

FIRM LEVEL ENVIRONMENTAL PERFORMANCE AND FINANCIAL DEVELOPMENT: PRELIMINARY EVIDENCE FROM MALAYSIA

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ABSTRACT

This paper presents a preliminary analysis of survey data in a study to examine the relationship between the financial performance and environmental achievements of Malaysian public listed companies. Data on 30 firms in pollution-intensive industries is used to describe five dimensions of the firm, namely, the facility's characteristics, environmental management systems and tools, environmental measures and innovation, motivations of environmental practices, and public environmental policy. Industries included in the study are the construction industry, mining, agricultural plantations, hotel and trading services. Firms in the sample are located in the states of Selangor, Sabah, Pulau Pinang, Sarawak, Kedah, Melaka, Negeri Sembilan, Trengganu, and the federal territory of Kuala Lumpur. The survey study is still in progress, hence the presentation of the current analysis to highlight the link between firm level environmental performance and firm-level financial development is an early assessment. However, descriptive statistics thus far are found to provide useful insights into the environmental behavior of firms in our study. There have been similar studies conducted in other countries, and the current study will examine the case for Malaysia. Our preliminary analysis suggests that while public-listed firms are concerned about economic performance, they are at the same time aware of the importance of taking measures to reduce negative environmental impacts. In addition, statistics show that firms undertake environmental management practices primarily to comply with government environmental regulations and to advance the firm's corporate social image, rather than to counter adverse direct effects on the environment.

Key words: Environmental management, pollution, financial performance, firm-level survey.

Introduction

Most developing countries undertake policies that enable the achievement of high economic growth to raise living standards. Increased income per capita may lead to higher material gains; however, quality of life may be measured by factors other than material wealth such as health and environmental sustainability. This paper examines the relationship between economic attainment and environmental performance of firms in Malaysia¹. We describe survey responses from public listed companies that form the basis of the preliminary analysis of the current data in our study. Firms in our survey sample are engaged in the production of goods and services in pollution-intensive industries including construction, mining, agricultural plantations, hotels and trading services. Most of the firms are headquartered in the Malaysian state of Selangor where nine of the thirty firms in the study are located. Six firms in our sample are from Kuala Lumpur, the capital city of Malaysia, five firms come from the state of Sabah, three are from Pulau Pinang, two from the state of Sarawak, and one firm each from the states of Kedah, Melaka, Negeri Sembilan and Terengganu. Descriptive statistics that analysed the responses to the research questionnaire suggest that Malaysian firms are aware of the importance of environment issues, and of undertaking measures to incorporate environmental management practices in the firm's production processes.

We discuss background and literature review in the next section, and present our descriptive statistics in section three. Section four provides a discussion of findings, while section five concludes.

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Background

Malaysia is a developing country that has achieved high rates of economic growth over a span of thirty years. Beginning with the implementation of national economic development programs decades after achieving its independence, Malaysia has transformed its economic landscape from an agro-rural economy to a modern industry-based economy that competes in the international trade markets. While the country has made impressive progress economically, it is currently attempting to move towards making progress on environmental issues as the country strives to achieve the status of being an industrialized economy by the year 2020.

The current study examines the issue environmental management practices of public listed companies in Malaysia. It attempts to relate firm-level environmental behaviour to the firm's financial performance. Previous studies have suggested that the environmental aspects of the firm's operations are linked to its financial performance, notably in developed countries such as Japan and the United States of America. In their study, Iwata and Okade (2011) find that while waste emissions do not have significant effects on the financial performance of Japanese manufacturing firms, the reduction of greenhouse gas emissions does suggest significant effects on financial performance. Rassier and Earnhart (2011) find evidence to suggest that environmental regulation, namely, the Clean Water Act, leads to improvement in the financial performance of firms in both the short run and in the long run. Rassier and Earnhart (2011) based their panel-data study on chemical manufacturing industry group in in the United States of America. Khanna and Kumar (2011) use a truncated regression model to estimate the benefits of the comprehensiveness of environmental management systems (EMS) and find that the adoption of an additional practice leads to approximately US\$ 35.5 million benefit for the average firm. Ziegler et al. (2009) find that for energy firms in the United States, disclosed corporate responses to climate change are associated with positive stocks performance. Meanwhile, panel-data analysis on Japanese manufacturing firm by Nishitani (2011) suggests that the implementation of environmental management systems leads to increases in value-added, an index of the firm's economic performance.

