12th International Conference on Modern Research in
MANAGEMENT, ECONOMICS and ACCOUNTING

14-16 May, 2021
Paris, France

Effect of Energy Transition on Social Performance of Energy Firms

Mide Philemon[1]

[1]*Abertay University Dundee, Scotland, United Kingdom*

Abstract.

Many companies' objective is no longer limited to economic gains but also incorporates economic and social issues. This is because meeting the demands of other stakeholders like the employees are increasingly essential to corporate continuity. To extend their sustainability goals, some energy companies are transitioning from fossil to renewable energy production. This study investigates if there is a significant effect of the energy transition on a social performance indicator of energy firms. The study analyzed a total of 736 firm-year observations of energy companies for the period 2006-2018 using a panel model. The dataset did not show a statistically significant effect of the energy transition on the accident rate.

Keywords: accident rate; energy firms; energy transition; stakeholder

1. Introduction

Ecological issues are now included in the strategic decisions of most corporate entities to promote sustainability. Before three-decade ago, there was practically no academic research or assembling circles over the link between ecological practices and corporate performance. Most businesses assumed that seeking after ecological objectives was contradictory to a sound business model and, doing so, was an infringement of managers' main obligation to investors. In line with customary thoughts, it was held that any interest in improved ecological performance would add to increased costs, for example, prolonged lead times, diminished quality or increased expenses - all of which decreased profitability and return to investors.

In 1991, Porter conducted a study, and his conclusion set a frontier for debate in sustainability research. Therefore, Porter established the hypothetical view that waste reduction and productivity were mutually exclusive goals (Porter, 1991). According to Porter, pollution in any form is a waste that reduces the firm's value and is an asymptomatic problem from the firms' operations. Thus, contrary to the popular view of that period, pollution or waste reduction or elimination would strengthen corporate competitiveness and not weaken it.

Other studies supported Porter's unique position (Porter and Van der Linde, 1995; Klassen and McLaughlin, 1996). In summary, the discussion proceeds with a positive outcome because, over the last thirty (30) years, tremendous change has occurred in pollution management and better environmental management.

2. Literature review and hypothesis

The shareholders' theory underpins this study. The theory asserts that business entities should increase the shareholders' wealth and meet all other stakeholders linked to the business. An idea was developed after the overly focused shareholder's theory. The stakeholders' interest becomes salient to the management to the extent that they perceive them as possessing power, legitimacy, and urgency (Mitchell et al., 1997). Even though the strong supporters of the traditional view (shareholders theory) remain, they are diminishing in number, political grip and influence. Stakeholders have arisen from a tendency to adopt definitions such as "anything influencing or influenced by" the firm (Freeman, 1984). For this study, the employee's interest (accident rates) is taken, been the workforce constitutes one of the stakeholders.

2.1. Eco-innovation practices

Eco-innovation incorporates measures taken in the production process that are harmless to the ecosystem. As per Fernando and Wah (2017, p.2), eco-innovation is "the production, assimilation or exploitation of a novelty in products, production processes, services or in management and business methods, which aims, throughout its lifecycle, to prevent or substantially reduce environmental risk, pollution and other negative impacts of resource use including energy." The energy transition is another form of eco-innovation because it is a production strategy that involves switching from fossil-based energy to renewable energy.

Scholars focused on eco-innovations impacts on two aspects of sustainability: economic (e.g. Andabaka et al., 2019) and environmental (e.g. Lee and Min, 2015; Fernando and Wah, 2017), while little or no research is done on the social dimension. This study, therefore, postulates that: Hypothesis 1: Energy companies' transition to renewable energy is negatively related to the workforce's accident rates.

3. Data and Methods

The data comprises a total of 738 firm-year observations of energy companies for the period 2006-2018. The data is made up of secondary data from the financial statement of energy firms across the globe. The samples comprise only the energy companies that previously rely on fossil fuel for energy production but are subsequently incorporating renewable energy production into their operations. The variable energy transition is calculated as the percentage in production from fossil to renewable energy.

