Motives on the Implementation of Green Productivity Initiatives among EMS 14001 Certified Companies in Malaysia

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Abstract: Going 'Green' is fast becoming a trend and necessity in today's business worldwide. This is simply because, business is indirectly or directly giving a huge negative impact towards our environment by depleting these natural resources in the process of producing goods and services. A way to reverse the negative effect, the concept of 'Green Productivity' (GP) was introduced. This research studied on the motives in implementing Green Productivity initiatives in Malaysia. This research was focused on the EMS14001 certified companies in Malaysia. The response rate was about 30% from 400 companies identified for this study. The findings show that most of the respondents agree that GP can increase product quality, reduce scrap and rework costs, reduce waste and pollution and reduce risk. On the other hand, most of them do not agree that GP can reduce manufacturing cycle time, reduce unit manufacturing cost, reduce absenteeism, and increase worker participation and increase healthier environments. Accordingly, this study could give manager of Malaysia's firm a new perception on the green initiatives is not just morale responsibility but it is a strategic decision towards firms' success.

Keywords: Motives, Green Productivity, Implementation, Certified Companies, Malaysia

I. Introduction

The economic development policies of most developing countries have lead to industrialization and urbanization of its nation. This has resulted in major environmental crisis and becomes a challenging issue to the economy in recent years as a result through extraction, production and consumption of natural resources and generation of wastes. According to Gan (2004), the excessive economic growth creates not only resource scarcity but also pollutants that might exceed the assimilative capacity of natural environments, thereby degrading essential life-supporting systems. Furthermore, the demand for energy, initially through the burning of wood and charcoal and later by consumption of coal, oil, natural gas has resulted in a depletion of natural resources and has produce adverse effects to the globe.

In the case of Malaysia, however, three factors have been identified as the factors influencing the intensity of environmental crisis: the size of the population, the degree of affluence associated with increasing growth of economic activity, and the tendency of productive technology to pollute. Of those factors, the latter is the most to blame for the worsening industrial pollution in Malaysia (United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) Report, 2008). Silverman and Silverman (2000) have studied on the "Perceptions of Environmental Problems by Malaysian Professionals". They found that air pollution and waste management were perceived of as key local environmental issues, with industrial air emissions and vehicular exhaust two of the major sources of local environmental degradation. However, air pollution may be the more difficult of these problems to solve, perhaps conflicting with economic development interests.

Accordingly, loss of critical habitat, ozone depletion and climate change were also viewed as important to global-scale environmental conditions, although habitat destruction was seen as somewhat less important to the local situation. In addition, river pollution was identified as the major ecological problem in Malaysia, although drinking water quality was not seen as a critical issue. Malaysian environmental professionals' perceptions of global-scale environmental problems are consistent with much of the international environmental community (Silverman & Silverman, 2000). Consequently, there is room for discussion on the environmental crisis and its effects on economic growth as Malaysia is a developing country.

Problem Statement

Improvement in the quality of life is often associated with an increase in demand for goods and services. Production of these goods and services, however, often has two negative aspects on the environment, in a way; it depletes the natural resource and generates pollutants which, if dumped into natural bodies, often cause environmental damage. Based on the report from Industrial Development Bureau Ministry of Economic Affairs (MOEA) (2002), toxic and hazardous substances discharged during the process of producing goods and services posing great risks to the environment and health. Even though such techniques may sometimes be economically attractive but are not sustainable because of their potential threats to society. Economic policies emphasizing productivity and economic growth alone, however, may lead to an adverse and irreversible environment.

Subsequently, environmental protection through pollution prevention and the meeting of environmental standards by waste treatment of the effluents in the various industries

have not worked in many countries (Kwong, 2002). The problem of industrial environmental pollution is particularly serious in developing countries where the enforcement of environmental regulations is not strictly enforced. Environment protection is seen by industries as only an added cost, which reduces competitiveness and profits of the enterprises that strictly follow such environmental regulations. Environment protection needs to be accompanied by productivity and quality improvements if it is to be more widely accepted and practiced by the industries. Green Productivity (GP), therefore, has been launched in 1994 in line with the 1992 Earth Summit. It laid stress on economic development and environmental protection to be the key elements of sustainable development. It was initiated in Japan as APO (Asian Productivity Organization) with an objective to enhance productivity and simultaneously reduce the negative impacts on the environment. The concept of GP shows that for any development strategy to be sustainable it needs to have a focus on environment, quality, and profitability, which form the triple focus of GP (Hwa, 2001). Accordingly, Tuttle and Tebo (2007) have introduced the concept of the three productivities economic, social and environmental as a means of further elaborating a comprehensive view of competitiveness and societal value creation from both the enterprise and national perspectives. While these terms mirror the elements of the triple bottom line approach to measure organizational performance, there are key differences.

