

Full Length Research Paper

Motives in implementing Green Productivity among EMS 14001 certified companies in Malaysia

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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 is 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.

Key words: Motives, Green Productivity, implementation, certified companies, Malaysia.

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 and Qi (2004), the excessive economic growth creates not only resource scarcity but also pollu-tants 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

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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 and 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 (Jih-Hwa and Hsieh-Sheng 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 evolution of green productivity which gives general idea about the research topic. This paper then continues 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 appeared in literature in 1766 used by a 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 (1965) 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.

Miyai (1997) has proposed the similar concept of productivity. According to Miyai (1997), productivity is the measure of how well resources are brought together in organizations and utilized for accomplishing a set of results. Along with Miyai's (1997) 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.

According to Mohanty and Deshmukh (1998), productivity is concerned with the effective and efficient transformation of resources into desired outputs. Manufacturing, traditionally, has paid great attention to this conversion in terms of its effect on organizational profit but not on its harmful environmental effects (Mohanty and Deshmukh, 1998). As pressures rise to establish "green manufacturing" processes, the issue becomes one of both being



Figure 1. Evolution of Green Productivity. Source: Hwa (2001).

seen as socially responsible, and as conforming to increasing legislative and regulatory frameworks. The green productivity (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 achieved by means of using as much renewable energy as possible and also by utilizing more eco-friendly chemicals in the manufacturing process (APO, 2009). 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 and Heap, 2007).

Hwa (2001) illustrated the evolution of GP in their studies (Figure 1). Earlier before the 1950s, businesses do not care about environment pollution and often ignore it. In the 1960s, there was an improvement on the environment awareness and “the solution to pollution is dilution” concept was adopted to address the issue. Air pollutants were dispersed by tall smokestacks and water pollutants were discharged into the river/sea. However, this does not solve the problem but contributed towards unsustainability by accumulation in soil and water. In 1970s, efforts were concentrated to establish environmental

standards to regulate pollutants. This is where the use of end-of-pipe (EOP) treatment systems was introduced. With these EOP systems, pollutions were not eliminated but in fact it was just transferred from one centre to another. At a later stage, the trend was gradually changing from command-and-control process to voluntary systems focusing on preventing pollutions at its source, waste minimization, cleaner production, and environmental management systems such as the ISO 14000 series.

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 (<http://www.1malaysia.com.my/speeches/dewan-rakyat>).

Besides this, the government is also providing a total of RM 1.5 billion as soft loans to companies that supply and

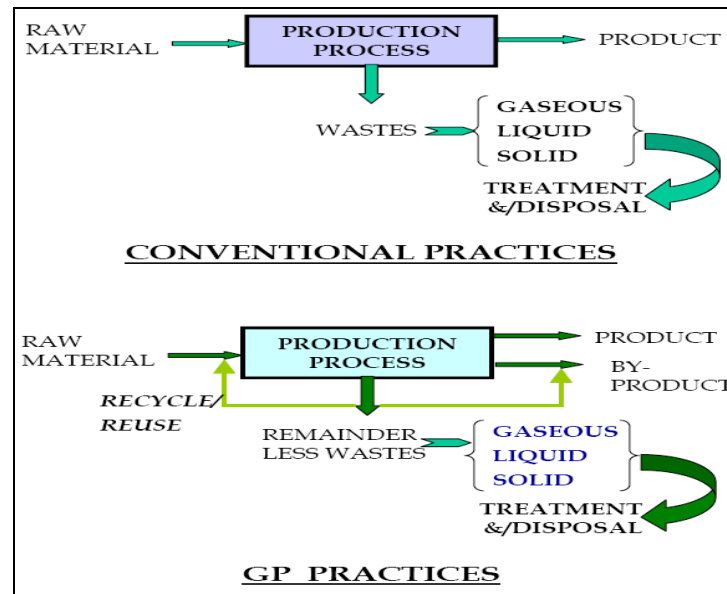


Figure 2. Conventional versus GP Practice. Source: APO (2009).

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 managers' understanding of the importance and value of green productivity practices. Figure 2 compares visually the conventional and GP practices in the value chain. 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.

LITERATURE REVIEW

Green Productivity

In recent years, there is more clear evidence that global warming is fast becoming a threat to the world and such avoidance by business towards the sustainability is not considered a strategic business move (Tuttle and Heap, 2007). This is simply because, the processes involved in the production of goods and services is surely either using and/or discharging toxic and hazardous substances which is becoming a big threat and risks towards the

environment and health. This process is not sustainable in the long run because it is affecting the society in a negative way (MOEA, 2002). The growing pressure for environmentally sound products and processes poses a challenge to industries that are trying to address environmental issues in addition to traditional quality and productivity concerns to achieve competitive advantage. Many concepts and strategies of manufacturing performance have evolved over time with the increased importance of environmental and resource concerns in product development, process technology, and systems management (Henson and Culaba, 2004).