The aforementioned studies suggest that for many countries, the firm's environmental performance may influence its economic or financial performance. In the case of Malaysia, no study has been undertaken to examine the relationship between the environmental performance and the economic performance of firms. Oursurvey instrument is based on a questionnaire used in a similar study by the Organisation for Economic Co-operation and Development (OECD) which we modified. While the current study is still in progress and thus has not yet attained a sufficiently large sample to allow for an estimation analysis, the descriptive statistics of our survey data thus far provide a preliminary insight into the Malaysian case.

Descriptive findings

The survey examined five dimensions of the environmental aspects of 30 firms in our study sample. These environmental aspects include the following: facility characteristics, environmental management systems and tools, environmental measures and innovation, motivations of environmental practices, and public environmental policy. In this section, we discuss the descriptive statistics along the lines of the aforementioned dimensions.

Facility characteristics

The profiles of public listed companies surveyed in this study are tabulated in Table 1. The primary customers of 36 percent of the firms' products are other manufacturing firms and 32 percent have other facilities within their own firms as their primary customers. Customers of 13 percent of the firms are wholesalers or retailers, and another 13 percent have households as their primary customers. On the scope of the market, 32 percent of the firms engage in global market trade, 29 percent in the local market, 10 percent in the national market, and 7 percent in the regional market.

In terms of years of operation, one fifth of the firms in the survey sample are young companies, with 23 percent in the 0 - 10 years' age bracket; 16 percent are in the age bracket of 11 - 20 years; nearly 10 percent are in the age brackets of 21 - 30 years; another 10 percent in the 31 - 40 years; and 13 percent in the age bracket of 41 - 50 years.

When asked whether firms allocate a portion of their research and development budget specifically for environmental matters, one quarter or 26 percent say they do, while a majority 71 percent say they do not.

Many firms, about 42 percent in the sample, did not respond to the question concerning revenue that pertains to the firm's profit. However, the majority of the firms that do respond indicate that they earn a small profit, comprising 29 percent of firms in the sample, while another 10 percent indicate they earn revenue well in excess of costs. This means about 39 percent has positive profits, with another 10 percent of firms indicating that they break-even in the earnings of their revenue.

Firms respond to the question of whether they are listed on a stock exchange board by indicating that 67 percent of the firms are listed, 13 percent say they are not, and 20 percent did not provide any indication. These statistics have yet to be ascertained as to whether the firms that responded in the negative are actually subsidiary firms of a public-listed company. Meanwhile, the majority of firms at 73 percent are headquartered locally.

Interestingly, 53 percent of the firms in this sample indicate that they have an environmental department, while 27 percent indicate that they do not have an environmental department.

In terms of green practices, only 23 percent of firms indicate that they use renewable sources to generate fuel, heat or electricity, while 53 percent do not. However, 43 percent indicate that they use technology or practices to improve energy efficiency, while 30 percent of firms say they do not. The majority of firms, about 77 percent, do not use technology or practices to specifically reduce greenhouse gases other than through renewable energy generation and energy efficiency, and only 13 percent report that they do. In terms of using technology or practices in operations to conserve natural resources, excluding the use of recycled inputs, only 17 percent of firms indicate that they undertake such measures.

Table 1: Facility characteristics (in percentage %)

