Sustainability and Firm Performance:

A Case Study of Japanese Electronics Companies

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Abstract

Social legitimacy is a conventional view on why companies perform sustainability reporting. In this age of global warming, firms communicate their environmental performance to their varied stakeholders to renew their 'social license' as a responsible corporate entity. However, social and environmental performance was earlier viewed by management as a business nuisance. This study explores the impact of environmental innovations on financial performance of Japanese electronics companies following the growing literature linking corporate social performance with profitability. Using sample electronics companies listed in the Tokyo Stock Exchange, this industry case study focuses on the global manufacturing leaders as they play a significant role in advancing environmental reporting due to their supplier networks and subsidiaries. We initially investigate if sustainability performance of electronics companies positively impacts financial performance following the resource-based view perspective. Alternatively, we explore if environmental performance is facilitated by financial performance in prior years following the theory on slack availability of resources. Our findings point to risk minimization efforts of electronics companies in spite of declining profitability. Their sustainability performances are justified by the legitimacy granted to them as socially responsible that translates into improved revenue generation.

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INTRODUCTION

Sustainability reporting has been standardized in Japan for over a decade now. Guided by the Ministry of Environment's (MOE) initiative, these social and environmental reports accompany annual financial reports in communicating firm performance (MOE 2002). Japanese electronics manufacturers are significant in this age of global warming due to the magnitude of their distribution network worldwide, and the corresponding carbon dioxide emission in the production process and ultimate use by its customers.

Multinational companies (MNCs) are pressured by various stakeholder groups to be responsible in dealing with the environment (Stanwick & Stanwick, 2002). These changing values of stakeholders like host governments and the general consuming public made the MNCs integrate social and particularly environmental performance in their governance philosophy.

Sustainability is traditionally seen from a triple bottom line perspective namely society, economy and environment. However, over the past decade, Japanese sustainability reports exhibited the predominance of the environment in non-financial performance reporting. Arguably, following the paradigms of Senge (2002) and Hart (2005), without the environment there will be no society and without society, there will be no economy. The economy therefore depends on the environment, making environmental preservation and sustainability not only an obligation, but also a priority. This is highly relevant especially today, where globalization is rapidly enveloping the world and is causing serious implications on environmental sustainability. This is evident in an empirical study prepared by Tullao, Rivera, Cabuay, and Reyes (2011). The fruits of globalization entail a greater openness in trade, improvements in technology as shown in greater value added in the manufacturing industries (as it is believed that the exchange of technology benefits the manufacturing sector a lot more since it is capital-intensive), and greater

population, which all emprically increase the level of carbon emissions. Greater trade causes greater use of various transportation modes and hence greater use of fossil fuels, and the same with population growth since this entails a greater percentage of the population making use of automobiles and electronic products. Developments in the manufacturing industry require huge developments and huge increases in the production of the the electronics sector where electronic products are highly fossil fuel-intensive in their production processes. Thus, environmental strategies are relevant in this age of globalization. Therefore, there is a need for companies, particularly MNCs, to adapt more environmentally-friendly processes and environmental innovations for their products.

Environmental innovations started early in Japan in response to pollution problems in the 1970s due to rapid industrialization and economic growth. This is reflected in the product and process improvements that provide for waste minimization, reduction of CO2 emissions, elimination of toxic substances, and design for recycling.

Corporate social responsibility (CSR) literature has evolved into corporate social performance and more specifically could be operationalized into environmental performance or simply sustainability. Scholars have theorized the links of social performance positively with financial performance.

Following literature on corporate social performance and the link to financial performance, this study aims to: (1) present the environmental costs of innovations on product and process improvements; (2) determine the impact of these costs on financial performance on succeeding years; (3) and establish any impact of prior financial performance on future environmental innovations.