Increasing awareness and growing public concern about the negative impacts on the environment and natural resource base has prompted the government to reconsider its strategy for growth and economic development. Most of the Asian countries are trying their best to balance the development and environmental needs based on the economic situation of their countries. GP techniques are used to bring about the changes that will result in better environmental performance and improved productivity. They range from simple house-keeping 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.

Theoretical base of the study

The previous sections reviewed literature related to the practices of green productivity initiatives and benefits from these initiatives. However, to understand the motives of green productivity initiatives, the study needs underlying theories. Theory is critical in order to define, establish and explain relationships between concepts or constructs (Zsidisin and Siferd, 2001). This study utilizes the institutional theory to explain the motives on the implementation of green productivity initiatives.

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 et al. (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 selected randomly 400 companies out of the 569 manufacturing companies.

DATA ANALYSIS

Profile of companies

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 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 show 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.

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. Table 2 shows that electronics manufacturer appeared to be the longest EMS 14001 holder compared to other manufacturer. It has been shown that the electronic manufacturer ($\chi^2= 27.476$; $p \text{ value} > 0.001$) documented highest percentage of EMS 14001 certified holder from 6 to 20 years.

Motives of Green Productivity

Table 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.

IMPLICATIONS

This study identifies the motives in implementing green productivity initiatives among Malaysian EMS 14001 certified companies. Given that knowledge about existence of green productivity initiatives in Malaysia, and developing countries in general is lacking, the study can add considerable knowledge in this area and provide a

Table 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 and 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

Table 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%		

Table 3. Motives of Green Productivity.

		Frequency Percent	
		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

base for future studies about the issue. This can add to the knowledge about the reasons why green productivity initiatives are diffused among organizations in Malaysian context. This knowledge can also enrich theories that deal with diffusion of innovations or initiatives among organizations, such as institutional theory.

In addition to the practical contributions, this study discloses the innovation of green productivity, thus, it can advance managers' 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. Thus, it can enhance the understanding of managers and policy makers about the green productivity initiatives in organizations. This understanding can help managers design appropriate policies for the diffusion of green productivity initiatives in their organizations and other organizations based on the specified factors. The study also may help policy makers in developing countries in general, and Malaysia in particular, in setting appropriate policies and strategies

for improving environmental performance of business firms. The Malaysian National Policy on the Environment gives special emphasis to pollution problems of the Malaysian firms and encourages large firms to establish partnerships with the small ones to exchange experience in EMS (MSTE, 2002). Therefore, concepts and results of green productivity, developed in this study, may be utilized by policy makers to improve environmental performance of business firms.

Limitations of the study

There are several limitations that need to be considered before coming to a conclusion with the results of this study. Firstly, the study only focused on manufacturing companies in Malaysia and does not take consideration of other industry like service organization. Therefore the results of this study shall be carefully considered when applying to non-manufacturing organizations or countries other than Malaysia. Second, this study is only limited to ISO14001 certified companies. It shall be noted in the descriptive analysis that majority of the respondent organization are large firms with 81% of the companies having more than 500 full time employees. As such, small & medium enterprises (SME) might not have enough representation in this study. Hwa (2001) stressed that in most Asian countries, environmental protection is considered as an "additional cost" to SMEs. Most SMEs do not have the resources to improve their environmental performance. As such it shall be noted that the initiatives undertaken by SMEs and also the drivers that motivate them might be different from the same that apply to large firms. Therefore, the results of this study shall be used with caution when comparing to non-certified small firms. Finally, this study is done by addressing the questionnaire to the EMR. This respondent is selected as knowledgeable person in the organization having combined knowledge about firm operation and environmental aspect. It shall be noted that there is still room for bias as the view of this single person might not represent the overall view of the organizations.

Conclusion

Over the past decade, there is strong concern that focuses on environmental sustainability thus challenging our capacity to be self-aware and find solutions to these critical issues that arise from world-wide climate change and natural resource conservation. In fact, commendable progress has been made through law and enforcement in many countries to reduce automobile exhaust emissions, lower pollution through the traded carbon credit program, and improve safety by eliminating the use of lead-based paint. But despite all this concern and enforcement,

scientific evidence is showing us that the acceleration of global warming and larger steps are needed to protect the environment.

Looking at this situation, there is growing concern on how to integrate this environmental protection aspect in the daily business operation so that business operation and green practises can co-exist and complement each other. To ensure this co-existence, green productivity concept was introduced not only to protect the environment but at the same time to increase the profitability of the organization; and not only do organizations gain from profitability, there are also other benefits that are associated with green productivity.

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