

## Green it Parvasiveness in Business Activities Towards Environmental Conservation

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Every company, particularly IT business is facing a challenge in performing business practices that complied with the environmental conservation. As a response, IT sector had fostered an initiative identified as 'Green IT' which is a practice of designing, manufacturing, using and disposing of IT equipments with less damage to the environment. Implementing green IT practices will assist a company to respond to its moral obligation in preserving the environment and abiding in government regulation. Nevertheless, a company has to consider some challenges in practicing green IT such as investing in IT hardware and infrastructure without sacrificing its profitability. At last, the green IT initiatives will be beneficial for the company in creating competitive advantages and to be able to sustain its business performance.

Key words: Green IT, Business Activities, Environmental Conservation

### INTRODUCTION

Environmental conservation has become an issue in business environment. As human activities play a significant role in the increasing amount of greenhouse gases, so do business practices. In particular, the development of Information Technology (IT) has been part of environmental problems, since IT is related to the substantial use of electric power that requires coal and petroleum to be generated. As a result, power generation will release carbon dioxide to the atmosphere and increase the greenhouse gases which cause the global warming (Murugesan 2008, p. 25).

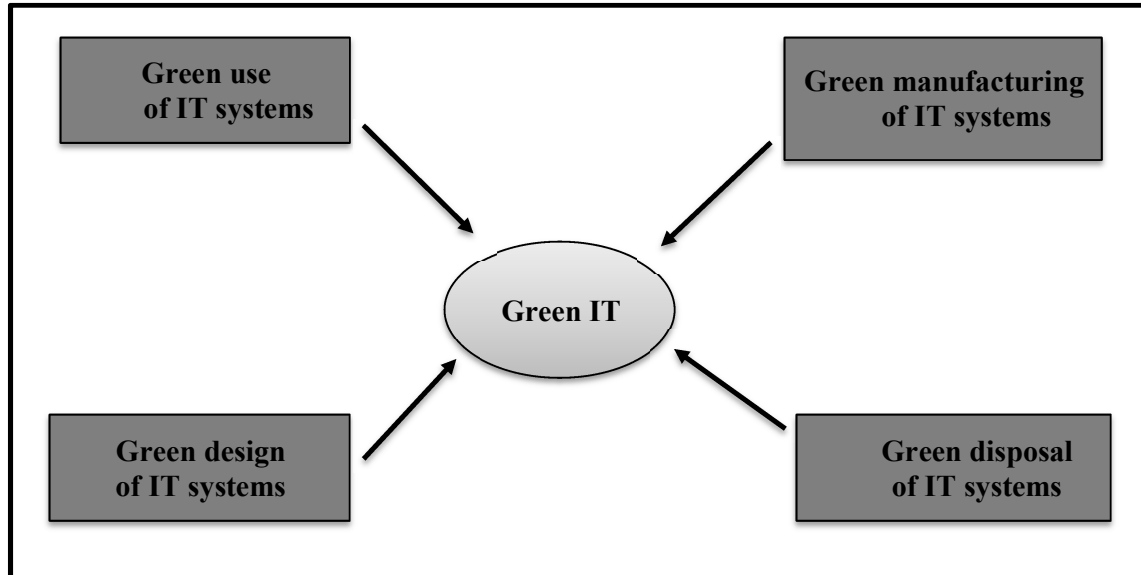
Responding to the environmental problems, IT sector has been fostered the idea of "Green IT", which according to Murugesan (2008, pp. 25-26) is "a study and practice of designing, manufacturing, using, and disposing of computers, servers, and associated subsystems-such as monitors, printers, storage, devices, and networking and communications systems – efficiently and effectively with minimal or no impact on the environment". Furthermore, businesses also

have to take into consideration as governments have been setting regulations related to IT practices, particularly when the U.S. Environmental Protection Agency (EPA) initiated the Energy Star in 1992 as a standard of recognizing energy-efficiency characteristic of electronic equipments (Ruth 2009, p. 74). Since then, more standards have been developed for electronic equipments 'green' compliance, such as: EPEAT, an evaluation tool for computers and IT hardware's environmental performance; RoHS (Restriction of Hazardous Substances) Directive, to restrict the usage of hazardous substances in manufacturing electrical and electronic equipment; and Energy Star 4.0 Standard, a regulation for energy performance of personal computers, desktops, and gaming systems (Murugesan 2008, p. 32).

As well as moral responsibility of conserving the environment, IT business also facing profitability issue. This report will present the green IT initiatives in helping companies to contribute in conserving the environment without sacrificing profit, through several approaches adopted from Murugesan (2008, p. 27) as describes in figure 1; firstly, from the designing of IT equipments;

secondly, from the manufacturing; and lastly from the disposal.

