	−0.03	0.05	0.07	0.26	0.21
	(0.05)	(0.06)	(0.07)	(0.09)	(0.06)	(0.06)	(0.15)	(0.32)
lnLEFF	0.00	0.00	−0.12	−0.12	−0.01	−0.02	−0.10	0.25
	(0.06)	(0.07)	(0.12)	(0.13)	(0.06)	(0.07)	(0.20)	(0.52)
Constant	2.01	−2.68	6.60**	5.21	1.07	0.60	10.13**	28.58**
	(1.61)	(1.72)	(3.21)	(3.45)	(1.60)	(1.68)	(4.69)	(13.28)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
obs	10,577	9,813	2,298	2,205	16,298	15,288	10,664	2,319
year	2005-2013	2005-2013	2005-2013	2005-2013	2005-2013	2005-2013	2005-2013	2005-2013
Within R-squared	0.02	0.03	0.02	0.02	0.00	0.01	0.33	0.38
Overall R-squared	0.37	0.38	0.38	0.40	0.03	0.02	0.06	0.00

	(9) *Score*	(10) *ROA*	(11) *ROA*	(12) *ROA*	(13) *Tobinq*	(14) *Tobinq*	(15) *Tobinq*
EPolicy							
SPolicy							
lnCmSpe		0.001***			0.01***		
		(0.00)			(0.00)		
lnETCst			0.002*			0.02***	
			(0.00)			(0.00)	
lnR&DEx	0.03			−0.00			0.00
	(0.02)			(0.00)			(0.00)
Size	0.36**	−0.01***	−0.01***	0.35***	−0.61***	−0.24***	−1.73***
	(0.15)	(0.00)	(0.00)	(0.02)	(0.02)	(0.04)	(0.07)
lnKL	−0.07	−0.02***	−0.01***	−0.12***	−0.00	−0.10***	0.47***
	(0.12)	(0.00)	(0.00)	(0.01)	(0.02)	(0.03)	(0.05)
lnLEFF	−0.04	0.05***	0.08***	0.27***	0.05**	0.02	−0.49***
	(0.13)	(0.00)	(0.00)	(0.01)	(0.02)	(0.04)	(0.06)
Constant	3.09	0.03	−0.34**	−9.16***	14.28***	7.26***	38.42***
	(3.44)	(0.04)	(0.16)	(0.50)	(0.65)	(1.13)	(1.60)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
obs	24,115	9,712	1,937	24,110	10,476	2,277	23,814
year	2005-2013	2005-2013	2005-2013	2005-2013	2005-2013	2005-2013	2005-2013
Within R-squared	0.24	0.13	0.17	0.02	0.14	0.14	0.04
Overall R-squared	0.00	0.04	0.04	0.01	0.05	0.06	0.01

Notes: ***, **, * denote significances at the 1%, 5%, and 10% level (two-tailed), respectively. Coefficients are without parentheses, and standard errors are in parentheses.

Table 6 Regression result: Energy and utilities industry

	(1) *lnCmSpe*	(2) *lnCmSpe*	(3) *lnETCst*	(4) *lnETCst*	(5) *lnR&DEx*	(6) *lnR&DEx*	(7) *Score*	(8) *Score*
EPolicy	0.00		−0.08		0.06			
	(0.04)		(0.07)		(0.07)			
SPolicy		0.12*		0.03		−0.23**		
		(0.06)		(0.12)		(0.10)		
lnCmSpe							0.33**	
							(0.14)	
lnETCst								0.66***
								(0.24)
lnR&DEx								
Size	0.78***	0.96***	0.73**	0.84**	0.29	0.28	0.95	−0.42
	(0.21)	(0.23)	(0.33)	(0.38)	(0.37)	(0.37)	(0.88)	(1.43)
lnKL	0.07	0.05	0.29**	0.20	0.79***	0.85***	0.31	0.61
	(0.09)	(0.10)	(0.12)	(0.17)	(0.23)	(0.23)	(0.37)	(0.53)
lnLEFF	0.00	0.10	0.64*	0.69*	−0.20	−0.33	−0.00	−0.48
	(0.14)	(0.16)	(0.36)	(0.41)	(0.27)	(0.27)	(0.59)	(1.54)
Constant	−4.69	−10.20*	−14.62*	−17.05*	−5.90	−4.18	−5.64	29.17
	(4.96)	(5.42)	(8.87)	(10.33)	(8.82)	(8.87)	(20.38)	(37.55)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
obs	1,157	1,091	389	369	1,515	1,465	1,179	395
year	2005-2013	2005-2013	2005-2013	2005-2013	2005-2013	2005-2013	2005-2013	2005-2013
Within R-squared	0.04	0.06	0.15	0.13	0.02	0.03	0.38	0.51
Overall R-squared	0.44	0.46	0.25	0.29	0.00	0.01	0.15	0.02