| | | | | | | |
|---|--|--|--------------------------------------|--|--|------|
| Primary customers of firm's products | Other manufacturing firms | Wholesalers or retailers | Households | Other facilities within your firm | Not applicable (N/A) | |
| | 35.5 | 12.9 | 12.9 | 32.3 | 6.4 | |
| The scope of firm facility's market | Local | National | Regional | Global | N/A | |
| | 29.0 | 9.7 | 6.5 | 32.3 | 22.6 | |
| | 0 - 10 | 11 - 20 | 21 - 30 | 31 - 40 | 41 - 50 | N/A |
| What is the approximate age of your facility (in years)? | 22.6 | 16.1 | 9.7 | 9.7 | 12.9 | 29.0 |
| Firm facility has a budget for research and development specifically related to environmental matters? | YES | | NO | | N/A | |
| | 25.8 | | 71.0 | | 3.2 | |
| Assessment on firm facility's overall business performance over the past three years. | Revenue has been so low as to produce large losses | Revenue has been insufficient to cover costs | Revenue has allowed us to Break-even | Revenue has been sufficient to make a small profit | Revenue has been well in excess of costs | N/A |
| | 6.5 | 3.2 | 9.7 | 29.0 | 9.7 | 41.9 |
| | | | YES | NO | N/A | |
| Firms listed on a stock exchange? | | | 66.7 | 13.3 | 20.0 | |
| Is your firm's head office located in a foreign country? | | | 6.7 | 73.3 | 20.0 | |
| Firm has environmental department (or equivalent such as environmental, health and safety department)? | | | 53.3 | 26.7 | 20.0 | |
| Firm's facility generates electricity, heat, or fuel using renewable sources. | | | 23.3 | 53.3 | 23.3 | |
| Firm's facility uses technologies or practices to improve energy efficiency. | | | 43.3 | 30.0 | 26.7 | |
| Firm's facility uses technologies or practices to reduce greenhouse gas emissions through methods other than renewable energy generation and energy efficiency. | | | 13.3 | 76.7 | 10.0 | |
| Firm's facility uses technologies or practices in operations to conserve natural resources, excluding the use of recycled inputs in production processes. | | | 16.7 | 3.3 | 80.0 | |

Environmental management systems and tools

Table 2 describes the results of our descriptive analysis on the first section of the questionnaire that addresses the firm's environmental management systems and tools. The table shows that 90 percent of the 30 companies surveyed assigned personnel that are explicitly responsible for the environmental aspects of the firm. In purchasing or marketing of goods and services, 57 percent of firms consider assessing the environmental performance of their suppliers. Meanwhile, 60 percent require their suppliers to undertake environmental measures, and 30 percent inform their customer or buyers on how to reduce environmental impacts as a result of using their goods.

When firms are asked about the type of practices that they have established in their facility in order to implement environmental management, 83 percent conduct their business with regard to environment matters based on written environmental policy.

Additionally, 70 percent placed environmental training programs for their employees, 80 percent carried out internal environmental audits and 57 percent conducted external environmental audits. In addition, 47 percent have a benchmark for environmental performance, 60 percent have environmental performance indicators or goals, and 47 percent of firms have used environmental criteria to evaluate or compensate their employees. On the other hand, only 27 percent of the 30 companies engage in environmental reporting, while 30 percent use an environmental accounting system.

Table 2: Environmental management systems and tools

| | Frequency | Percentage (%) |
|---|-----------|----------------|
| Explicitly Responsible Person: | | |
| Explicit responsibility | 27 | 90.0 |
| Non-explicit responsibility | 3 | 10.0 |
| Areas of Person in Charge: | | |
| Senior Management | 6 | 20.0 |
| Production/Operation | 6 | 20.0 |
| Product Development | 2 | 6.7 |
| Human Resource | 5 | 16.7 |
| Specialized Environmental Department | 4 | 13.3 |
| Others | 7 | 23.3 |
| Consideration Measure of Purchasing/Marketing Goods and Services: | | |
| Assessing environmental performance. | 17 | 56.7 |
| Requiring to undertake environmental measure. | 18 | 60.0 |
| Informing how to reduce environmental impact. | 9 | 30.0 |
| Practices Implemented on Environmental Management: | | |
| Written environmental policy. | 25 | 83.3 |
| Environmental criteria used in the evaluation and/or compensation of employees. | 14 | 46.7 |
| Environmental training program in place for employees. | 21 | 70.0 |
| Carry out external environmental audits. | 17 | 56.7 |
| Carry out internal environmental audits. | 24 | 80.0 |
| Benchmark environmental performance. | 14 | 46.7 |
| Environmental accounting. | 9 | 30.0 |
| Public environmental report. | 8 | 26.7 |
| Environmental performance indicators / goals. | 18 | 60.0 |
| Consideration to Introduce Environmental Management System: | | |
| Help to prevent or control pollution. | 24 | 80.0 |
| Improve efforts to achieve regulatory compliance. | 24 | 80.0 |
| Reduce applicability of some regulations. | 19 | 63.3 |
| Better identify future environmental liabilities. | 23 | 76.7 |
| Improve our relations with regulatory authorities. | 21 | 70.0 |
| Regulators' incentives made it attractive. | 13 | 43.3 |
| Allow for differentiation of our products. | 19 | 63.3 |
| Improve our facility's profile/image. | 24 | 80.0 |
| Create cost savings in terms of use of inputs. | 18 | 60.0 |
| Create cost savings in terms of waste management. | 21 | 70.0 |
| Improve information about our facility's operations. | 22 | 73.3 |
| Other facilities like adopting similar systems. | 15 | 50.0 |
| Actual implementation of Environmental Management System: | | |
| Implemented. | 13 | 43.3 |
| In progress. | 7 | 23.3 |
| Expected Benefits of Environmental Management System is as Anticipated: | | |
| | 13 | 43.3 |

