

**COMPANY PRACTICES INFLUENCING THE  
IMPLEMENTATION OF GREEN PRODUCTIVITY INITIATIVES  
AND ITS EFFECT ON THE PERFORMANCE AMONG EMS  
14001 CERTIFIED COMPANIES IN MALAYSIA**

**By**

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## **Abstrak**

Tanggungjawab terhadap alam sekitar, telah menjadi tren dan keperluan perniagaan di seluruh dunia pada masa ini. Ini adalah kerana, perniagaan secara langsung atau tidak langsung memberikan kesan negatif yang sangat besar terhadap alam sekitar dengan menyusutkan sumber tersebut dalam proses pengeluaran barangan dan perkhidmatan. Kajian ini bertujuan untuk mengkaji amalan syarikat yang mempengaruhi pelaksanaan 'Produktiviti Hijau' dan juga meneliti apakah kesan amalan-amalan tersebut terhadap prestasi organisasi. Kajian ini akan turut mengkaji sama ada prestasi organisasi dimediasikan oleh 'Produktiviti Hijau'. Kajian ini difokuskan kepada organisasi di Malaysia yang telah mendapat piawaian EMS14001. Berdasarkan kepada rekod FMM dan SIRIM, terdapat sebanyak 569 syarikat perkilangan di Malaysia yang telah mendapat piawaian sijil ISO 14001. Soal selidik telah diedarkan kepada 400 buah syarikat yang telah dipilih secara rawak. Perisian SPSS telah digunakan bagi tujuan untuk menganalisis data yang dikumpul dan untuk ujian hipotesis. Terdapat 3 hipotesis utama yang diuji dalam kajian ini iaitu 1) Amalan syarikat mempengaruhi pelaksanaan 'Produktiviti Hijau' secara positif, 2) Pelaksanaan 'Produktiviti Hijau' mempengaruhi prestasi organisasi secara positif dan 3) Hubungan antara amalan syarikat dan prestasi organisasi adalah dimediasikan oleh inisiatif 'Produktiviti Hijau'. Kajian ini mampu memberi satu persepsi baru kepada pengurus-pengurus syarikat di Malaysia bahawa 'Productiviti Hijau' bukan sahaja satu tanggungjawab sosial tetapi satu keputusan strategik terhadap kejayaan syarikat.

## **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' was introduced. This research will study companies' practices that are influencing implementation of Green Productivity initiatives and also what are the effects of these practices on the performances of the organization. This study will also ascertain if organizational performances is mediated by green productivity. This research is focused on the EMS14001 certified companies in Malaysia. Based on FMM and SIRIM record there were combined total of 569 manufacturing companies in Malaysia certified to ISO 14001. 400 companies were randomly selected and distributed with questionnaire. SPSS software was used to analyze the data gathered and for testing of hypothesis. There were 3 main hypothesis tested in this research which was 1) Company Practices positively affect the implementation of green productivity initiatives, 2) The implementation of green productivity initiatives positively affect organizational performance and 3) The relationship between company practices and organizational performance is mediated by green productivity initiatives. This study could give Manager of Malaysia's Firm a new perception on the Green Productivity Concept as Green Productivity Initiatives is not just morale responsibility but it is a strategic decision towards firms' success.

# CHAPTER 1

## INTRODUCTION

### 1.0 Introduction

*“Contrasting yet plausible stories can be told for how the world and its regions will develop in the next 30 years; each has fundamentally different implications for the environment.”*

Global Environment Outlook 2002

The economic development policies of most developing countries have led 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. For air pollution, over the past few decades, it has been observed that there is an increasing atmospheric concentration of greenhouse gases such as carbon dioxide (CO<sub>2</sub>) and other emissions that have a negative impact on the environment such as sulfur dioxide (SO<sub>2</sub>), nitrogen oxide (NO<sub>x</sub>) and carbon monoxide (CO). Consequently, Borhan and Ahmed (2008) have measured the relationship between economic growth and different indicators of air pollution in Malaysia, for instance; Carbon Monoxide (CO), Sulphur Dioxide (SO<sub>2</sub>), Nitrogen Dioxide (NO<sub>2</sub>), Ozone (O<sub>3</sub>) and Particulate Matter (PM<sub>10</sub>). These measures were found to be having positive effect of secondary industry share on pollution.