In contrast, the accident rate is used as it is derived from the datastream. The controlled variables are calculated as they were used in previous studies. Firm size is a Natural logarithm of the company's total assets (Berrone and Gomez-Mejia, 2009); capital intensity is calculated as operating revenue(sales) divided by stockholders equity (Rokhmawati et al. 2017); innovation is the R&D expenditure divided by a total asset (Iwata and Okada, 2011); leverage is the firm risk, and it is derived as total debts divided by a total asset (Deesomsak et al., 2004).

This study adopts the panel model for conducting the analyses. Fixed-effect and random-effect regressions were conducted.

3.1 Descriptive statistics of data

Table 1 below gives the descriptive statistics of the dependent variable, accident rate. The distribution showed that the data is an unbalanced panel. The mean distribution maximum mean value is 2006, which has a value of 369.69, while the minimum was in the year 2018 with the value of 104.86.

Tab .1: Summary statistics of accident rate by year

-> year = 2006

Variable	Obs	Mean	Std.Dev.	Min	Max
Total accident	16	369.688	382.249	27	1124
-> year = 2007	Obs	Mean	Std.Dev.	Min	Max
Variable					
Total accident	20	208	245.842	9	1060
-> year = 2008					
Variable	Obs	Mean	Std.Dev.	Min	Max
Total accident	32	263.219	260.803	5	951
-> year = 2009	Obs	Mean	Std. Dev.	Min	Max
Variable					
Total accident	50	196.240	277.895	1	1243
-> year = 2010					
Variable	Obs	Mean	Std.Dev.	Min	Max
Total accident	68	219.103	309.866	0	1284
-> year = 2011	Obs	Mean	Std. Dev.	Min	Max
Variable					
Total accident	73	170.260	221.538	0	987
-> year = 2012					
Variable	Obs	Mean	Std.Dev.	Min	Max
Total accident	85	174.894	230.926	0	1131
-> year = 2013	Obs	Mean	Std Dev.	Min	Max
Variable					
Total accident	81	149.247	211.764	0	1044
-> year = 2014					
Variable	Obs	Mean	Std.Dev.	Min	Max
Total accident	85	150.282	211.777	0	1116
-> year = 2015	Obs	Mean	Std. Dev.	Min	Max
Variable					
Total accident	79	131.835	183.029	0	758
-> year = 2016					
Variable	Obs	Mean	Std.Dev.	Min	Max
Total accident	81	125.543	195.914	0	878
-> year = 2017	Obs	Mean	Std. Dev.	Min	Max
Variable					
Total accident	66	104.864	200.311	0	1086
-> year = 2018					

Variable	Obs	Mean	Std.Dev.	Min	Max
Total accident	14	260.786	326.961	2	969

3.2. Modelling

Hypothesis 1: Energy companies' transition to renewable energy is negatively related to the workforce's accident rates.

$$AccR_{it} = \chi_0 + \chi_1 ET_{it} + \chi_2 SZ_{it} + \chi_3 CI_{it} + \chi_4 IN_{it} + \chi_5 LV_{it} + \varepsilon_{it}$$

Where:

AccR= Accident Rate
ET=Energy Transition
SZ=Firm Size
CI=Capital Intensity
IN=Innovation
LV=Leverage (Firm Risk)

4. Results

4.1. Correlation Matrix

Tab. 2 presents the correlation matrix for the five (5) variables used in the modelling. The matrix showed that the highest correlation among the variables is between firm size and innovation, and the value is -0.298. The absence of big values is an indication of the absence of multicollinearity amongst the variables.

Tab. 2: Matrix of correlations for the model for accident rate

Variables	(1)	(2)	(3)	(4)	(5)
(1) Accident Rate	1.000				
(2) Energy Transition	0.049	1.000			
(3) Firm Size	0.079	0.010	1.000		
(4) Capital Intensity	0.008	0.055	-0.056	1.000	
(5) Innovation	-0.065	-0.054	-0.298	-0.117	1.000

4.2. Regression Models

The regression model comprises both fixed-effect and random-effect, as shown in Tab. 3 and 4 below. The results of Hausman's specification test in Tab. 5 indicates that the random

effect model is more consistent and efficient; hence this study adopts it. The p-values of the values in Tab. 2 shows that the coefficients of the variables are insignificant except that of the constant.