Table 2 (Cont.): Environmental management systems and tools

| Implementation of Other Management Practices: | | |
|--|----|------|
| Quality management system (<i>e.g.</i> ISO 9000). | 24 | 80.0 |
| Health and safety management system. | 28 | 93.3 |
| Full-cost or activity-based accounting. | 15 | 50.0 |
| Management accounting system. | 22 | 73.3 |
| Process or job control system. | 17 | 56.7 |
| Inventory or materials requirement planning. | 19 | 63.3 |

On the question of whether firms would consider introducing an Environmental Management System (EMS) within their organization, 67 percent of the 30 firms have considered implementing EMS. A total of 80 percent of the firms anticipate that EMS would help to prevent or control pollution; another 80 percent of firms expect that EMS would help improve efforts to achieve regulatory compliance, and 80 percent of the firms expect it to improve the firms' or facility's profile and image. Furthermore, 23 percent of firms have the opinion that EMS would result in better identification of future environmental liabilities, while 22 percent look forward for the EMS to improve information about their facility's operations. In addition, 19 percent of firms expect that EMS would reduce applicability of some regulations, 21 percent expect EMS to improve firms' relations with regulatory authorities, while 19 percent expect it to allow for product differentiation. Further, 18 percent expect EMS to create cost savings in terms of use of inputs and 21 percent of firms expect EMS to create savings in in terms of waste management. Only 13 percent of firms indicate that regulators' incentives made EMS attractive to implement while 15 percent of facilities would like to adopt similar systems.

The statistics show that 43 percent of firms have implemented EMS since the year 1992 and have been awarded ISO14000. Meanwhile, 7 percent of firms are in the process of executing EMS. Of the firms that carried out EMS, 43 percent agree that the application of EMS provide benefits. In addition to EMS, 80 percent of firms have implemented quality management systems such as ISO 9000, while 93 percent are involved in the execution of health and safety management system, 73 percent in the implementation of management accounting system. Further, 63 percent of firms implement inventory or materials requirement planning, 50 percent implement full-cost or activity-based accounting, and 57 percent are in the process of implementing job control systems.

Environmental measures, innovation and performance

In this section, firms are asked to provide an overall picture of how their facility has sought to address the environmental impacts of its production activities through technical measures and innovations. Table 3 shows that 40 percent of firms do not consider the use of natural resources as having negative environmental impact from their products and production processes. Many firms, at 47 percent believes that the use of natural resources have moderately negative environmental impact, while only 7 percent of firms indicate that the use of natural resources has very negative impact on the environment.

Most firms indicate that solid waste generation, wastewater effluent, local or regional air pollution, global pollutants and the risk of severe accidents have only moderately negative environmental impacts, at respectively 57 percent of firms, 43 percent, 47 percent, 40 percent, 57 percent and 53 percent of firms indicating their moderate perspectives. On the matter of soil contamination, the majority of firms at 47 percent indicate that soil contamination has no negative impact on the environment. Only 10 percent of the firms indicate that soil contamination has very negative impact on the environment.

Statistics further indicate that 70 percent firms do regularly monitor the use of natural resources, 70 percent monitor solid waste generation, 67 percent firms monitor wastewater effluent, 57 percent monitor air pollutants and 67 percent monitor the risk of severe accidents. Aesthetics effects, global pollutants and soil contamination are monitored by 43 percent, 33 percent and 30 percent of firms, respectively.

Firms that undertake concrete actions to reduce environmental impacts outnumber firms that do not. 73 percent of firms take measures to reduce solid waste generation, 70 percent take actions to reduce wastewater effluent, 67 percent take actions to reduce the environmental impacts of the use of natural resources, and another 67 percent take steps to mitigate the environmental impacts of the risk of severe accidents. 57 percent of firms take significant technical measures to reduce environmental impacts by making changes in their production technologies.