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.

## **1.1 Background of the Study**

Shireman (2001) highlighted the appearing of the new economy named Eco-Economy, not because it is ecologically sustainable, but rather because the new economy operates much more like an ecosystem than the old, the industrial economy. Interestingly, Saxena, Bhardwaj and Sinha (2003) supported that current economic policies highlighted only productivity and economic growth, without addressing environment, have resulted in adverse and irreversible environmental impacts. As a consequence, these challenges and pressures push governments to seriously considering environmental impacts in its economic policies as that productivity is primarily a topic for the economists. Accordingly, current economic realities are leading to a rethinking of the notion/concept of productivity (Ahmed, 2009). He further mentioned that traditionally, productivity is viewed mainly as an efficiency concept (amount of outputs in relation to efforts or resources used). Productivity is now should be viewed from the efficiency and effectiveness perspective. Effectiveness is focused on how the enterprise meets the dynamic needs and expectations of customers (buyers/users of products and services) i.e. how the enterprise creates and offers customer value. As one can see here, productivity is now seen to depend on the value of the products and services (utility, uniqueness, quality, convenience, availability, etc) and the efficiency with which they are produced and delivered to the customers (Ahmed, 2009).

Considering the globalization of the economy and other associated trends, therefore, its require a much broader conception of productivity and a fuller appreciation of the changing dynamics of the determinants involved in the process of its improvement (Vogtlander, Bijma & Brezet, 2002). The increased competitiveness, internationalization and sophistication of markets, the globalization of manufacturing

and the increased concern about social and ecological issues make productivity improvement more important. Hsuan, *et. al.*, (2001) stressed that the important role that productivity improvement can play in the preservation, rehabilitation and enhancement of the environment is increasingly recognized. Productivity improvement through better utilization of the energy, materials, water, solvents, etc. is now seen as an effective tool in preventing pollution at source. Productivity improvement must therefore take into full consideration the impact of the production, distribution, consumption and disposition processes on the environment. While meeting the customer needs, products and services supplied and the processes used to produce and distribute them must have minimum negative impact on the physical environment Hsuan, *et. al.*, (2001).

This recognition led to the development of green productivity (GP) program of the Asian Productivity Organization (APO), which integrates environmental protection and productivity improvement (APOa, 2002). Green productivity is defined by APO as strategy for enhancing productivity and environmental performance for socio-economic development (APOa, 2002). It is the application of appropriate technologies and process and management techniques to produce environmentally-compatible goods and services for enhanced productivity and profitability (APOa, 2002). Avishek, Nathawat and Pathak (2008) extended the definition of GP. They defined GP as a strategy for simultaneously enhancing productivity and environmental performance for overall socio-economic development that leads to sustained improvement in the quality of human life. It is the combined application of appropriate productivity and environmental management tools, techniques and technologies that reduce the environmental impact of an organization's activities, products and services while enhancing profitability and competitive advantage.

Avishek et al., (2008) concluded that the traditional methods of increasing productivity were not eco friendly and the pollution control measures were not optimal for sustainable environmental protection. They proposed that GP programme should focus on increased profitability & quality production, environment protection, health and safety, ensure regulatory compliance and lead to sustainable Development.

In summary, the goal of GP is to attain a higher level of productivity for serving the needs of the society and to protect and enhance the quality of the environment. The concept of GP is drawn from the integration of two important developmental strategies via productivity improvement and environmental protection. Productivity provides the framework for continued improvement while environmental protection provides the foundation for sustainable development. Therefore, GP is a strategy for enhancing productivity and environmental performance for overall social, economic development. This study is, therefore, mainly motivated by the quest to answer the question: - How does GP enhance overall productivity and environmental performance?" Accordingly, the study starts with this introductory chapter which gives general idea about the research topic and problem of the study. The chapter starts with providing background of the study. The background includes also discussions on the environmental issues and evolution of GP. The chapter then followed by the problem of the study, the research questions and objectives. Next, the chapter portrays the significance of the study, expected contributions and its focus. The chapter ends with defining the key terms of the study and organization of the thesis.