Theoretical Review and Recent Literature

From corporate social responsibility to sustainability reporting

Earlier corporate social responsibility (CSR) works particularly by Aupperle, Carroll & Hatfield (1985) pointed that CSR has no identifiable relationship with firm performance. However, as the construct developed into measurable variables of corporate social performance, environmental performance and eventually, sustainability, scholars are able to establish the link to financial performance (Orlitzky, Schmidt & Rynes, 2003).

Legitimacy and slack view of resources were theories that first emerged in explaining the trend of corporate social performance. The principle is that firms engage in social performance because they are bound by the legitimacy and power given by society (Wood, 1991). Social pressures have brought the motivations on competitiveness, legitimacy and ecological responsibility. Otherwise referred to as corporate ego (Spence, 2009), companies manage how they want to be perceived by establishing a responsible reputation.

More than addressing social pressures, on the other hand, corporate social performance was established to have a positive association with prior financial performance (Waddock & Graves, 1997). This suggests that with available or slack resources from successful financial performance, companies have the ability to engage in social performance.

The changing stakeholder concerns currently highlight environmental conservation through reduced CO2 emissions and pollution prevention. These made the construct of CSR evolve further into environmental performance measures in different variables of environmental management and life cycle assessment.

On the other hand, resource-based theorists, argue that companies invest in resources that are 'rare, valuable, non-substitutable, and imperfectly inimitable' to achieve an advantage over competition (Barney 2001). The business rationale for sustainability (Orlitzky, et. al., 2003) posits that corporate social performance has benefits to a company in terms of reduced costs, increased revenues, improved profits and reduced risks.

From 2000 onwards, there was a notable increase in environmental reports issued by companies to supplement their annual financial report. These were observed in countries like the United Kingdom, Germany and Japan with industries like chemical & pharmaceutical manufacturing, automotive and electronics topping the list. The role of regulation is important in stimulating this initial reporting mechanism until it gets institutionalized (Kolk, 2003).

Institutional theory (Dimaggio & Powell, 2003) could likewise explain the standardization of environmental reporting, particularly in Japan. Initially through 'coercive isomorphisms', the MOE prescribed the Guidelines for Environmental Reporting at the time when the Global Reporting Initiative (GRI) guidelines were being developed. Considering Japanese business and society, the consensus built on developing the

guidelines made majority of publicly listed companies comply. 'Mimetic isomorphisms' brought the trickle-down effect to the networks of organizations within the Japanese keiretsu system. Considering that a manufacturer has hundreds of subsidiaries and related parties worldwide, the consolidation at the headquarters will only be permissible if the sources of information are comparable, hence, facilitating mimetic activities across the network. Finally, 'normative isomorphisms' follow that environmental reporting has been standardized as a practice and that companies publish their reports not just a simple matter of compliance but as a mode of governance. Sustainability reports of Japanese companies communicate these very well in their environmental philosophy.

The Japanese electronics industry, relevant laws, and institutions for environmental innovation

The electronics industry of Japan is a multi-trillion yen industry with majority of production exported to global consumers. Its highest production output was at the turn of the century at JPY 26.2 trillion and the value was sustained at roughly JPY 20 trillion from 2001 to 2007. However, due to the global economic crisis, production plummeted to its all time low in 2009 at JPY13.6 trillion (JEITA, 2010).

Processes used by electronics companies are naturally energy-intensive and produce a lot of carbon emissions as well as other wastes (electronic wastes or e-wastes in particular). Electronic waste is comprised of discarded computers, electronic office equipment, electronic entertainment devices, mobile phones, television sets and refrigerators. These wastes when inappropriately disposed of, produce many harmful elements and chemicals that contribute to not only greater pollution, but also harmful health detriments. Most hazardous wastes found in electronic products are americium, mercury, sulphur and lead. These substances are deadly as they are either poisonous or are able to cause various diseases (cancer, sensory impairment, damage to organs) and may cause the same level of damage to the environment through the release of harmful chemicals into the atmosphere.

