International Scholars Journals

Frontiers of Agriculture and Food Technology ISSN 7295-2849 Vol. 8 (11), pp. 001-011, November, 2018. Available online at www.internationalscholarsjournals.org © International Scholars Journals

Full Length Research Paper

Kyoto protocol and social accounting implication on global-warming in Malaysia: An action research approach

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Accepted 21 February, 2018

This study examines the relationship between social change demands and tactical decision making processes resulting from apparent global-warming and climate-change by employing an action research methodology. The objective was to uncover the perceptions of Malaysian corporate management concerning the present debate on climate change. These corporate officers occupy the top decision making positions that disperse the day to day operational decisions as well as being directly involved with longer term considerations, particularly of the financial implications of the debates and forthcoming national and international legal implications concerning global-warming/climate-change. This research is a descriptive study. Interviews with the management of 30 randomly selected companies were conducted, and the results and conclusions support the view that carbon trading is not an effective approach to resolve the apparent carbon dioxide problem. This study has provided greater understanding of the corporate view regarding measures aimed at prevention of large rise in global temperatures.

Key words: Action research, global warning, climate change, greenhouse emission.

INTRODUCTION

Studies to assess the success of environmental management measures in both developing and developed countries and their impact upon the economic sustainability of these actions are currently limited (Callon, 2009). More importantly, studies seeking to measure corporate management commitments to such sustainability are few and far between. This paper is motivated to discover the extent of awareness of the management of Malaysian Corporations towards global warming and climate change and their active roles and responsibilities to reduce greenhouse gas (GHG) emissions, it also seeks to uncover what strategies corporate managers might pursue to obtain competitive advantages in a business environment that is increasingly carbon constrained.

While, an economic growth policy is used as the model of socio- economic development, increasing calls for the inclusion of multi-scale conservation of natural resources, such as preserving large undeveloped areas as natural habitat or environment, as tools to deal with the challenges of sustainability (Lomas et al., 2008). For example, in spite of the increase in number, area, and associated budgets of natural and protected areas and other conservation measures, many report that general sustainability is decreasing (Lomas et al., 2008). However, it must be noted that conservation is not preservation; conservation engages use while preservation does not. Yet exploitation and not conservation seems to be the rule rather than the exception, and there is a limited quantity of literature within developed and developing countries on the impacts on sustainability of exploitative actions by corporations and governments. This paper seeks to uncover what a developing country, Malaysia, is contemplating, both at the corporate and Governmental levels to develop strategies to create a plan that may recognizes the possibility of generated carbon controls.

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The paper represents a response to a statement supporting research in sustainability of industry through accounting processes to provide the foundation of sustainable practices (Amran, and Devi, 2008). Prior to this, this research area has emphasized the rationality of sustainability practices (Hasan and Adnan, 2002; Lomas et al., 2008).

There is agreement with some authors that there is a lack of research into the attitudes of managers and their perceptions of the reporting processes concerning environmental matters (Mackenzie, 2008) and with certain exceptions to any system proposed (European Commission., 2005). More particularly there is a lack of sustainability research within the context of developing countries who are trying to repeat the past wasteful practices of the now developed world (Amran and Devi, 2008) Apparently there are opportunities for developing countries to take advantage of global-warming/climate-change as a source of sustainable strategic issues (Schultz and Williamson, 2005; Olsen, 2007).

The major feature of what is left of the Kyoto protocol is the binding targets for 37 industrialized countries and the European community for reducing greenhouse gas (GHG) emissions. This amounts to an average of five percent against 1990 levels over the five-year period 2008-2012.("Kyoto Protocol, retrievedhttp://unfccc.int/kyoto_protocol/items/2830.php").

However, the Kyoto Protocol's effectiveness will depend upon two critical factors:

1. Whether Parties follow the Protocol and comply with their stated commitments.
2. Whether the emissions data used to assess compliance are reliable.

Recognizing this, the Kyoto Protocol and Marrakesh Accords, adopted in Montreal, Canada, on December 2005, includes a set of monitoring and compliance procedures to enforce the Protocol's rules, to address any compliance problems, and to avoid any error in calculating emissions data and accounting for transactions under the three Kyoto mechanisms (emissions trading, clean development mechanism, and joint implementation) and activities related to land use, land use change, and forestry (LULUCF) ("Kyoto Protocol, http://unfccc.int/kyoto_protocol/items/2830.php," 2008).