### ***1.1.1 Environmental Issues***

According to the Intergovernmental Panel on Climate Change (IPCC) Report in 2007, the warming of the climate system is clearly evident in the rise of global average air and ocean temperatures, widespread melting of snow and ice and rising sea levels. Other effects can also be seen in the form of erratic rainfall pattern and more frequent and severe weather related disaster. Studies have shown that the main cause of climate change is the emission of greenhouse gases especially carbon dioxide (CO<sub>2</sub>), due to human activities such as the burning of fossil fuel and rapid deforestation in the pursuit of economic development (Mohanty & Deshmukh, 1998; Srinivasan, 2002; Parasnis, 2003; Tersine, 2004 and Moharamnejad & Azarkamand; 2007). Nevertheless, the impacts of industries towards environment not only can be seen at the early stage of production but it is damaging the natural resources in every stage of a good or services production. Hur, Kim and Yamamoto (2004) elaborated on the issue. According to them, the soil degradation start the moments raw materials are sourced by mining and other extraction process which also leads to vegetation and contamination. This effect continues to the manufacturing process where emission and solid waste generation leads to pollutions. Finally the use and disposal of products by consumers again contributes towards pollutions (Fatta & Marneri, 2004).

According to Al-Darrab (2000), green consumerism has begun to emerge in pressuring manufacturer and service provider to be more responsible in the process of manufacturing and delivering goods. Studies during the 1985 shows that 37.6% of consumers are demanding for eco-friendly products and they are also beginning to encourage by consuming products of manufacturer who take responsibility not only in their manufacturing process but also in the disposal of products such as batteries, computers and etc (Al-Darrab, 2000). Hur et., (2004) have claimed that firms,



engaging in the eco-efficiency revolution, are thought to have long term advantages in terms of international competitiveness because it encourages business to become more competitive, more innovative and more environmentally responsible.

On the business perspective, green is now becomes a common practice to portray the environmentally-friendly image of products, processes, systems and technologies, and the way business is conducted (Vachon & Klassen, 2006). In other words, green is referred to practices, processes and products that have minimal impact on the health of the ecosystem in which the emphasis is on non-hazardous, recyclable, reusable and energy efficient products and processes (Aberdeen Group, 2008). It should, therefore, be an important agenda for many companies towards commitment to the natural environment in enhancing their competitive advantage. The key challenge of global socio-economic development now is to integrate environmental protection with productivity enhancement. Productivity provides the framework for continuous improvement while environmental protection provides the foundation for sustainable development.

### **1.1.2 Evolution of Green Productivity (GP)**

*"Productivity is above all a state of mind. It is an attitude that seeks the continuous improvement of what exists. It is a conviction that one can do better today than yesterday and that tomorrow will be better than today. Furthermore it requires constant efforts to adapt economic activities to ever-changing conditions and the application of new theories and methods. It is a firm belief in the progress of humanity."*

APOa (2002)

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 (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. 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.

Productivity is the name of reaching the higher level of performance with the least expenditures of resources. Sumanth (1990) believes that productivity is a family of ratios of output to input. The living standard of the country is measured by the productivity. Productivity is measured by the goods and services produced by per unit of national resources. Sink (1985) has further clarified productivity with reference to time and application of generic system of calculation. In its broadest sense, productivity is a relationship between outputs from a given system during or over a given period in time, and inputs to that system during that same period, should be generic and universal Sink (1985). Lawlor (1985) has also given two concepts of productivity. According to Lawlor (1985), productivity is a comprehensive measure about how efficiently and effectively organizations satisfy the following five aims: Objective achievements, Efficiency of the process, Effectiveness, Comparability with

other organizations and Trend- productivity measured over a period. According to APOa (2002), productivity improvement means improvement in QCDMS:-

Q = Quality - Higher quality that meets or exceeds customer requirements,

C = C - Lower Cost.

D = Delivery - Timely delivery as desired by the customer.

M = Morale - Boosting morale of all concerned.

S = Safety - Improving the safety of every aspect of the product and process.

Campbell and Campbell (1988), however, have viewed this issue in a different manner. According to them, productivity is a concept that has captured the imagination and energy of managers and behavioral scientist for decades. In this statement, productivity looks a concept more than a definition. Baig (2002) has defined productivity in the following words, “doing things right at the least possible cost in least possible time with the highest possible quality and to the maximum level of satisfaction of the customers and employees”. Similarly, Chen, Liaw and Chen (2001) define productivity in the following words, “productivity is often used to evaluate the aggregate performance of a business unit, generally defined as the ratio of outputs to inputs. However, for different applications and research domains there are different definitions of productivity”. This definition supports the established fact discussed in previous paragraphs that productivity has different meanings in different situations.