	(9) *Score*	(10) *ROA*	(11) *ROA*	(12) *ROA*	(13) *Tobinq*	(14) *Tobinq*	(15) *Tobinq*
EPolicy							
SPolicy							
lnCmSpe		0.00			−0.00		
		(0.00)			(0.01)		
lnETCst			0.006***			0.00	
			(0.00)			(0.01)	
lnR&DEx	0.03			−0.00			0.00
	(0.05)			(0.00)			(0.00)
Size	1.56**	−0.03***	−0.04***	0.02***	−0.54***	−0.29***	−0.75***
	(0.64)	(0.00)	(0.01)	(0.00)	(0.06)	(0.09)	(0.06)
lnKL	−0.04	−0.01***	−0.00	−0.00	0.00	−0.00	−0.03
	(0.38)	(0.00)	(0.00)	(0.00)	(0.02)	(0.03)	(0.03)
lnLEFF	0.26	0.02***	0.05***	0.03***	−0.09**	0.09	0.21***
	(0.44)	(0.00)	(0.01)	(0.00)	(0.04)	(0.10)	(0.04)
Constant	−24.83*	0.64***	0.35	−0.91***	15.08***	6.66***	15.39***
	(14.33)	(0.14)	(0.32)	(0.16)	(1.48)	(2.40)	(1.34)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
obs	1,993	1,179	395	1,993	1,167	389	1,970
year	2005-2013	2005-2013	2005-2013	2005-2013	2005-2013	2005-2013	2005-2013
Within R-squared	0.27	0.24	0.25	0.12	0.32	0.38	0.25
Overall R-squared	0.20	0.05	0.14	0.03	0.06	0.11	0.01

Notes: ***, **, * denote significances at the 1%, 5%, and 10% level (two-tailed), respectively. Coefficients are without parentheses, and standard errors are in parentheses.

Table 7 Regression result: Manufacturing industry

	(1) *lnCmSpe*	(2) *lnCmSpe*	(3) *lnETCst*	(4) *lnETCst*	(5) *lnR&DEx*	(6) *lnR&DEx*	(7) *Score*	(8) *Score*
EPolicy	0.04		0.01		−0.01			
	(0.02)		(0.05)		(0.01)			
SPolicy		−0.03		0.12		−0.00		
		(0.04)		(0.09)		(0.02)		
lnCmSpe							0.00	
							(0.03)	
lnETCst								−0.03
								(0.16)
lnR&DEx								
Size	0.49***	0.81***	0.45*	0.59**	0.61***	0.64***	0.00	−0.42
	(0.10)	(0.11)	(0.25)	(0.26)	(0.08)	(0.08)	(0.27)	(1.05)
lnKL	−0.17	−0.26**	−0.28	−0.27	−0.09	−0.10	0.45	0.97
	(0.11)	(0.11)	(0.19)	(0.20)	(0.07)	(0.08)	(0.27)	(0.82)
lnLEFF	0.18	0.24*	−0.10	−0.18	0.06	0.08	−0.47	−0.79
	(0.12)	(0.12)	(0.22)	(0.23)	(0.07)	(0.08)	(0.30)	(0.91)
Constant	1.42	−4.92*	9.19*	6.76	2.04	1.24	23.46***	30.10
	(2.43)	(2.59)	(5.43)	(5.77)	(1.73)	(1.83)	(6.15)	(22.52)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
obs	5,793	5,275	970	929	10,965	10,232	5,814	974
year	2005-2013	2005-2013	2005-2013	2005-2013	2005-2013	2005-2013	2005-2013	2005-2013
Within R-squared	0.01	0.02	0.02	0.03	0.01	0.01	0.34	0.41
Overall R-squared	0.33	0.35	0.39	0.39	0.12	0.13	0.00	0.00

	(9) *Score*	(10) *ROA*	(11) *ROA*	(12) *ROA*	(13) *Tobinq*	(14) *Tobinq*	(15) *Tobinq*
EPolicy							
SPolicy							
lnCmSpe		0.0007*			−0.00		
		(0.00)			(0.00)		
lnETCst			0.004**			0.05***	
			(0.00)			(0.01)	
lnR&DEx	0.03			−0.00			0.00
	(0.02)			(0.00)			(0.01)
Size	0.30	0.00	0.00	0.52***	−0.43***	−0.17	−2.21***
	(0.20)	(0.00)	(0.01)	(0.03)	(0.03)	(0.11)	(0.11)
lnKL	0.02	−0.05***	−0.05***	−0.27***	−0.10***	−0.34***	0.82***
	(0.17)	(0.00)	(0.01)	(0.03)	(0.04)	(0.08)	(0.09)
lnLEFF	−0.21	0.09***	0.13***	0.44***	0.09**	0.13	−0.71***
	(0.16)	(0.00)	(0.01)	(0.02)	(0.04)	(0.10)	(0.09)
Constant	6.03	−0.50***	−1.19***	−13.12***	10.80***	6.52***	46.89***
	(4.34)	(0.06)	(0.27)	(0.75)	(0.88)	(2.48)	(2.39)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
obs	15,692	5,813	974	15,692	5,767	960	15,525
year	2005-2013	2005-2013	2005-2013	2005-2013	2005-2013	2005-2013	2005-2013
Within R-squared	0.24	0.20	0.25	0.03	0.15	0.18	0.04
Overall R-squared	0.00	0.01	0.02	0.01	0.03	0.01	0.01

Notes: ***, **, * denote significances at the 1%, 5%, and 10% level (two-tailed), respectively. Coefficients are without parentheses, and standard errors are in parentheses.