Tab. 3: Fixed-effect regression model

Accident Rate	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Energy Transition	0.028	0.041	0.68	0.497	-0.053	0.109	
Firms' Size	-0.033	0.072	-0.46	0.645	-0.173	0.108	
Capital Intensity	0.021	0.039	0.52	0.600	-0.057	0.098	
Innovation	0.009	0.009	1.01	0.311	-0.009	0.027	
Constant	4.258	0.464	9.18	0.000	3.347	5.169	* **
Mean dependent var		4.117	SD dependent var			1.655	
R-squared		0.003	Number of obs			736.000	
F-test		0.473	Prob > F			1.000	
Akaike crit. (AIC)		1222.101	Bayesian crit. (BIC)			1245.107	

**** p<0.01, ** p<0.05, * p<0.1*

Tab. 4: Random-effect regression model

Accident Rate	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Energy Transition	0.030	0.041	0.73	0.467	-0.050	0.110	
Firms' Size	-0.035	0.062	-0.57	0.569	-0.156	0.086	
Capital Intensity	0.022	0.038	0.56	0.574	-0.054	0.097	
Constant	4.392	0.424	10.36	0.000	3.561	5.223	***
Mean dependent var		4.117	SD dependent var			1.655	
Overall r-squared		0.10	Number of obs			736.000	
Chi-square		1.187	Prob > chi2			0.756	
R-squared within		0.001	R-squared between			0.005	

**** p<0.01, ** p<0.05, * p<0.1*

Decision: based on the regression model results, we do not have sufficient evidence to conclude that energy companies' transition to renewable energy is negatively related to the workforce's accident rates.

Tab. 5: Hausman's test for specification

	Coef.
Chi-square test value	6.049
P-value	.195

5. Conclusion

This study concludes that firms in the energy sectors need not worry about social issues on accidents rate because the dataset shows that energy transition has not worsened this social index. This implies that the employees would not resist energy transition since it is not having detrimental effects on it.

References

Andabaka, A., Basarac Sertić, M., & Harc, M. (2019). Eco-innovation and economic growth in the European Union. Zagreb International Review of Economics & Business, 22(2), 43-54.

Berrone, P., & Gomez-Mejia, L. R. (2009). Environmental performance and executive compensation: An integrated agency-institutional perspective. Academy of Management Journal, 52(1), 103-126.

Deesomsak, R., Paudyal, K., & Pescetto, G. (2004). The determinants of capital structure: evidence from the Asia Pacific region. Journal of multinational financial management, 14(4-5), 387-405.

Fernando, Y., & Wah, W. X. (2017). The impact of eco-innovation drivers on environmental performance: Empirical results from the green technology sector in Malaysia. Sustainable Production and Consumption, 12, 27-43.

Freeman, R. E. 1984. Strategic management: A stakeholder approach. Boston: Pitman

Iwata, H., & Okada, K. (2011). How does environmental performance affect financial performance? Evidence from Japanese manufacturing firms. Ecological Economics, 70(9), 1691-1700.

Mitchell, R. K., Agle, B. R., & Wood, D. J. (1997). Toward a theory of stakeholder identification and salience: Defining the principle of who and what really counts. Academy of management review, 22(4), 853-886.

Klassen, R. D., & McLaughlin, C. P. (1996). The impact of environmental management on firm performance. Management science, 42(8), 1199-1214.

Lee, K. H., & Min, B. (2015). Green R&D for eco-innovation and its impact on carbon emissions and firm performance. Journal of Cleaner Production, 108, 534-542.

Rokhmawati, A., Gunardi, A., & Rossi, M. (2017). How powerful is your customers' reaction to carbon performance? Linking carbon and firm financial performance. International Journal of Energy Economics and Policy, 7(6), 85-95.

Porter, M. E. (1991). Towards a dynamic theory of strategy. Strategic management journal, 12(S2), 95-117.

Porter, M. E., & Van der Linde, C. (1995). Toward a new conception of the environment-competitiveness relationship. Journal of economic perspectives, 9(4), 97-118.