Whilst Malaysia being a non-Annex 1 country, it has no binding commitments under the Kyoto protocol, to reduce emissions, as a leading underdeveloped country, the Malaysian government has proactively sought to apply the CDM process as a means for attracting foreign investment to GHG mitigation projects and to support the sustainable development objectives of Malaysia (European Commission, 2005).

The reasons for selecting Malaysia as the location for the research are as follows: Firstly, the unique Malaysian political economy, based upon a strong State led economic development with the trend of government linked and politically linked businesses and with a strong policy of maintaining multi-racial equity within the sphere of economic development (Michaelowa and Michaelowa, 2007), this is the setting for Malaysia's dealing with Sustainable Development (SD). Secondly, the Malaysian government is an active supporter of the Kyoto protocol (European Commission., 2005), thirdly, studies on environmental reporting show the strong influence of the Malaysian government's aspirations on environmental reporting, and fourth, the government has in its 2009 Budget mandated CSR disclosures for public listed companies (Budget Gazers 2009), and it is interesting to examine the support of company management to the government's SD agenda. Lastly, we observe that the participation of developing countries is crucial to the successful implementation of mechanisms to address climate change, and understanding how Malaysian companies participate in these initiatives will assist policy makers in furthering efforts on reducing GHG emissions in other developing countries.

Many countries apparently, are now moving into the application phase of the Kyoto protocol-2008 to 2012 (Kyoto protocol, 2008). Much has been discussed about carbon emissions trading schemes whereby companies with excess carbon credits can sell their credits and companies which have insufficient credits purchase them (Mackenzie, 2008).

This work has three objectives:

1. An investigation into the awareness of management in Malaysia and their concern of the effects of global-warming/climate change and the effects of carbon trading schemes on their company's future.
2. The perception of Malaysia's management of the effect that carbon trading will have on their business and whether or not such trading systems will, in their opinion be effective in reducing the effects of global-warming/climate-change.
3. To comprehend the views of Malaysian management and how a carbon trading system may strategically affect their businesses and how best to maintain competitiveness within such a scheme.

LITERATURE REVIEW

This study is set in the context of an emerging economy, which also has a unique political economy, with each of Malaysia's states actively and strongly presenting projects that link government and politically desirable business projects. As a result, Malaysia intends to lead and other developing countries are seriously considering

adopting Malaysia's approach.

Sustainable development (SD)

Sustainable development will develop further as certain raw material production reaches either a 'tipping point' or the resources are so depleted that replacement products are developed, promoted, and used, yet there must be a business reality in dealing with this situation.

Environmental accounting

Currently, there are weaknesses in the accumulation of data to support current production methods and the introduction of sustainable development. Gross Domestic Product (GDP) has been a measure of economic growth but it has never included a cost of damage to the land, sea or air and the cleanup of pollution from any of the production processes, though there are some attempting this measure (Olsen, 2007) and using new approaches such as the Triple Bottom Line (Sugget and Goodsir, 2002), but these processes have yet to be universally accepted .However, it is clear, the days of purely measuring business performance by financial result are numbered. KPMG (2010) believe that discerning investors will look for something broader to measure an entity's real contribution and performance. Triple bottom line is an amalgam of financial results and an assessment of the social and environmental impacts of a business: People, Planet and Profits (KPMG, 2010).

Sustainable development and global warming

Currently, there is concern expressed in the literature about Green House Gas emissions (GHG). Schultz and Williamson (2005) expresses the opinion that mankind must reduce GHG emissions, specifically, carbon dioxide, even though it is a bio-degradable gas, to prevent global warming, without mentioning an actual physical method to do this, as he relies upon administrative processes to accomplish this result. However there is doubt upon whether a long-run adherence to the Kyoto protocol will achieve carbon dioxide reductions whether or not a trading system is imposed (Kyoto protocol, 2008).

Climate change

The reliability of currently available data, its statistical extrapolation, and the conclusions so drawn from this 'educated guesswork,' is currently questionable, at all levels, including sea level change, temperature changes, and changing weather patterns and many other 'Doomsday' scenarios recently proposed (Schultz and Williamson, 2005).