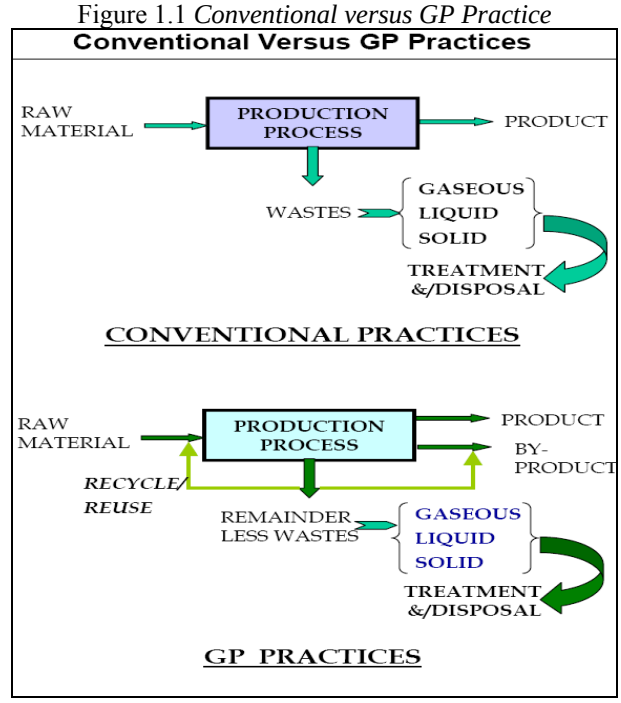
With these obstacles in mind, questions arise about to what extent green productivity practices exist in practice? What are the motives that these certified companies implement green productivity practices? Accordingly, the paper starts with this introductory section which gives general idea about the research topic and problem of the study. This paper starts with providing literature review of the study. The paper then followed by methodology of the study and ends with the conclusion.

Evolution of Green Productivity (GP)

The word productivity first time appeared in literature in 1766 used by French mathematician in his article (Sumanth, 1990). Fabricant broadly defines productivity as always a ratio of output and input (as cited in Afzal, 2004). This is the most common definition of productivity. Kendrick and Creamer have proposed two definitions of productivity; which are:- functional definitions for partial, total factor and total productivity; and loose description of relationship usually in ratio form, between outputs and all of the associated inputs in real terms (as cited in Afzal, 2004). In these definitions, authors have differentiated partial productivity from total productivity. Nevertheless, their focus is on relationship between the output and input. Mali has proposed the similar concept of productivity (as cited in Afzal, 2004). According to Mali, productivity is the measure of how well resources are brought together in organizations and utilized for accomplishing a set of results. Along with Mali's definition of productivity, it is believed that many organizations have defined productivity in different ways (Sumanth, 1990). Nonetheless, the task of defining productivity has been sufficiently difficult to make reaching agreement on the appropriate definitions as diverse meanings of productivity coined by different people and organizations in different periods will be presented.

The GP program is the concerted effort by the Asian Productivity Organization (APO) to address this challenge. The program was started by APO in 1994 with the primary focus had been the application of GP to SMEs as these have been identified as major contributor to environmental issues. Green Productivity is defined by APO as a strategy in which appropriate tools, techniques, technologies, and management system are applied to produce environmentally-friendly goods and services (APO, 2009). In the context of GP, improvements in productivity can be seen when less utilization of resources are achieve by means of using as much renewable energy as possible and also by utilizing more eco-friendly chemicals in the manufacturing process (APO, 2009). Refer to Figure 1.1 for more detail. The APO view is that green productivity involves a concern with using a customer focus (i.e. quality) to achieve the appropriate balance between profitability and environmental performance (Tuttle & Heap, 2007).