Table 8 Regression result: Non-manufacturing industry

	(1) *lnCmSpe*	(2) *lnCmSpe*	(3) *lnETCst*	(3) *lnETCst*	(5) *lnR&DEx*	(6) *lnR&DEx*	(7) *Score*	(8) *Score*
EPolicy	0.00		−0.12*		0.05			
	(0.03)		(0.07)		(0.03)			
SPolicy		−0.01		−0.01		−0.03		
		(0.05)		(0.10)		(0.04)		
lnCmSpe							0.07	
							(0.06)	
lnETCst								0.03
								(0.17)
lnR&DEx								
Size	0.63***	0.88***	0.01	0.09	0.24	0.30*	0.35	−1.65*
	(0.13)	(0.14)	(0.27)	(0.29)	(0.15)	(0.16)	(0.35)	(0.94)
lnKL	0.06	0.00	−0.11	−0.21	0.01	0.05	0.09	−0.23
	(0.09)	(0.11)	(0.15)	(0.19)	(0.11)	(0.13)	(0.27)	(0.54)
lnLEFF	−0.14	−0.09	−0.28	−0.23	−0.06	−0.12	−0.04	−0.36
	(0.13)	(0.14)	(0.30)	(0.34)	(0.14)	(0.16)	(0.35)	(1.04)
Constant	−0.37	−5.67*	20.20***	19.02***	1.02	0.23	12.22	61.44**
	(3.08)	(3.30)	(6.96)	(7.36)	(3.67)	(3.91)	(8.41)	(24.12)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
obs	2,575	2,439	546	527	3,651	3,431	2,612	555
year	2005-2013	2005-2013	2005-2013	2005-2013	2005-2013	2005-2013	2005-2013	2005-2013
Within R-squared	0.04	0.05	0.04	0.04	0.00	0.00	0.32	0.36
Overall R-squared	0.28	0.30	0.02	0.16	0.01	0.00	0.07	0.03

	(9) *Score*	(10) *ROA*	(11) *ROA*	(12) *ROA*	(13) *Tobinq*	(14) *Tobinq*	(15) *Tobinq*
EPolicy							
SPolicy							
lnCmSpe		0.004***			0.06***		
		(0.00)			(0.01)		
lnETCst			−0.003*			0.00	
			(0.00)			(0.01)	
lnR&DEx	0.02			−0.002*			0.00
	(0.03)			(0.00)			(0.00)
Size	−0.28	−0.00**	−0.02***	0.10***	−0.66***	−0.20***	−0.91***
	(0.29)	(0.00)	(0.00)	(0.01)	(0.06)	(0.06)	(0.05)
lnKL	−0.22	−0.01***	−0.01***	0.08***	0.00	−0.06	0.15***
	(0.19)	(0.00)	(0.00)	(0.00)	(0.05)	(0.05)	(0.03)
lnLEFF	0.11	0.03***	0.04***	−0.08***	0.11	0.00	−0.24***
	(0.24)	(0.00)	(0.01)	(0.00)	(0.07)	(0.07)	(0.04)
Constant	13.48**	−0.02	0.33	−1.87***	13.71***	6.27***	21.99***
	(6.68)	(0.09)	(0.24)	(0.26)	(1.64)	(1.70)	(1.32)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
obs	6,164	2,608	551	6,164	2,574	548	6,072
year	2005-2013	2005-2013	2005-2013	2005-2013	2005-2013	2005-2013	2005-2013
Within R-squared	0.26	0.08	0.13	0.05	0.13	0.15	0.10
Overall R-squared	0.02	0.07	0.03	0.00	0.08	0.05	0.03

Notes: ***, **, * denote significances at the 1%, 5%, and 10% level (two-tailed), respectively.

Coefficients are without parentheses, and standard errors are in parentheses.

Table 9 Regression result: Summary

	All Industries	Energy & Utilities Industry	Manufacturing Industry	Non-Manufacturing Industry
1st step: Policy to Capability				
(1) *EPolicy→lnCmSpe*	+			
(2) *SPolicy→lnCmSpe*		+		
(3) *EPolicy→lnETCst*				−
(4) *SPolicy→lnETCst*				
(5) *EPolicy→lnR&DEx*				
(6) *SPolicy→lnR&DEx*		−		
2nd step: Capability to Benefits				
(7) *lnCmSpe→Score*	+	+		
(8) *lnETCst→Score*		+		
(9) *lnR&DEx→Score*				
(10) *lnCmSpe→ROA*	+		+	+
(11) *lnETCst→ROA*	+	+	+	−
(12) *lnR&DEx→ROA*				−
(13) *lnCmSpe→Tobinq*	+			+
(14) *lnETCst→Tobinq*	+		+	
(15) *lnR&DEx→Tobinq*				

Notes: This table summarizes results from **Table 5** to **8**. Positive coefficients at a statistically significant level are indicated as '+', and negative coefficients at a statistically significant level are indicated as '−'. If a coefficient is not statistically significant, the cell is left blank.

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