This does not mean that the re-evaluation of the data and the methods used to create negative results ought to be rejected outright, only that they should be considered possible, though currently not very probable.

Climate change initiatives - Kyoto protocol

The major, it seems, contradiction of the Kyoto protocol was the creation of an artificial shortage of GHG allowances, as the Kyoto protocol is meant to provide a stimulus to nations to create taxation penalties for emitters of carbon dioxide, and profit opportunities for those who do not have an emissions problem. Copenhagen put paid to this idea by collapsing into chaos over this agenda item, as low or non-industrial nations tried to 'extort' the industrialized world by overzealous demands for funding, and cash-based aid.

As the United States and other nations have not ratified the Kyoto protocol, and major emitters, China and India are exempted, the industrialized West had demanded at Copenhagen that China and India be included and as these two nation seriously objected and actually sabotaged the Copenhagen meeting, so there is little current consensus as to how carbon dioxide emissions, in particular, are to be controlled without consideration being given to the natural processes that convert this gas into its component, and harmless, parts.

MATERIALS AND METHODS

Amran and Devi (2008) show that social and environmental accounting literature has paid little attention to either organizational influences on a company's practices nor has a company's practices influenced its organization.

In this research, the focus is on how action research was conducted to draw out the answers to the three questions posed and how action research led to further action. The objectives of this study are three-fold. First, it aims to investigate whether Malaysian management is concerned about global warming issues and carbon trading schemes. Secondly, it seeks to obtain the perceptions of management if they consider carbon emission trading to be an effective method in addressing global warming. Thirdly, it seeks to understand management's views on how this issue could be strategically utilized by the company to maintain and improve its competitiveness.

In this research, the authors describe the consensus between "action research" and lived experience as a possible new method to reduce the distance between idealism and practice, in all combinations to yield a new approach, that is, the lived experience action research explains why problems are resolved in a particular way in a given culture at a given time. Here, the approaches and philosophies of Collier (1963), Lokey (2007) and the approaches of Wong (2004 a, b) within the approach and methodology of "action research" are used as sources that offer explanations of the perceived and real situation.

This study adopts an engagement research approach and uses

action research to engage with the management of Malaysian corporations to reveal their views and opinions of the feasibility of the suggested mechanisms that address GHG emissions reduction (Wong, 2004a, 2004b, 2005, 2006, 2007). It is our contention that only when there is top management commitment to GHG emissions reduction mechanisms, will companies implement strategies to focus on sustainable development.

The study adopts a qualitative inquiry by way of in-depth interviews with selected top management of listed companies or subsidiaries of these 30 listed companies.

Conducting interviews

Manufacturing, rural plantations, and commercial trading companies were selected at random and top management contacted for interview requests over a two month period from August to September 2008. Thirty respondents agreed to be interviewed and the in-person interviews took place in October 2008. Appendix 1 lists the respondents companies, the type of organization, and their management positions. To maintain anonymity of respondents, reference is made to them as Respondent 1 to Respondent 30 according to listing in Appendix 1.

Interview questions were open ended, and before each interview the objectives of the project were explained. The interviewees were given the list of questions prior to the interview, and the interviews were recorded with the consent of the interviewees and transcribed verbatim. The analysis of these transcriptions was carried using QSR Nvivo *7*. However, for the purposes of this paper we present only the descriptive results.

RESULTS

Table 1 shows the demographic profile of respondents from 30 companies.

Table 2 shows the respondents' profiles in percentages. Seventy seven percent of the sample comprises respondents from public listed companies and the rest, 23% are from non-listed companies. The respondents occupy a range of positions in their corporations where Chief Executive Officers/Executives represent about 27% and around 40% are Chief Financial Officers and Financial Controllers in the accounts and finance positions, around 24% occupy senior positions in operations and environment and the remaining 10% are senior management in corporate positions and human resources.

The sample was fairly distributed among industries, but mainly dominated by manufacturing and plantation sectors with 33 and 23% respectively. Oil and gas, services, Consultants in CDM and solid waste management represent the rest 20% of the sample with 13.35 and 6.7% respectively.

Awareness of global warming

Of the 30 respondents, 28 were aware of the concept of global warming and carbon trading.