Figure 1.1 *Conventional versus GP Practice*



Source: APO (2009)

II. Literature Review

Productivity Improvement

GP techniques are used to bring about the changes that will result in better environmental performance and improved

productivity .They range from simple housekeeping techniques to designing "green" products.

GOOD HOUSEKEEPING

GP techniques include awareness programs and the 5S management techniques which focus on keeping processes, equipment, workplaces and work forces organized, neat, clean, standardized and disciplined. Other good housekeeping techniques relate to measures that prevent the loss of materials, minimize waste, conserve and save energy, and improve operational and organizational procedures.

DESIGN CHANGE

The environmental impact of a product is to a large extent determined by its design. By taking environmental considerations into account during product planning, design and development -- and so designing environmentally compatible products -- a company can minimize the negative impact of its products and process on the environment.

PROCESS MODIFICATION

Process modification is a key GP technique which encompasses both simple and more complex changes -- from replacing inefficient or old processes with new technology. to totally changing the production process used. Such alterations can also involve energy conservation techniques such as the use of efficient appliances and the re-use and recycling of heat.

WASTE MANAGEMENT

Waste stream segregation and the promotion of recycling, reuse and recovery are two broad techniques used to reduce the amount of waste a company produces and to improve waste disposal. Off-site recycling is often implemented if on-site recovery and reuse of resources is not feasible. Often substantial improvements can be made in the nature and quantity of waste produced by the substitution or purification of some material inputs.

Implementations of Green Productivity Practices

GP is driven by forces both external and internal to the organization. External forces are typically: •pressure from regulations, national and international;•demands from various stakeholders such as consumers and suppliers. Regulations may be in the form of increasingly stricter and more complex national regulations and standards; fiscal instruments such as taxes and penalties; and judicial directives. Many of the national regulations are a reflection of the international regulatory developments in environmental and natural resource protection. Evolving global and industry standards are serving as driving forces for the move towards GP. These include international conventions such as the Montreal Protocol and Climate Change Convention; Responsible Care of the Chemical Industry; Marine Stewardship Council for the food processing sector; Forest Stewardship for pulp and paper sector; and codes of conduct for environmental and social responsibility.

Internal forces that affect GP are those that are integral to the enterprise such as: worker health and safety; and internal efficiency. Establishment of standards such as SA 8000; adoption of the International Labor Organization's (ILO) standards for social welfare; and social codes of conduct adopted by corporate and retail chains are driving businesses to recognize worker health and safety as a crucial issue in business. The advantages of ensuring worker health and safety include: reduced health and insurance costs; reduced absenteeism; lower liabilities; and an increase in the morale of workers. This is reflected as improved labor productivity, which is a strong driving force for the adoption of a strategy like GP. Internal efficiency of processes and operations in an organization that serve as a driving force for GP primarily involve resource efficiency.

In considering the relationship between companies and society, there are two important activities for a "green" company. The first is to establish a company image, productivity strategy, CSR, health and safety and internal efficiency (Takagi, 2008). Gandhi et al (2006) have proposed the greening strategy grid that is used to analyze various greening strategies, where as field force analysis is used for selecting the best option for greening process. In addition, international trends are demonstrating that concepts such as CSR and health and safety are rapidly becoming key tools for forward-thinking corporations. Furthermore, a growing body of evidence suggests that such approaches are well placed to deliver a range of benefits over and above environmental benefits and mere compliance. This study therefore will focus the company practices towards green productivity implementation based on Takagis' recommendations (2008) such as company image, productivity strategy, corporate social responsibility, health and safety and internal efficiency.

Benefits of Green Productivity Practices

There is substantial business benefits associated with green productivity strategies that more than offset additional costs associated with assuming responsibility for the societal costs associated with a given business. Green productivity is at the heart of the concept of sustainable development (Miyai, 1997). Willard (2002) suggests that there are seven types of business benefits that can be achieved from adopting a sustainable business strategy. These areas of benefit are:

(1) Easier hiring of the best talent;
(2) Higher retention of top talent;
(3) Increasing employee productivity;
(4) reduced expenses in manufacturing;
(5) reduced expenses at commercial sites;
(6) Increased revenue/market share; and
(7) Reduced risk, easier financing.