Motivations of environmental practices

Pollution abatement and the reduction of negative environmental impacts entail costs that would affect the profit level of companies engaged in dirty productions. Environmental standards and regulations that require compliance means that the firms need to set aside expenditures that would otherwise form part of the firm's financial portfolio. In this next section, companies are

asked to reveal their primary motivations in undertaking measures to alleviate the environmental impacts of their business activities.

Table 3: Environmental measures and innovation

| | Not impact | Moderately negative impact | Very negative impact | N/A | | |
|--|------------|----------------------------|----------------------|----------------------|----------------------|------|
| Importance of the following potential negative impacts from products and production processes: | | | | | | |
| (Percentage % of firms) | | | | | | |
| Use of natural resource (energy, water, etc.). | 40.0 | 46.7 | 6.7 | 6.7 | | |
| Solid waste generation. | 23.3 | 56.7 | 13.3 | 6.7 | | |
| Wastewater effluent. | 26.7 | 43.3 | 23.3 | 6.7 | | |
| Local or regional air pollution. | 33.3 | 46.7 | 10.0 | 6.7 | | |
| Global pollutants (e.g. greenhouse gases). | 33.3 | 40.0 | 13.3 | 13.3 | | |
| Aesthetic effects (noise, smell, landscape). | 30.0 | 56.7 | 6.7 | 6.7 | | |
| Soil contamination. | 46.7 | 30.0 | 10.0 | 13.3 | | |
| Risk of severe accidents. | 30.0 | 53.3 | 13.3 | 3.3 | | |
| | YES | NO | N/A | | | |
| Environmental performance-measures that the firms' facility regularly monitors: | | | | | | |
| Use of natural resources (energy, water, etc.). | 70.0 | 13.3 | 16.7 | | | |
| Solid waste generation. | 70.0 | 16.7 | 13.3 | | | |
| Wastewater effluent. | 66.7 | 20.0 | 13.3 | | | |
| Local or regional air pollution. | 56.7 | 23.3 | 20.0 | | | |
| Global pollutants (e.g. greenhouse gases). | 33.3 | 36.7 | 30.0 | | | |
| Aesthetic effects (noise, smell, landscape). | 43.3 | 36.7 | 20.0 | | | |
| Soil contamination. | 30.0 | 43.3 | 26.6 | | | |
| Risk of severe accidents. | 66.7 | 13.3 | 20.0 | | | |
| Undertake concrete actions to reduce environmental impacts: | | | | | | |
| Use of natural resources (energy, water, etc.). | 66.7 | 6.7 | 26.7 | | | |
| Solid waste generation. | 73.3 | 6.7 | 20.0 | | | |
| Wastewater effluent. | 70.0 | 6.7 | 23.3 | | | |
| Local or regional air pollution. | 50.0 | 16.7 | 33.3 | | | |
| Global pollutants (e.g. greenhouse gases). | 33.3 | 23.3 | 43.3 | | | |
| Aesthetic effects (noise, smell, landscape). | 40.0 | 23.3 | 36.7 | | | |
| Soil contamination. | 30.0 | 23.3 | 46.7 | | | |
| Risk of severe accidents. | 66.7 | 3.3 | 30.0 | | | |
| Significant measures specifically related to production technologies: | | | | | | |
| Changes in production processes that reduce pollution emissions and/or resource use. | 63.3 | | | | | |
| End-of-pipe technology that reduces pollution emissions or allow for resource recovery. | | 16.7 | | | | |
| Not Applicable. | | | | | 20.0 | |
| Significant technical measures, which reduce the environmental impacts: | | | | | | |
| Changes in production technologies. | 56.7 | | | | | |
| Changes in product characteristics. | | 23.3 | | | | |
| Not Applicable. | | | | | 20.0 | |
| Experienced change in the environmental impacts per unit of output of products or production processes in the last three years: | | | | | | |
| | Decrease | No Change | Increase | Significant Increase | Significant Decrease | N/A |
| Use of natural resources (energy, water, etc.). | 23.3 | 30.0 | 16.7 | - | - | 30.0 |
| Solid waste generation. | 36.7 | 6.7 | 23.3 | 3.3 | - | 30.0 |
| Wastewater effluent. | 30.0 | 23.3 | 13.3 | 3.3 | - | 30.0 |
| Local or regional air pollution. | 23.3 | 26.7 | 10.0 | - | 3.3 | 36.7 |

| | | | | | | |
|--|------|------|-----|------|-----|-----|
| Global pollutants (e.g. greenhouse gases). | 13.3 | 30.0 | 6.7 | 46.7 | - | 3.3 |
| Soil contamination. | 10.0 | 20.0 | 6.7 | 60.0 | 3.3 | - |
| Risk of severe accidents. | 20.0 | 33.3 | 3.3 | 36.7 | 3.3 | 3.3 |