In today’s business world, therefore, the term productivity has been interpreted in many different ways, yet there is still no agreement on what actually constitutes productivity. Vittal (2002) has attached another concept with productivity and that is the objective of the organization. Vittal (2002) says that, “productivity, at a very

element level can be defined as output by input. But mere increase in output is of no value unless the output also has a bearing on the objectives of the organization or the environment under which the transaction takes place". In this context, productivity is associated not only with output and input but also with the value of environment. In an extension of Vittals' (2002) definition, Srinivasan (2002) is looking productivity with another angle. Alternatively, Srinivasan (2002) argued that the concept of productivity has undergone a sea change with the advent of the e-Age and in the new business paradigm, the traditional definition has to be modified; in fact it has already been redefined in this knowledge era. Srinivasan (2002) has further stated, "It has become to be recognized that there are several intangible, nevertheless vital ingredients that constitute the sum of productivity".

In the above arguments, it is clear that simple output and input ratio is not the true meaning of productivity, firms produce some intangible things, which are also vital. In addition, there is a need to measure intangible out put too while measuring productivity. According to Sink (1985), engineers, psychologists, economists, politicians, sociologists, organizational behaviorists and managers all have different perception on the concept of productivity. Baig (2002) has defined productivity in another way. According to Baig (2002), productivity has different meanings to different people as such:-

- For employers: Improve competitive position in the market
- For Employees: An increase in compensation, development of skills and other capabilities
- For Customers: Lower price, high quality, timely delivery,
- For Society: Low inflation, improvement in living standards, environmental protection

- For Government: More revenues, more resources for social services

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 (APOa, 2002). 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 (APOa, 2002). 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 visualized the differences between conventional productivity and green productivity practices. Productivity has been widely recognized and adopted as the ratio of output to input. However, the conventional concept of productivity may be too narrow when defined as the ratio of output/input to be useful in decision-making particularly in business management (Onchan, 2002). On the other hand, environmental compliance can be achieved cost effectively by pollution prevention through material substitution, and improvement of the design and operation of production processes GP concept (APOa, 2002). Thus, the goal of GP can be reached when raw materials, water, energy, and other resources are used more efficiently, less harmful substances substituted for hazardous ones, toxic substances are eliminated

from production process and products, or new greener technology is employed. Eventually the remaining residues and pollutants will require to be managed to comply with applicable environmental standards using the optimal and sound end-of-pipe treatment measures.

**Figure 1.1:**

***Conventional versus GP Practice***

Source: APOa (2002)

A number of popular productivity improvement programs are directly pertinent to GP (Nachimutha et al, 2006). For example, elimination of wastes and continuous improvement are the basic tenets of TPM, Kaizen, and 5S philosophy. They create substantial opportunities for pollution prevention since their basic philosophy is to minimize waste. Total Productive Maintenance (TPM) addresses equipment maintenance, 5S ensures structured and systematic housekeeping in an enterprise, and Kaizen a philosophy committed to continual improvement. According to them, all of these programs lead to cost reduction by enhancing resource efficiency and waste minimization. According to APOa (2002), there are three ecological principles that are guiding GP, which is:

a) Sustainable use of natural resources

Under this guidance, our readily available natural resources should not be used up at a rate faster than they can be renewed or regenerated. In the event that the natural resources could not be renewed or regenerated, the use of such resources shall not be faster than a substitute is available. GP's objective is to ensure that our natural resources are used very efficiently which will result in its conservation and sustainable use of our mother nature.

b) Protection of ecological balance

Protection of ecological balance can be achieved when pollution is controlled within the capacity of the environment to treat this waste and pollution. Pollution will disrupt the ecological process by contaminating our food chain that provides us with our food. With this objective, GP focus in preventing and reducing pollution and this in turn will protect our

ecological process that is important in maintaining ecological balance of the environment.

c) Protect plant and animal species

Plant and animal are also important towards our long term survival as they contribute in maintaining the ecological balance of our environment. They are also the basis for our food and other products. The genetic composition of these plants and animals are essentials as it helps improve our food crops and also being sources of our medicine. When the above two objective of GP is maintained, it will also contribute towards survival of these species.