The best example for this is the microchip. The microchip is the most basic element in any electronic product. The study of Williams, Ayres and Heller (2002) find that the estimated fossil fuel and chemical inputs used

to produce one 2-gram microchip 1,600 grams and 72 grams respectively. Secondary materials used in production total 630 times the mass of the final product, indicating that the environmental burden is significantly greater than the small-sized product, and that is just the most basic element in electronics. What about the other advanced elements used in more specialized electronic products? Surely these more specialized products entail more intensive use of fossil-fuel-based processses.

The Japan Electronics and Information Technology Industries Association (JEITA) is the industry association that coordinates the environmental activities of its members particularly the reduction of greenhouses gases in pursuit of the provisions of the Kyoto Protocol. JEITA basically aims to promote the healthy manufacturing, international trade and consumption of electronics products and components to contribute to the overall development of the electronics and information technology industries, thereby expanding and accelerating Japan's economic development and cultural prosperity (JEITA, 2010). Aside from its objectives of ensuring global competitiveness, development of human resources and developing the electronics and information technology industries of Japan, JEITA is currently developing its own countermeasures for global warming, and is currently taking the lead role in actively pursuing activities to help achieve a global social structure sustaining both environmental preservation and economic progress. JEITA's basic policy is to promote the Green Innovation Strategy through research and development, and other activities through the help of other related organization such as the Green IT Promotion Council and the Japan Green Procurement Survey Standardization Initiative.

One of the main thrusts of the JEITA is to build a low-carbon society; proposing policies for an international framework to reduce the greenhouse gas emissions, to help achieve the goals of the Kyoto Protocol, develop the method of calculating the contribution of products and services to carbon emission reduction and consider international applicability and analyzing the feasibility of crediting the emissions replaced by replacing home appliances with energy-saving ones, and engaging in consistent activities to clarify the contribution of components and products to carbon emission reduction (JEITA, 2010).

There are two applicable laws on environmental sustainability practices: The Basic Environment Law and the Home Appliance Recycling

Law. Three principles are carried out in the Basic Environment Law: (1) that blessings of the environment should be enjoyed by the present generation without compromising the future generation; (2) that a sustainable society minimizes the impact of human activities on the environment; (3) and that Japan should contribute actively to global environmental conservation (Stanwick & Stanwick, 2002).

Particularly, the Home Appliance Recycling Law (formerly the Specified Home Appliance Recycling Law) that took effect in April 2001 required manufacturers and importers to collect and recycle their own appliances. While the broad implementation of extended producer responsibility (EPR) in Europe has received significant attention, EPR in Japan is often overlooked. Nonetheless, in recent years, the Japanese government has enacted producer responsibility requirements for waste packaging, end-of-life vehicles, electric appliances, and personal computers. Like European models on recycling, the 'old for new' principle means manufacturers must take back from the consumer either a similar or used product through collection outlets (INFORM, 2003). This entails disposal costs for consumers depending on the electronic appliance. There are two general consortiums. Group A is composed of Electrolux, GE, Matsushita and Toshiba. Group B is composed of Daewoo, Hitachi, Sanyo, and Sharp. Companies with limited products in Japan may engage the recycling services of other organizations (INFORM, 2003). Nevertheless, some electronics manufacturers like Toshiba have built their own recycling facilities that manage specific concerns like materials renewal and toxic waste disposal (Cortez, 2011). Unlike the EU's directive on waste electrical and electronic equipment, the Home Appliance Recycling Law does not include collection targets, but instead emphasizes recycling goals, requiring certain rates of recycling for each type of appliance. As of late 2002, the national recycling rate was 3kg per capita for all appliance targeted under law.

While the individual companies are required to track, among other things, the weight of their own products collected and recycled within each product category, the Association for Electric Home Appliances is responsible for aggregating this data and voluntarily reports on implementation of the law. The Home Appliance Recycling Law does not specify a public reporting schedule, but individual companies, the government, and the AEHA publicly disseminate the data collected on

recycling results. The Home Appliance Recycling Law enables Japanese companies to set up plants in other countries to sell turnkey solutions, establish recycling systems for other electronic products, and develop international standards based on Japanese experience (Department of Trade and Industry, 2005).