Table 4 describes the responses of the 30 firms surveyed in the current study. In general, firms are motivated by factors including compliance of government regulations, corporate image, and the desire to prevent environmental accidents which may prove more costly than adhering to limits and standards put in place to mitigate the environmental impacts of the firm's production.

Groups or organizations that are considered to be the most important by firms in their consideration of engaging in environmental practices are the public authorities, as deemed by 70 percent of respondents. Next in importance are environmental groups or organizations, as regarded by 57 percent of companies surveyed; management employees come in third in importance as deemed by 53 percent of firms, while corporate headquarters and neighborhood/community groups are regarded as very important by 50 percent of the firms respectively.

Table 4: Motivation of environmental practices

| | Not Important | Moderately Important | Very Important | N/A |
|---|-------------------------|----------------------|----------------|------|
| Importance of the following groups or organizations on environmental practices of firms' facility: | | | | |
| | Percentage of firms (%) | | | |
| Public authorities (government, state, municipal). | 13.3 | 6.7 | 70.0 | 10.0 |
| Corporate headquarters. | 6.7 | 23.3 | 50.0 | 6.7 |
| Household consumers. | 13.3 | 30.0 | 26.7 | 26.7 |
| Commercial buyers. | 3.3 | 43.3 | 26.7 | 26.7 |
| Suppliers of goods and services. | 10.0 | 40.0 | 23.3 | 26.7 |
| Shareholders and investment funds. | 6.7 | 36.7 | 33.3 | 23.3 |
| Banks and other lenders. | 13.3 | 36.7 | 16.7 | 33.3 |
| Management employees. | - | 23.3 | 53.3 | 23.3 |
| Non-management employees. | 6.7 | 30.0 | 36.7 | 26.7 |
| Labor unions. | 6.7 | 23.3 | 30.0 | 40.0 |
| Industry or trade associations. | 6.7 | 23.3 | 43.3 | 26.7 |
| Environmental groups or organizations. | 6.7 | 13.3 | 56.7 | 23.3 |
| Neighborhood/community groups & organizations. | - | 23.3 | 50.0 | 23.3 |
| Importance of having the following motivation with respect to the firms' environmental practices: | | | | |
| Prevent or control environmental incidents. | - | 26.7 | 53.3 | 20.0 |
| Regulatory compliance. | - | 10.0 | 73.3 | 16.7 |
| Corporate profile/image. | - | 13.3 | 66.7 | 20.0 |
| Cost savings. | - | 36.7 | 46.7 | 16.7 |
| New technology development. | 3.3 | 33.3 | 40.0 | 23.3 |
| New product development. | 6.7 | 26.7 | 43.3 | 23.3 |
| Facilities similar to ours are adopting similar practices. | 3.3 | 50.0 | 26.7 | 20.0 |

Factors of motivation that have played a very important part with respect to the firm's engagement of environmental practices as listed in decreasing degree of importance, are, regulatory compliance with 73 percent of firms, corporate profile or image with 67 percent of firms, to prevent or control environmental incidents with 53 percent of firms, and costs savings with 43 percent of firms regarding it as a very important motivation.

Public environmental policy

Public environmental policy that impacts the firm's production activities is considered important or very important by less than 50 percent of the sampled firms in the study. This result is shown in Table 5 where it holds across the board of all types of environmental policy instruments.

Table 5 shows that input bans are considered to be very important by 30 percent of firms. Meanwhile, 37 percent of firms consider technology based standards to be very important, 43 firms consider performance based standards very important, 30 percent are for input taxes, 30 percent for emission or effluent taxes or charges, 30 percent for tradable emission permits or credits, 47 percent for liability for environmental damages. In addition, demand for information measures 33 percent, supply information measures 40 percent, voluntary or negotiated agreements 20 percent, subsidies or tax preference 33 percent and technical assistance programs 30 percent.