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 easier hiring of the best talent; higher retention of top talent; increasing employee productivity; reduced expenses in manufacturing; reduced expenses at commercial sites; increased revenue/market share; and 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.

## **1.2 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. Therefore, it needs to be accompanied by productivity and quality improvements if it is to be more widely accepted and practiced by the industries (Kwong, 2002).

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 by APO (Asian Productivity Organization) with an objective to enhance productivity and simultaneously reduce the negative impacts on the environment. The concept of GP is drawn from the integration of two important development strategies: productivity improvement and environmental protection. It is the application of appropriate techniques, technologies and management systems to produce environmentally compatible goods and services (Nachimutha et al, 2006). 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. First the focus on productivity involves consideration of both inputs and outputs and the three productivities also through the focus on perceived value have a customer perspective that is missing from the triple bottom line paradigm.

A study done by Nooi (2000), 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.” Beside this there are very little facts available to researcher and policy maker in regards to Green Productivity in

Malaysian manufacturing companies (Nooi, 2000). Recently, Ahmed (2009) has published a book titled *Green Productivity: Applications in Malaysia's Manufacturing*. This book is intended to be empirical attempts to extend productivity measure by taking into account pollutant emissions into production function as un-priced input, which have been ignored in the most of literature.

Following this, the local council of MPSP Penang has recently conducted a Green Productivity workshop under the LA 21 initiative for the factories in Perai Industrial Area in a move to encourage more factories to adopt green productivity practices (SERI, 2010). On top of this, Prime Minister in one of his speech has mentioned that Malaysia has bright prospects to reduce its carbon footprint by 40 per cent by 2020 if companies install the necessary equipment and embrace the right systems in protecting rainforests to reduce greenhouse gas emissions (GHG). "We can also use satellite systems to monitor emissions in targeted industries. We must use science in embracing green technology and design to empower companies with ways to use nature to boost productivity while protecting the environment," (Bernama, April 09, 2010). Realizing the importance of the green productivity as a competitive weapon, the Malaysian government has extended the role and function of the Malaysia Productivity Center (MPC). MPC is now spearheading the effort to prepare local industries to compete globally by automating their green productivity processes (Malaysia Productivity Center, 2009). Specifically, MPC roles is to plan and implement training programmes, systems development, outreach programmes, research and compilation of best practices in *GP* domestic firms, enhancing of networking with various local and international institutions to facilitate the implementation of various GP support programmes.

With these supports by the government, questions arise about to what extent green productivity initiatives exist in practice? What company practices influence them to implement green productivity initiatives? And what are the performances realized by the implementing organizations? A survey needs to be carried out in order to gauge how organizations in this country practice it. The purpose of this study, therefore, is to investigate the level of green productivity initiatives by companies in Malaysia in which that the green productivity will be one of the most excellence way in business practices towards business performance.

### **1.3 Research Objectives**

The main objective of this study is to ascertain the company practices that influence companies in Malaysia to implement Green Productivity in their operation and also to what extend does this GP is being practice in those organization. In addition, the relationship between the green productivity initiatives with the performance will be investigated. To examine whether green productivity initiatives mediate the relationships between company's practices and with performance of the organization in Malaysia.

### **1.4 Research Questions**

Based on the above questions, the study tries to attain the following objectives:

- i) What are the companies practices influencing them to implement green productivity initiatives?
- ii) What is the relationship between green productivity initiatives and the performance of the organization?

- iii) Do green productivity initiatives mediate the relationships between company's practices and with performance of the organization?

### **1.5 Scope of Study**

The study focuses on ISO 14001 certified manufacturing firms in Malaysia. The manufacturing sector was selected because it is the largest sector in terms of sales, employment, and contribution to the economy (MIDA, 2007; Department of Statistics Malaysia, 2007). Moreover, the sector has tremendous contribution to the quality and environmental problems in Malaysia (DOE, 2006). Thereby, any effort to improve environmental performance of this sector can produce substantial benefits. Within the manufacturing sector, the study focuses on EMS ISO 14001 certified companies. These companies were selected because they are expected to have the highest level of green productivity implementation.

### **1.6 Contributions of Study**

The study emanates its expected theoretical contributions to knowledge and practical contributions to business and public organizations as follows.