Sustainability and financial performance

Sustainable development is a type of development that aims for economic development, environmental protection, as well as poverty and inequality reduction. It is what is known as a "development that lasts", a development that meets the needs of the present generation without compromising the needs of future generations.

For the purposes of this study, sustainability shall be defined based on the Dow Jones (2010) corporate sustainability definition as:

> "...a business approach that creates long-term shareholder value by embracing opportunities and managing risks deriving from economic, environmental and social developments."

The focus on shareholder value relates to the impact of sustainability practices on financial performance. The conceptual benefits espoused by authors supporting this view are: environmental management practices and technologies include cost reduction, revenue enhancement, supplier ties, reduction of liabilities, competitive edge, quality improvements, efficiency, more productive work force, and reducing business risk (Senge, 2002; Hart 2005; Orlitzky, et. al., 2003).

Alternatively, 'concurrent bi-directionality' was established by Orlitzky et. al (2003) in their meta-analysis of studies on corporate social performance and financial performance. They concluded that there is a virtuous cycle where corporate social performance and financial performance mutually reinforce each other in a short loop cycle, suggesting applicability in immediate future periods (Orlitzky, et. al., 2003).

A study by Cortez and Cudia (2011) makes use of a panel data regression on the effects of environmental innovations on the top electronic companies' financial performance as well as the reverse direction for the period 2001-2009. They find that environmental

innovations positively, and significantly impact sales, and firm size/assets over the long-run, but counter-intuitively, environmental innovations appear to empirically increase long-term debt, which led the authors to conclude that electronics companies make use of debt-financing to engage in CSR activities. However, their other hypotheses on the effects of environmental innovation on profitability, shareholder wealth, were rejected due to the coefficients of the variables being statistically indifferent from zero. The other side of the relationship (the slack availability side) seems to be reinforced as well, however, has weaker coefficients (Cortez & Cudia, 2011). To verify the completion of the virtuous cycle of environmental innovations and financial performance, the study made use of the bivariate Granger Causality Test on the individual companies and found that only Panasonic exhibits the complete virtuous cycle among the other top electronics companies and that risk-minimization appears to be a predominant motivation for electronics companies to invest in environmental innovations. They therefore conclude that the virtuous cycles are broken over the long-run, and that they do not hold consistently over time.

Cortez (2011) performs fixed effects panel data regression analysis on 20 out of 50 top actively traded companies in the Tokyo Stock Exchange comprising automotive, diversified, electronics, and heavy industries over the period 2004-2009. Compared to the results of Cortez and Cudia (2011), Cortez (2011) makes use of different representative variables for the same hypothesis on the impacts of revenues, profits, firm size, long-term debt and shareholder wealth and vice-versa in a sense that he considers market performance variables like book values, high prices for 1 year, pretax income and the like, aside from the usual financial performance indicators. The reversed direction, namely the slack availability of resources, appeared to have a weaker relationship thus reinforcing the accumulated slack theory that benefits are accumulated from the bi-directional relationship of constructs.

The perception of Japanese electronics firms on the virtuous cycle of enivronmental innovations and financial performance

A study by Cortez and Nugroho (2011) surveys the perception of the top electronics companies on the existence of the virtuous cycle: that investment in CSR activitites and environmental innovations generally

enhance an electronics firm's financial performance, and in return, better financial performance allows the firm to invest more in environmental innovations and engage more in CSR activities. Given the resource-based view, around half of the sample strongly agreed that environmental innovations positively influence their revenues, profitability, firm size/ assets and enhance shareholder wealth, whereas environmental innovations decrease risks and long-term debt. Nearly fifty percent (50%) remained neutral on the issue signifying that they may not believe in the theory or possibly not experiencing the said benefits of environmental innovations in theory, except for the perspective that environmental innovations decrease risk wherein there was a consensus of agreement in the sample. There is generally a variation among the electronics companies regarding the enforcement of the resource-based view, but they express a better relative level of unanimity regarding the slack availability of resources theory which states that better financial performance leads to greater environmental investments. Majority of the sample agreed with the hypothesis posted by the slack availability of resources, and relatively few firms remained neutral for the lot of the questions. They conclude therefore that electronics companies have not yet recovered economically from their turn of the century financial performance levels which have been worsened by the recent global crisis. Also, scholars advocate that there may exist a virtuous cycle that mutually reinforces the two theoretical perspectives. However, notwithstanding an empirical basis, the cycle appears to be broken as perceived by management of Japanese automotive and electronics companies.