Further, programs are put in place to encourage the firm to house an environmental management system for the following purposes. 43 percent of firms have programs aimed at reducing the frequency of regulatory inspection; 40 percent have programs to inform about the value of having environmental management systems; another 40 percent have programs to provide technical

assistance; and 33 percent have programs to provide recognition or awards. Further, 30 percent of firms have programs to consolidate environmental permits; 27 percent have programs to expedite environmental permits; another 27 percent have programs to provide references for public procurement; and 17 percent of firms have programs to waive environmental regulations, reduce the stringency of regulatory threshold, and provide financial support.

Most firms, at 57 percent, report that the environmental regime to which their facility is subject to are of moderate stringency that require that managerial and technological responses, while 13 percent report that they are subject to very stringent environmental policy regime, and another 13 percent report that the policy regime that they are subject to are not particularly stringent.

Table 5: Public Environmental Policy

| | Not Important | Moderately Important | Very Important | N/A | |
|--|-------------------------|---|---|--|-----|
| Environmental policy instruments' impacts on firm's facility's production activities: | | | | | |
| | Percentage of firms (%) | | | | |
| Input bans. | 3.3 | 26.7 | 30.0 | 40.0 | |
| Technology based standards (e.g abatement equipment) | 3.3 | 23.3 | 36.7 | 36.7 | |
| Performance based standards (e.g. emission levels). | - | 23.3 | 43.3 | 33.3 | |
| Input taxes (including energy). | - | 36.7 | 30.0 | 33.3 | |
| Emission or effluent taxes or charges. | - | 33.3 | 30.0 | 36.7 | |
| Tradable emission permits or credits. | 6.7 | 23.3 | 30.0 | 40.0 | |
| Liability for environmental damages. | 3.3 | 23.3 | 46.7 | 26.7 | |
| Demand information measures (e.g. Eco labels). | 3.3 | 36.7 | 33.3 | 26.7 | |
| Supply information measures (recognition programs). | - | 36.7 | 40.0 | 23.3 | |
| Voluntary / negotiated agreements. | 3.3 | 46.7 | 20.0 | 30.0 | |
| Subsidies / tax preferences. | - | 36.7 | 33.3 | 30.0 | |
| Technical assistance programs. | - | 46.7 | 30.0 | 23.3 | |
| | YES | | NO | N/A | |
| Regulatory authorities programs and policies in place to encourage firm's facility to house an environmental management system? | | | | | |
| Reducing the frequency of their regulatory inspections. | 43.3 | | 30.0 | 26.7 | |
| Expediting environmental permits. | 26.7 | | 40.0 | 33.3 | |
| Consolidating environmental permits. | 30.0 | | 36.7 | 33.3 | |
| Waiving environmental regulations. | 16.7 | | 50.0 | 33.3 | |
| Reducing stringency of regulatory thresholds. | 16.7 | | 50.0 | 33.3 | |
| Providing technical assistance. | 40.0 | | 26.7 | 33.3 | |
| Providing financial support. | 16.7 | | 50.0 | 33.3 | |
| Providing special recognition or award. | 33.3 | | 33.3 | 33.3 | |
| Providing references for public procurement. | 26.7 | | 40.0 | 33.3 | |
| Providing information about the value of such system. | 40.0 | | 26.7 | 33.3 | |
| | | Not particularly stringent, obligations can be met with relative ease | Moderate stringency, requires some managerial and technological responses | Very stringent, has a great deal of influence on decision making within the facility | N/A |
| The environmental policy regime to which the firm's facility is subject to. | 13.3 | 56.7 | 13.3 | 16.7 | |

Discussion

Statistics show that the majority of the public listed companies in this study are international firms that trade globally and regionally. Further, their main markets are other firms or their own subsidiaries, rather than households. Interestingly, only about one quarter of the firms allocate any research and development (R&D) budget specifically for environmental matters, while about three quarter of the firms do not allocate any funds for environmental research and development. There are several possible reasons to explain the lack of funding towards environmental matters. One reason could be because the end consumer of the firms' products are other firms who may further transform the products for value added purposes; two, firms in this study are not subject to very stringent environmental regulations, and three, firms do not need to provide public environmental reports. In the case where firms are selling products to other firms that are meant for re-transformation, environmental concerns may not be given high priority if the product is used as an input and thus do not require environmental scrutiny. On the second and third

reasons, firms are not inclined to undertake environmental R&D if firms are already in compliance with environmental obligations that can be easily met or that are only moderately stringent. This appears to be the case for the majority of firms in the study. Further, merely a quarter of firms provide public environmental reports that could be subject to public scrutiny. Therefore, it appears that the majority of the firms do not have the inclination to engage in rigorous environmental research and development to address public environmental concerns.