#### ***1.6.1 Theoretical Contributions***

This study identifies green productivity initiatives implemented in the Malaysian EMS 14001 certified companies and portrays their extent of implementation. 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 base for future studies about the issue.

The study also identifies factors for green productivity in the Malaysian context and reveals the influence of each factor on green productivity initiatives. This can add to the knowledge about how 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. Furthermore, the study identifies the performance from green productivity initiatives and shows the influence of green productivity initiatives on each type of the performance. This can add to the knowledge about the value and importance of green productivity initiatives to organizations and the society at large. This knowledge can also enrich theories about the value of green initiatives, especially the natural resource-based view of the firm (Hart, 1995).

### ***1.6.2 Practical Contributions***

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 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.

The study also shows the factors for the implementation of green productivity, 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.

### **1.7 Definition of Key Terms**

**Green Productivity:** Strategy in which appropriate tools, techniques, technologies and management system are applied to produce environmentally friendly goods and services. In Green Productivity concepts, productivity provides foundation for continual improvement and environmental protection provides a framework for sustainable development (APOa, 2002)

**Green Productivity Initiatives:** A set of endeavors or efforts undertaken by a firm that aim to minimize negative environmental effects associated with the entire life cycle of its products or services starting from design of the product, acquisition of raw materials, product use, up to the final disposal of the product (Zsidisin & Siferd, 2001).

**ISO 14001:** A management tool enabling an organization of any size or type to 1) identify and control the environmental impact of its activities, products or services, 2) to improve its environmental performance continually, 3) implement a systematic approach to setting environmental objectives and targets, to achieving these and to demonstrating that they have been achieved ([www.iso.org](http://www.iso.org)).

**Productivity Strategy:** Productivity strategy is a systematic approach to productivity improvement which identifies the interrelationship between the elements of the system in the manufacturing line and its surrounding environment. It is a process of



decisions and plans for achieving long-term productivity improvement goals (Mc Tavish, *et al.*, 1996).

**Company Image:** Is a scenario that distinguishing a firm from their competitors by creating an environmentally friendly image (Pouliot, 1996).

**Corporate Social Responsibility:** Is an activity that focuses on an organization's duty or obligation to perform in a socially responsible manner in large (O'Dwyer, 2002).

**Internal Efficiency & Effectiveness:** Efficiency is “doing things right” and effectiveness is “doing the right things”. A measure of efficiency assesses the ability of an organization to attain the output(s) with the minimum level of inputs (Drucker 1977). Efficiency is primarily concerned with minimizing the costs and deals with the allocation of resources across alternative uses (Achabal *et al.*, 1984). Effectiveness assesses the ability of an organization to attain its pre-determined goals and objectives (Keh *et al.* 2006). An organization is effective to the degree to which it achieves its goals (Asmild *et al.*, 2007).

**Health & Safety:** Occupational safety and health is a cross-disciplinary area focussed on protecting the safety, health and welfare of individual involved in work or employment. The main objective of all occupational safety and health programs is to provide and improve a safe work environment (Wikipedia). It is a process in preventing employees from being hurt or ill due to work related activities by adopting

the right precautions - and providing a satisfactory working environment (HSE, 2008).

**Intangible Performance** related to workers health & safety, product image of the organization, perceived image by customers and supplier and also level of workers absenteeism. It is difficult to quantify outcomes that can actually result from the implementation of green productivity initiatives (Kassinis & Soteriou, 2003).

**Environmental Performance:** defined as positive consequences of green productivity initiatives on the natural environment inside and outside the firm (Zhu & Sarkis, 2004).

**Economic Performance:** defined as financial returns that can actually result from the implementation of green productivity initiatives (Zhu & Sarkis, 2004).

## **1.8 Report Organizations**

The report is organized as follows: Chapter one is an introductory chapter aims to provide general idea about the research problem, research questions, research objectives, and the settings. Chapter two provides literature review that explains green productivity initiatives. Besides, it explains the development of the theoretical framework and research hypotheses based on analysis of literature. Chapter three provides research methodology that includes research design, specifying population and sample, and developing measures and scales for the variables of the study. The chapter then explains questionnaire design and statistical techniques to be used in analyzing the data. Chapter four presents findings of the study that includes analysis