Willard (2002) makes a strong case at the firm level for how green productivity initiatives lead to improved business results. As profitability is a key factor in business, GP would not be taken serious without its integration with profitability. Looking at this, GP is a strategy also leads towards organization profitability. This is because excessive use of resources means low productivity and less efficiency. When resources are use wisely by reducing it and recycling, it is also a form of saving to the organization.

III. Methodology

The unit of analysis of the study is the individual firm. The population of this study consists of all EMS ISO 14001 certified manufacturing firms in Malaysia. ISO 14001 certified firms were selected because they are expected to be embarked in the implementation of green productivity initiatives. This is supported by the studies of Darnall, Jolly and Handfield (2008), Sroufe, (2003), and Zhu, *et. al.*(2008). Darnall et al. (2008) studied the effect of EMS on green initiatives adoption and found that green initiatives adoption rates were higher for EMS adopters. They concluded from this result that the high level of awareness and experience of environmental issues generated through adoption of EMS facilitate adoption of green initiatives.

In deciding the appropriate sample size for this study, Sekaran (2003) suggested that a sample size of 234 is appropriate for a population of 600. Roscoe's (1975) rule of thumb suggests that the minimum sample should be at least 10 times the number of variables (90 in this study) (Sekaran, 2003). However, given the small sampling frame of the study and the likelihood of low response from mail survey (Sekaran, 2003); this study will select randomly 400 companies out of the 569 manufacturing companies.

IV. Analysis

The original sample of the study is 400 firms. After two reminder letters in addition to telephone calls and e-mails, 121 completed questionnaires were received. The response rate is 30%. Table 1.1 shows the profile of firms who answered the questionnaire. The table shows that about half (52.9%) of the firms belong to the electrical and electronics (E&E) industry. This is expected because E&E is the largest industry in Malaysia. The other half distributed between the machinery industries and textiles. The table shows also that the newly established firms are few in the sample (24.2%) and most of the firms (75.8%) are well-established (more than 15 years).

Similarly, most firms are considered large firms (more than 500 employees) (about 81%). This is consistent with the ownership status of the firm which shows that MNCs account for about 66.1% of firms while Malaysian fully owned account for 33.8% of firms. The data shows also about half of the firms (42.1%) have been certified with Environmental Management System (EMS 14001). Regarding productivity department, the table reveals that more than 50% of firms have the productivity department. This gives additional evidence of the existence of innovation in productivity in the Malaysian industry. With regard to the green productivity implementation, the table shows that most of the firms (75.2%) are implementing green productivity. Finally, about half of the firms (49.6%) have been engaged in green productivity for less than 5 years.

Table 1.1 *Profile of Companies*

		Frequency	Percent
Age of the firms	≤ 15 years	21	24.2
	> 15 years	100	75.8
Number of full time employees	101-500	23	19.0
	>500	98	81.0
Organization Category	Fully Malaysian owned	28	23.1
	Local & Foreign Joint Venture	13	10.7
	Fully Foreign owned	80	66.1
Main manufacturing activity	Machinery	1	.8
	Electronics	64	52.9
	Textiles/wearing apparel	3	2.5
	Other	53	43.8
State	Northern	76	62.8
	Central	7	5.8
	Southern	30	24.8
	East Coast	8	6.6
Years certified EMS	<5	30	24.8
	6-10	51	42.1
	11-15	32	26.4
	16-20	8	6.6
Have productivity dept	Yes	68	56.2
	No	53	43.8
Role of productivity dept	Very good	52	43.0
	Good	20	16.5
Implement green Productivity	Yes	91	75.2
	No	26	21.5
How Long Engage GP	1 - 5 Years	60	49.6
	6 - 10 Years	27	22.3
	> 11 Years	7	5.8

The chi-square test was performed to investigate the relationship between main manufacturing activities and year

certified EMS. In the bivariate setting of chi-square analysis, the main manufacturing activities were found to be related to Year Company certified EMS. In Table 1.2 shows that electronics manufacturer appeared to be the longest EMS 14001 holder compare to other manufacturer. It has been shows the electronic manufacturer (χ^2= 27.476; p value> 0.001) documented highest percentage of EMS 14001 certified holder from 6 to 20 years.