Environmental accounting in Japan

Consistent with the Kyoto Protocol, The MOE of Japan promulgated a guideline for environmental accounting system in 1998 to enable the public to correctly understand, evaluate and support the manner of environmental conservation of companies. The guidelines were revised in 2002 and can be summarized into three key points: conservation costs, conservation effects and economic effects (MOE, 2002).

The guideline aims to identify the cost of environmental conservation during the normal course of business, identify the benefits gained from such activities, provide the best possible means of quantitative measurement (in monetary or physical units) and support the communication of results. It is

intended to integrate financial performance and environmental performance through correlating the environmental conservation effects and economical effects with environmental measures (MOE, 2002).

However, the guidelines were criticized to provide much room for management discretion in estimating the benefits (Kokubu & Nashioka, 2002). This is where we would take off in determining the relationship between environmental costs and actual financial benefits by using traditional measures of financial performance.

A similar study was performed by Kokubu & Nashioka (2001) earlier when environmental accounting system of reporting was still in its infancy stage. They found that there is no significant difference in corporate size (sales, total assets, operating profits) between companies which disclose environmental accounting information in their environmental reports and those which do not. But there is a significant difference between comapnies that implement advanced environmental accounting based on some kind of standards and those which do not. They conclude as well that theguidelines prepared by the MOE has a strong influence on the methods of disclosing environmental costs, conservation effects and economic effects. Environmental costs have a siginficant positive correlation with companies' sales, total assets and operating profits, as well as a significant positive correlation on economic effects. Environmental accounting in Japanese companies exhibits complicated features since standardization is progressing in the midst of much diversity. A decade of comparable information, as prescribed by the guidelines, provides us with data that could be correlated with various archival data on the Japanese electronics companies.

Methodology

Ten large electronics manufacturers were chosen from the Tokyo Stock Exchange (TSE) within the classification of consumer electronics, office equipment, computers & peripherals and household appliances. These brands carry global recognition with varied product lines. Information from the Japan Electronics & Information Technology Association (JEITA), Business Insight COMPUSTAT, and Dow Jones Sustainability Index facilitated the choice of the following: JVC Kenwood, Canon Inc., Casio Computer, Sharp Corp., Oki Electric, Hitachi Ltd.,

Fujitsu Ltd, Toshiba Corporation, Panasonic Corp., and Sanyo Electric.

Annual reports for the nine year period covering 2001 to 2009 were reviewed for revenues, profit, assets, liabilities and equity. The data set was compared with information generated from COMPUSTAT and Dow Jones Factiva.

As for environmental costs, the sustainability reports of the ten companies were gathered from their websites. Environmental investments and maintenance costs were totaled to provide for consistency of treatment of research and development, the main item of environmental expenditure. It should be noted that sustainability reports are published a year after annual financial reports and that there is an adjustment and estimate mechanism in coming up with the environmental investments and environmental maintenance costs. Hence, environmental costs are not in accordance with GAAP; but rather in compliance with the format and classification prescribed by the MOE. As a result, the year of publication captures the environmental costs of the previous fiscal year. We used the year of publication, nevertheless in tabulating data to link environmental costs with financial performance in succeeding years.