On a more positive finding, roughly half of the firms in this study designate an environmental department within the company. Interestingly, nearly all of the firms designate an explicit person-in-charge within their environmental management system (EMS) programs which indicate that even if firms do not have an explicit environmental department, they have at least one person put in charge to oversee environmental matters. The majority of firms employ written environmental policy, have environmental training programs for employees, carry out internal environmental audits and external audits, and have environmental indicators or goal. These statistics show that firms do practice EMS on a satisfactory level, although most do not engage in environmental accounting or in providing public environmental reports.

In addition, statistics show that the majority of firms are aware of the social implications of environmental considerations. The three considerations shared most by firms are that EMS will help prevent or control pollution, improve efforts to achieve regulatory compliance, and improve the company's profile or image. About three quarters of the firms are aware that EMS will help to better identify future environmental liabilities, to improve information about operations, improve their relations with regulatory authorities and to create costs savings in terms of waste management. Only about two thirds of the firms consider differentiation of products and savings in the use of inputs as motives to introduce EMS within the firm. Less than half of firms think that regulators' incentives make it attractive to introduce EMS. Therefore, the considerations that firms take into account to introduce EMS are primarily to advance the company's own benefits rather than for regulatory compliance. And notably, merely one fifth of the firms have actually implemented an EMS or are in the process of doing so. This suggests that for firms, environmental awareness does not translate into actual environmental actions.

On the motivations of the firm's environmental practices, the groups or organizations that are deemed very important in the consideration of undertaking environmental practices are, first, the public authorities, second, environmental groups, third, the firm's management and fourth, corporate headquarters. Neighborhood or community groups come in sixth. Only about a fifth of the firms consider household consumers to be important groups. These statistics are consistent with the fact that the majority of firms' customers are other firms and not household consumers. Only about a fifth of firms consider commercial buyers, suppliers of goods and services as very important.

In addition, it is interesting to note that of the motivations for environmental practices, the very important motivation as listed by most firms is regulatory compliance. A second very important motivation is corporate image or profile, and a third very important motivation is to prevent or control environmental incidents. Thus, more firms are concerned with regulatory compliance and corporate images than with actually preventing or controlling adverse environmental incidents that may result in direct detrimental effects on the human community. It suggests that firms are more worried about adverse corporate implications than negative social environmental effects. This aspect is fundamental to and consistent with the objective of attaining financial development of the firm.

Overall, the firms are not particular about the type of environmental policy that is imposed on them. In all categories of environmental policy instruments, less than half of the firms report that any one of the instruments are moderately important or very important in affecting production activities. Of the moderately important instrument deemed moderately important are voluntary or negotiated agreements and technical assistance programs. Policy instruments deemed very important are liability for environmental damages and performance based standards. Notably, while the moderately important instruments are beneficial for the firm's pre-production, the very important instruments matter in post-production, which means that they may affect profits directly.

In terms of the monitoring of environmental measures, the majority of firms regularly monitor the use of natural resources and solid waste generation, followed by wastewater effluent and the risk of severe accidents, then local and regional air pollution. Aesthetics effects, global pollutants and soil contamination are regularly monitored by less than half of the firms. These statistics may suggest that firms are more concerned about local environmental effects that are regulated by the authorities compared to global pollutants that are less environmentally regulated.

Conclusion

Preliminary findings indicate that public-listed companies in Malaysia are aware of the importance of environmental measures. Firms are knowledgeable of and are concerned about the environmental implications on the firm's performance. Such implications include the impacts of environmental measures on the firm's production, its image and profitability, and on its compliance with environmental regulations. Apart from safeguarding the firm's financial and regulatory interests, data suggest that firms are less motivated by the social and environmental implications of environmental activities than by financial or company interests. This is consistent with the firm's objective to attain financial development and gains. The preliminary insights provided by the data thus far may not be indicative of a more general trend among financially large companies in Malaysia; additional data and more rigorous analysis will be required to enable more general conclusions. The relationship between financial and environmental performances will be re-assessed once the current research has progressed to allow for a larger sample.

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