Effectiveness of carbon trading

One third of the respondents consider that carbon trading can be an effective approach to reduce global warming, while the other two thirds are split about evenly between those who disagree and those who do not know or are indifferent to the issue.

Business strategy

Table 3 shows the analysis of responses to the open ended question as to what strategies the respondent's company is using or intending to use to reduce GHG emissions. A total of 21 strategies emerged from the in-depth interviews. These were then reclassified into 4 main strategies as seen in Table 3. The strategies were:

(i) Improving internal processes.
(ii) Involvement in CDM projects/strategic alliances.
(iii) Utilization of carbon trading as an investment opportunity.
(iv) Compliance with regulations.

It is interesting to note that although two-thirds of the respondents did not believe that carbon trading was an effective mechanism for reducing GHG emissions, more than a third (11 out of 30) have ventured into carbon trading or are considering it. Clearly these respondents see this as a business opportunity as claimed by Schultz and Williamson (2005). Another group (7 out of 30) merely view emissions reduction mechanisms as further compliance or regulatory requirements.

DISCUSSION

Improving process improvements

One respondent from the airline industry indicated that improving current processes is the main strategy undertaken to stay competitive. Route planning, regular maintenance and fleet renewal plan are among the more prominent activities in their organization. In addition, the organization flies more direct routes at the most economical speed, continuous descent approaches and flying lighter and cleaner aircrafts to improve fuel efficiency.

Six other respondents are also taking the similar initiative of improving energy efficiency or reducing carbon emissions by using renewable energy. They are mainly from the manufacturing (4), plantation (1), and utilities (1).

Developing, improving or upgrading the technology currently used by their organizations is also one of the

Table 1. Demographic profile of respondents.

Respondent	Respondent position	Industry
1	4- Senior management (Corp)/HR	Manufacturing
2	CEO/ MD/Senior GM	Service
3	CFO/FC/ Group accountant / GM Finance	Plantation/Plantation mgmt
4	CFO/FC/ Group accountant / GM Finance	Agricultural
5	4- Senior management(Corp)/HR	Plantation
6	CEO/ MD/Senior GM	6 = Automobile
7	3-Senior management(Operation/Environment)	2 = Manufacturing
8	CFO/FC/GA/GM F	7 = Utility
9	Senior management (O/E)	4 = Plantation
10	Senior management (O/E)	2 = Manufacturing
11	CFO/FC/GA/GM F	8 = Consultancy in carbon asset management, developer
12	CEO/ MD/Senior GM	9 = Construction
13	Senior management (O/E)	8=Developer and suppliers of emissions reduction to industries
14	CFO/FC/GA/GM F	4 = Oil Palm plantation
15	Senior management (O/E)	4 = Plantation
16	CEO/ MD/Senior GM	8 = CDM Developer
17	CFO/FC/GA/GM F	2 = manufacturing
18	CFO/FC/GA/GM F	2 = Steel Manufacturing
19	CEO/ MD/Senior GM	8 = Consultant-CDM projects
20	CEO/ MD/Senior GM	2 = Manufacturing -palm oil related
21	CFO/FC/GA/GM F	10=Solid Waste Management
22	CFO/FC/GA/GM F	Plantation, Manufacturing etc.11=Diversified
23	Senior management (Corp/HR)	2 = Aluminium Dye castings(Manufacturing)
24	CEO/ MD/Senior GM	2 = Palm Oil Industry
25	CFO/FC/GA/GM F	10 = Solid waste management
26	Senior management (O/E)	5 = Airlines
27	CEO/ MD/Senior GM	4 = Plantation Management
28	CFO/FC/GA/GM F	1 = Oil and Gas
29	Senior management (O/E)	4 = Plantation
30	CFO/FC/GA/GM F	2 = Manufacturing

strategies adopted by 5 respondents (16.7%). This includes using new technology boilers by a respondent from the manufacturing industry to reduce emissions. Other respondents are from airline industry (1), agriculture/plantation (1), solid waste management (1) and the oil and gas industry (1). In addition, one respondent from the plantation industry has a partnership with foreign company for technology transfer to ensure the organization has the competitive advantage in the industry.