In support of the academic literature (Senge, 2002; Hart, 2005; Orlitzky, et. al., 2003; Kokubu & Nashioka, 2002) linking corporate social performance with financial performance, we have the following propositions:

H1: Environmental costs positively impact revenue generation.
H2: Environmental costs positively impact profitability.
H3: Environmental costs positively impact firm size (assets).
H4: Environmental costs negatively impact accounting risk (liabilities).
H5: Environmental costs positively impact shareholder wealth.

Alternatively, we explore the possibility of 'reciprocal causality' (Orlitzky, et. al., 2003) by interchanging the variables environmental costs and financial performance. By using financial measures of revenues, profit, assets, liabilities and equity against the next year's environmental costs, arguably, a 'virtuous cycle' could be established (Orlitzky, Schmidt, & Rynes 2003). Hence, the following propositions:

H6: Revenue generation positively impacts environmental costs in the succeeding period.

H7: Profitability positively impacts environmental costs in the succeeding period.

H8: Firm size positively impacts environmental costs in the succeeding period.

H9: Liabilities negatively impacts environmental costs in the succeeding period.

H10: Shareholder wealth positively impacts environmental costs in the succeeding period.

Results and Discussions

Panel regression analyses were performed to determine the two-directional relationships, i.e., if environmental costs have impact on financial performance of the Japanese electronics companies included in this study for the years 2001 to 2009; and vice versa. This section presents the results and discussion regarding the first panel regression analysis, i.e., the impact of environmental cost on financial performance as follows:

Table 1. Environmental cost impacts financial performance

	P values	Adj.R2
Revenue	0.000	0.9762
Profit	0.588	0.2747
Assets	0.897	0.9773
Liabilities	0.001	0.9197
Equity	0.797	0.9328

* test of heteroskedasticity and autocorrelation performed; level of significance at 0.05

Impact of environmental costs to sales

Results show that environmental costs positively impact sales. Highly significant at $\alpha = 0.05$, coefficient of determination suggests goodness of fit in the model. This finding is consistent with the literature pointing the direction of relationship and the impact of social performance on financial performance (Senge, 2002; Hart, 2005; Orlitzky, et. al., 2003). Hence, it can be deduced that environmental sustainability performance measured in environmental costs positively impact revenue generation by Japanese

electronics manufacturers. This suggests that consumers value the eco-efficiency and environmentally compliant product designs of Japanese electronics manufacturers. Likewise, legitimacy could be basis why reputable electronics companies enjoy increasing revenues.

Impact of environmental costs to profitability

The figures in the analysis do not substantiate our hypothesis that environmental costs positively impact net income of Japanese electronics companies included in this study.

The above findings can be attributed to the operating losses incurred by Japanese electronics manufacturers particularly during the global financial crisis of 2008. The strengthening of the yen against the U.S. dollar decreased the value of Japanese exports coupled with the decline in volume of global demand. Nevertheless, it did not prevent the companies from engaging in product and process innovations that promote sustainability. This may run contrary to the slack view of resources yet upholds the legitimacy perspective (Wood, 1991) that companies are environmentally compliant. An alternative view is that profitability could have worsened had customers not patronized the products measured in revenues if the companies were not legitimized by their sustainability performance.

Impact of environmental costs to firm size (assets)

Contrary to prior expectation, environmental costs incurred by companies included in this study do not show positive impact on firm size measured in terms of assets. This may be a result of sustained losses hence, equity and assets are reduced in the comparative period of observation.

Impact of environmental costs on risks (liabilities)

Liabilities are also significantly controlled by environmental costs in an inverse manner, i.e., as environmental cost increases, accounting risk in terms of liabilities decreases. This supports the conventional theory, which posits that social, environmental performance, and disclosures reduce risks of contingent liabilities like environmental clean-up costs, fines and litigation costs (Orlitzky, et. al., 2003; McGuire, Sundgren, & Schneeweis, 1988).

Impact of environmental costs on shareholder wealth (equity)

Results show the same impact of environmental costs on firm size. Contrary to *a-priori*, these costs spent by companies included in this study do not show positive impact on shareholder wealth in terms of firm's equity.