Table 1.2: ***Chi-square: Main manufacturing activity versus Years certified EMS***

	Years certified EMS				χ^2	p value
	<5	6-10	11-15	16-20		
Machinery	3.3%	.0%	.0%	.0%	27.476	.001
Electronics	23.3%	60.8%	56.2%	100.0%		
Textiles/wearing apparel	10.0%	.0%	.0%	.0%		
Other	63.3%	39.2%	43.8%	.0%		

Motives of Green Productivity

Table 1.3 highlights the objectives of green productivity implementation. 60.3% of the respondents agree that GP can increase product quality, 66.9% can reduce scrap and rework costs, 74.4% can reduce waste and pollution, 59.2% can reduce risk, 43.8% can reduce manufacturing cycle time, 38.8% can reduce unit manufacturing cost, 24.8% can reduce absenteeism, 33.1% can increase worker participation, 65.3% can increase healthier environments and 20.7% are others.

Table 1.3: ***Motives of Green Productivity***

		Frequency	Percent
Increase product quality	**Yes**	**73**	**60.3**
	No	35	28.9
Reduce scrap and rework costs	**Yes**	**81**	**66.9**
	No	30	24.8
Reduce waste, pollution	**Yes**	**90**	**74.4**
	No	21	17.4
Reduce risk	**Yes**	**72**	**59.5**
	No	39	32.2
Reduce manufacturing cycle time	Yes	53	43.8
	No	58	47.9
Reduce unit manufacturing cost	Yes	47	38.8
	No	64	52.9
Reduce absenteeism	Yes	30	24.8
	No	81	66.9
Increase workers participation	Yes	40	33.1
	No	71	58.7
Increase healthier environments	**Yes**	**79**	**65.3**
	No	32	26.4

V. Conclusions

A study done by Phang Siew Nooi, A professor in University Malaya in the 1990s says that "in so far Green Productivity (GP) is concerned; it is a very new concept that has been introduced by the APO through the NPC Malaysia. The proposed strategy seems to be promising as a two-pronged approach where productivity is enhanced with better environmental performance." In 2008, there is a book entitled "Green Productivity: Applications in Malaysia's Manufacturing" written by Dr. Elsadig Musa Ahmed. Beside this there are very little facts available to researcher and policy maker in regards to Green Productivity in Malaysian manufacturing companies. This study identifies the motives of the green productivity practices implementation in the Malaysian EMS 14001 certified companies. Given that knowledge about existence of green productivity practices in Malaysia, and developing countries in general, is lacking, the study can add considerable knowledge in this area and provide a base for future studies about the issue.

Malaysia is a well known developing country with its robust economy activities and economy policies. Being economically active developing countries, Malaysia is changing from agriculture to manufacturing to support the demand of the global economic and directly contributing in depleting natural resources. Nevertheless Malaysia government is also taking Green Issue as serious as other developed nation. In the recent Budget 2010 announced by our Prime Minister YAB Datuk Seri Najib Tun Razak Najib, Malaysia is serious in promoting Green Practice and Green Technology or Green Innovation. In his speech, YAB Datuk Seri Najib Tun Razak has said "Green Technology has the potential to become an important sector in economic development". Towards this, the government launched the National Green Technology Policy in August. The objective of the policy is to provide direction towards management of sustainable environment.

Beside this the government are also providing a total of RM1.5 billion as soft loans to companies that supply and utilize green technology. Looking at this Green Productivity is still relatively new concept in Malaysia especially to the SMEs. Mostly MNC companies that having their parents companies are practicing GP as a policy from their headquarters. Very commonly practiced activity in manufacturing companies in Malaysia in related to Green Practice is ISO 14001 which is designed to introduce environmental improvement into every aspect of a company's operations, offers an organized approach to manage environmental issues. This study discloses the innovation of green productivity, thus, it can advance mangers' understanding of the importance and value of green productivity practices. This understanding is very

crucial due to the increasing environmental and economic importance of green productivity in addition to their role in enhancing competitive power of companies in international markets.

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