On the other hand, 10% or 3 respondents are using available natural resources, current waste material in new ways, or other raw materials as alternatives. For example, one respondent from the Oil Palm plantation uses EFB to replace chemical fertilizer and uses Cassia Cabonensis to keep insects and pest in balance with nature. One respondent from the manufacturing industry now uses alternate current (AC) motors instead of direct current (DC) motors to reduce electricity consumption in its production processes. The other respondent from a diversified industry (which includes manufacturing and plantation industry) is operating a biodiesel plant as their strategy.

Two respondents use byproducts for power generation for its boiler fuel (plantation industry) and for resale to Tenaga Nasional Berhad, a Malaysia utility company.

Five respondents (16.7%) adopt eco-friendly practices in their processing, for example, zero-burning replanting techniques as practiced by three respondents from the plantation industry and one from its plantation division of a diversified industry. The remaining respondent from solid waste management is using ceramic bags instead of plastic bag to stay environmentally friendly.

To remain competitive, one respondent from the agriculture/plantation industry is exploring the potential development of its existing products, namely the value

Table 2. Respondents profile in percentage**.**

	No.	%
Awareness on global warming and carbon trading		
Aware	28	93.3
Not aware	2	6.7
Company type		
Listed	23	76.7
Not listed	7	23.3
Respondent position		
CEO/Exec Chairman/MD/Senior GM	8	26.7
CFO/FC/Group Accountant/GM Finance	12	40.0
Senior Mgmt (Operation/Environment)	7	23.3
Senior Mgmt (Corporate/HR)	3	10.0
Race		
Malay	14	46.7
Non Malay	16	53.3
Sector/industries of company		
Oil and Gas	1	3.3
Manufacturing	9	30.0
Service	1	3.3
Plantation/Agriculture	8	26.7
Airlines	1	3.3
Automobile	1	3.3
Utility	1	3.3
Consultant in CDM/relevant services	4	13.3
Construction	1	3.3
Solid waste mgmt	2	6.7
Diversified	1	3.3
Total	30	100.0
Perception whether carbon trading is effective to reduce global warming		
No	10	33.3
Yes	9	30.0
Indifferent	11	36.7
Total	30	100.0

chain of Crude Palm Oil (CPO) mills waste, Palm Oil Mill Effluent biogas, Empty Fruit Brunch (EFP) pelleting, and mesacorp oil. Investment in Research and Development is cited by three respondents from automotive, utility and plantation/agricultural industry as its strategy to be and remain competitive.

Other steps taken are continuing to identify opportunities to reduce GHG emissions (three respondents, each from manufacturing, utility and plantation) and systematic control measure to ensure cost and operation efficiency (One respondent from plantation industry). One respondent from the automotive industry introduces new products which are environmentally friendly and one respondent from the manufacturing industry states that employee education would be the company strategy to be more environmentally conscious.

Involvement in CDM project and carbon trading

Interestingly, eight respondents are currently involved in Clean Development Mechanism (CDM) projects; five are

Table 3. Analysis of responses to the open ended question.

Strategies	Company	%	Actions
1. Improve current process	1	3.3	A
2. Improve energy efficiency or reduce carbon emissions by using renewable energy	7	23.3	A
3. Develop/improve/upgrade technology	5	16.7	A
4.Set up special dept to deal with carbon trading	1	3.3	B
5. Using natural resources/other raw materials as alternatives	3	10.0	A
6. Looking into potential development of existing products	1	3.3	A
7. Participate in carbon trading e.g. by selling credits/ EU ETS/carbon offset program	6	20.0	B
8: Monitor carbon emissions	5	16.7	D
9. Intend to explore carbon credit scheme	4	13.3	C
10. Invest in R and D	3	10.0	A
11. Identify opportunities to reduce GHG emissions-similar to 2	3	10.0	A
12. Systematic control measure to ensure costs and operation efficiency-similar to 1	1	3.3	A
13. Identify carbon trading as investment opportunity	1	3.3	C
14. New products which a Table 3 shows the analysis of responses to the open ended question as to what strategies the respondent's company is using or intending to use to reduce GHG emissions re more environmental friendly	1	3.3	B
15. Participate in CDM projects	8	26.7	B
16. Educate employees to be more environment conscious	1	3.3	A
17. To be familiar with local and international regulatory requirement	1	3.3	D
18. Adopt good eco-friendly practice in process (e.g. zero burning replanting techniques)	5	16.7	A
19. Comply with Environmental Quality Act	6	20.0	D
20. Use byproducts for power generation	2	6.7	A
21. Partner with foreign company for technology transfer	1	3.3	A