Reciprocal causality

Furthermore, to test our hypotheses on 'reciprocal causality'(Orlitzky, et. al., 2003), i.e., financial performance impacts next period's environmental cost, the following section presents the results of the panel data regression analysis performed for the same period covering 2001 to 2009. This shows the impact on environmental costs in the succeeding period given their financial performances in terms of revenue, net income, assets, liabilities and equity.

Table 2. Financial performance impacts environmental cost in the succeeding period

	P values	Adj.R2
Revenue	0.000	0.9145
Profit	0.588	0.8740
Assets	0.897	0.8736
Liabilities	0.001	0.8899
Equity	0.797	0.8737

* test of heteroskedasticity and autocorrelation performed; level of significance at 0.05

Impact of current revenues on next period's environmental costs

Results show that current revenues significantly impact the investment in environmental costs in the succeeding period. As environmental costs positively impact sales as presented in the preceding section, this study proves the two-way direction of relationships amongst variables. Hence, revenue generation in the current period mutually reinforces investments in environmental costs in succeeding periods.

Impact of current profitability on next period's environmental costs

As shown in Table 2, we failed to prove our hypothesis that current profit positively impacts next period's environmental costs as the p-value is not significant. Referring to Table 1, likewise, the relationship of

environmental costs and profitability is insignificant. Hence, profitability in the current period does not mutually reinforce investments in environmental costs in succeeding periods.

Impact of firm size on next period's environmental costs

We failed to prove our hypothesis concerning the impact of firm size on environmental costs. Table 2 shows that at 5 percent level of significance, firm size in terms of assets does not positively impact next period's environmental cost. This suggests that sustainability performance is somehow independent of the current financial position and perhaps driven by other factors like legitimacy.

Impact of liabilities on next period's environmental costs

As shown in Table 2, at 5 percent level of significance, the relationship between environmental innovations and liabilities is significant. The result is consistent with the literature that points to the negative correlation between environmental costs and liabilities. As firms engage in social and environmental performance, risks are minimized and measured in terms of decreases in liabilities. These decline in liabilities should reinforce environmental costs in succeeding years.

Impact of shareholder wealth on next period's environmental costs

In contrast to prior expectation, current shareholders' wealth does not positively impact the investment in environmental cost in succeeding periods. Since the results for the first direction is the same, this study was not able to prove that there is a relationship between environmental cost and shareholders' wealth, notable to have the same impact of environmental costs on firm size.

CONCLUSION AND RECOMMENDATIONS

Our study supports the growing literature linking corporate social performance with financial performance and alternatively explores what is referred to as 'reciprocal causality' (Orlitzky, et. al., 2003). By operationalizing social performance in terms of environmental costs contained in sustainability reports of Japanese electronics manufacturers, we empirically tested its impact on financial performance.

As shown in Tables 1 and 2, we posit the direction of relationships between environmental costs and financial performance. Environmental costs positively impact revenue generation and vice versa. This confirms earlier relationship established in literature as well as the negative relationship of environmental cost on liabilities by reducing accounting risks. Electronics companies have not yet recovered from the decade's accumulated losses. However, it is extremely important that environmental innovations impact their revenues and minimize their risks. Their financial condition could have worsened had they not engaged in sustainability performance.

Our study, however, is not able to establish the relationship of environmental costs with profitability, firm size and shareholders' equity according to expectations. An alternative explanation could be the incurred losses of these companies in recent years due to the global financial crisis, particularly the strengthening of the Japanese yen and the plummeting global volume demand for electronics.

Probably the key contribution of our study to literature is the qualification of earlier conceptualizations that financial performance measured in profits, assets and shareholders' equity reinforce investments in social performance that is measured in environmental cost. In the case of Japanese electronics companies, they may not be profitable yet revenue generation and risk minimization matter as a benefit of sustainability performance.

We used ten globally recognized brands of Japanese electronics and it would be an area for further research to consider other market players for more conclusive results. Likewise, this study may be replicated in other key manufacturing industries that are relevant to environmental sustainability.

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