Actions: A refers to Improve internal processes. B refers to strategic alliance/ CMD projects. C refers to investment opportunity.

from the plantation industry, one each from manufacturing, utility and solid waste management industries. Among these, four respondents are participating in carbon trading by selling the carbon credits. For example, respondent No 3 entered an agreement with a Japanese utility and respondent No 27 has a deal with a Danish company to supply its Carbon Emission Rights and has in fact set up a special department in the organization to focus on carbon trading. Both respondents are from the plantation industry.

The other active participant in the European Union Emission Trading Scheme (EU ETS) is the respondent from the airline industry. The airline organization invites its passengers on a carbon offsetting scheme whenever they fly with its airlines or subsidiaries. The passengers may choose to offset the carbon emissions of their flight by making a modest contribution. Those proceeds will help fund selected United Nations-sanctioned programs to protect rainforests in Malaysia, a natural carbon sink, that reduces greenhouse gases and curbs the onset of climate change, this is through a trust fund managed by the Forest Research Institute of Malaysia (FRIM) on behalf of the Ministry of Natural Resources and Environment (NRE), these are projects satisfying stipulated criteria and will be funded by these proceeds. The airline organization have included a carbon calculator on their website and this

Table 4. Awareness and responsibilities of the society on environment for any policy to be effective.

		Frequency	Percent	Valid percent	Cumulative percent
Valid	No	26	86.7	86.7	86.7
	Yes	4	13.3	13.3	100.0
	Total	30	100.0	100.0	

Table 5. Complexity in measurement of quantity and price of carbon emission trading.

		Frequency	Percent	Valid percent	Cumulative percent
Valid	No	27	90.0	90.0	90.0
	Yes	3	10.0	10.0	100.0
	Total	30	100.0	100.0	

allows passengers to calculate their share of carbon emissions as a result of their air travel and make a proportionate contribution via the internet booking channel.

Among our respondents, there are four CDM consultants/developers that are actively involved in carbon asset management, project developing and supplying of emissions reduction to industries.

Investment opportunity

Being fully aware of the industry potential, four respondents, all from the plantation industry, indicated the interest and intention of their organization to explore a carbon credit scheme. The other respondent from the plantation industry view carbon trading as a potential investment opportunity to maximize shareholder's wealth.

Compliance with regulation

Six respondents (two from plantations, two from manufacturing, one from oil and gas and one from an airline) are taking steps as part of its requirement to comply with the current environment regulations. For example, the airline organization is embarking on green programs on the ground such as integrating the 3R (reduce, reuse and recycle) waste management practices, water and energy conservation, pursuing and obtaining ISO14001 certifications for environmental management systems, and increasing the use of biodegradable products.

Apart from this, five respondents, two from manufacturing industry and one each from oil and gas, utility, and plantation industries monitor carbon emissions as part of their compliance responsibilities. Finally, one respondent being the developer and suppliers of emissions reduction equipment to industry stated that it is well versed with local and international regulatory requirements and that this would be its best business strategy.

Barriers

Barrier 1: Awareness and responsibilities of the society on environment for any policy to be effective (Table 4). Barrier 2: Complexity in measurement of quantity and price of carbon emission trading (Table 5). Barrier 3: Difficulties in implementation process of CDM (register, approval, verification) (Table 6). Barrier 4: Finance, cost of investment (Table 7). Barrier 5: Technology (Table 8).

There are some challenges and barriers to implement the above strategies. According to the survey, around 87% of the sample perceives societal awareness and responsibilities on environment issues as an important factor for any policy to be effective. Complexity in measurement of quantity and price of carbon emission trading has also perceived to be another barrier by 90% of respondents of this survey.

As far as CDM, two thirds of the received responses agree on the difficulties in the implementation process of CDM (register, approval, verification), while the other third did not view this as a real barrier. About one half of the sample considers financing the cost of investment to be a barrier, the rest disagree. Around 70% of the sample surveyed perceived technology to be a barrier.

Other constraints such as expertise and high training costs, unfamiliarity and uncertainty to Malaysians, limitation of current process, renewable energy not readily available, demands from big corporations, risk-takers or brokers (instead of from portfolios), unwillingness of clients to share information for CDM

Table 6. Difficulties in implementation process of CDM (register, approval, verification).

		Frequency	Percent	Valid percent	Cumulative percent
Valid	No	20	66.7	66.7	66.7
	Yes	10	33.3	33.3	100.0
	Total	30	100.0	100.0	

Table 7. Finance, cost of investment.

		Frequency	Percent	Valid percent	Cumulative percent
Valid	No	17	56.7	56.7	56.7
	Yes	13	43.3	43.3	100.0
	Total	30	100.0	100.0	

Table 8. Technology.

		Frequency	Percent	Valid percent	Cumulative percent
Valid	No	21	70.0	70.0	70.0
	Yes	9	30.0	30.0	100.0
	Total	30	100.0	100.0	

projects, lack of global accounting standard for guidance, and inability of companies to achieve target reduction of emission due to instability in efficiency in production were viewed to be the actual barriers by over 90% of respondents.

Interestingly, around 93% perceive companies to be relevant to carbon emission reduction while 97% agree on that companies must continue to monitor carbon emissions and carbon credits. Around 97% of respondents think that carbon emission policies will have a long payback period, while surprisingly 93% still view company's goal is to maximize profit to shareholders. Uncertainty on demand and price was also considered to be another barrier by around 73% of respondents. Finally, around 97% view the carbon calculators found on websites are not suitable for all industries.

Conclusion

The findings show that most respondents are aware of the climate change initiatives. Interestingly, we believe the global crisis has also shifted attention to more responsible corporate behavior towards issues of sustainability and climate change. These sentiments are prevalent amongst the Malaysian corporate leaders as evidenced in above discussion. Moreover, the corporate sector does hold a positive view on the strategic positioning of carbon emissions reduction mechanisms as means to achieve better firm performance.

The wider use of the findings is limited due to the small sample size. However, it provides some insights as to how management is reacting to issues of climate change. Future research should focus on conducting a survey to gauge the strategies adopted by corporations in emerging economies in dealing with climate change and need to be environmentally responsible.

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Appendix 1. Lists of the respondents companies, the type of organization, and their management positions. To maintain anonymity of respondents, reference is made to them as Respondent 1 to Respondent 30 according to listing in appendix.

Respondents	Respondent position	Industry
1	4-Senior management(Corp)/HR	Manufacturing
2	CEO/ MD/Senior GM	Service
3	CFO/FC/ Group accountant/ GM Finance	Plantation/plantation mgmt
4	CFO/FC/ Group accountant / GM Finance	Agricultural
5	4- Senior management (Corp)/HR	Plantation
6	CEO/ MD/Senior GM	6=Automobile
7	3- Senior management (Operation/ Environment)	2=Manufacturing
8	CFO/FC/GA/GM F	7=Utility
9	Senior management (O/E)	4=Plantation
10	Senior management (O/E)	2=Manufacturing
11	CFO/FC/GA/GM F	8=Consultancy in carbon asset management, developer
12	CEO/ MD/Senior GM	9=Construction
13	Senior management (O/E)	8=Developer and suppliers of emissions reduction to industries
14	CFO/FC/GA/GM F	4=Oil Palm plantation
15	Senior management (O/E)	4=Plantation
16	CEO/ MD/Senior GM	8=CDM developer
17	CFO/FC/GA/GM F	2=manufacturing
18	CFO/FC/GA/GM F	2=Steel manufacturing
19	CEO/ MD/Senior GM	8=Consultant-CDM projects
20	CEO/ MD/Senior GM	2=Manufacturing -palm oil related
21	CFO/FC/GA/GM F	10=Solid waste management
22	CFO/FC/GA/GM F	Plantation, manufacturing etc.11=Diversified
23	Senior management (Corp/HR)	2=Aluminium dye castings(manufacturing)
24	CEO/ MD/Senior GM	2=Palm oil industry
25	CFO/FC/GA/GM F	10=Solid waste management
26	Senior management (O/E)	5=Airlines
27	CEO/ MD/Senior GM	4=Plantation management
28	CFO/FC/GA/GM F	1=Oil and gas
29	Senior management (O/E)	4=Plantation
30	CFO/FC/GA/GM F	2=Manufacturing