**Figure 1. Green IT Approaches**



Source: *Harnessing Green IT: Principles and Practices* (Murugesan 2008, p. 27)

**Green Design.** The phase of designing IT component is a decisive part in conserving the environment, because it can determine the energy consumption and life of the devices. An experiment of notebook computer heating system conducted by Chao et al. (1995, pp. 259-264) shows that implementing a cooling system with no supplementary equipment, especially in a vertical configuration between LCD, keyboard and cover give better result in transferring the heat in a notebook computer, thus help to save the energy. Goldberg (1998, p. 17) states another example that is an efficient design of chips that allows saving more energy as the computer uses less energy, produces less heat, and requires less cooling system. In the end, energy reduction means cost reduction, hence increased company profit.

Generally, there are four issues addressed by green design which are, to reduce the consumption of resources and production of waste, to develop unplutted process of manufacturing, to minimize computers' energy consumption, and to prolong the use of computers and computers. Among these issues, the most difficult one is to manage the computer life cycle in order to expand the

use, which is estimated can be twice the average of today's appliances (Goldberg 1998, pp. 16-18).

However, for IT manufacturers and suppliers, extending computers life cycle is less beneficial as they prefer to have consumers repeatedly buying their product. As a result, these companies are not likely to produce long-life appliances. Nevertheless, more consumers are become aware of environmental issues and more competitors have been shifting in producing environmental friending product, thus give pressure to the business. Implementing green design would be more advantageous for the company to contribute in conserving the environmental, gaining profit, and at the same time able to compete with the competitors.

**Green Manufacturing.** Efficient manufacturing of IT products are very crucial in determining company's role to conserve the environmental and create competitive advantage to maximize profit. Murugesan (2008, p. 25) explains that, manufacturing process of computer and its components emits carbon dioxide to the atmosphere and affect the environment because it needs electricity and most of all produce dangerous

waste. Indeed, another study shows that three pounds of waste are generated from every pound of product during manufacturing process of personal computer (Goldberg 1998, p. 16).

There are three strategies introduced by Hart (1995, pp. 991-998) in his natural-resource-based view theory to increase a company's competitive advantage through the manufacturing process. First is pollution prevention by reducing, changing or preventing emissions. This approach can save cost on waste disposal and enhance productivity as well as efficiency by diminishing unnecessary activities. However, Hart argues that pollution is another form of waste which should be eliminated if a company wants to achieve a qualified business performance. Second is product stewardship, where a firm avoids doing business that can cause problem to the environment by designing a product system which can reduce liability besides producing lower-cost products. Nevertheless, Hart claims that involving external stakeholder to the product stewardship approach will be beneficial for the company, especially in undertaking other perspectives during the process of making decision. Third is sustainable development that can cut off the negative impact of economic activities to the environment. In spite of this, in order to achieve a sustainable development, there must be a collaborative effort between the company and government, to give more access to resources and technologies.

Green use. One of the keys for a company to conserve the environment is to wisely use IT. IT infrastructure uses a considerable amount of electricity which contributes to the increasing of greenhouse gas emission. Business activities also consume more energy in providing office spaces and equipments. Therefore, by reducing the consumption of electric power and work spaces, a company can minimize the negative impacts of IT to the environment, reduce the electricity cost and indirectly increase profits. In fact, there several ways that can be implemented in 'green using' the IT, such as conserving energy consumption of IT

appliances, conserving energy consumption of data centers, and telecommuting.

**Conserving personal computers (PCs) energy consumption.** Murugesan (2008, p. 28) states that there are several ways to conserve electric power consumption PCs, such as using a blank screensaver, enabling sleep mode or other power management modes and turning off the computer when it is not in use. In doing so company can reduce computers operational time and temperature, thus will save energy and lengthen the computer is fairly simple to do and will give benefit for the company in the long run, he argues that some people are not willing to do that because it consumes their time throughout workday to switch the computers on and off. However, people should know that conserving the energy is more important than their rebooting time, not only for the company but also for the environment.

**Conserving data centers energy consumption.** Data center is the host place for servers which contain critical applications and backups for a company. These servers are utilized in excessive energy consumption because they require high power and cooling systems, although some of them are not continuously used. Moreover, according to a study by IT consultant company, Gartner Group, data centers consume 100 times energy of office building per square foot. The limited energy source give burden to the company and environment, thus induce company to manage the data centers more efficiently (Moh et al. 2010; Murugesan 2008; Ruth 2009).

The increasing use of IT equipment and infrastructure, especially the data center is needed to improve business performance. However, Bachour & Chasteen (2010, p.2) and Wang (2007, p. 2) contend that the need of more servers and more floor spaces to support the business contributes to more energy consumption. In fact, the costs spent on IT infrastructure power and cooling system are greater than the costs of IT equipments processing power. For example, during 2005 and 2006 in the US, there is 2.75 power costs multiplied in only 9 months as a result of meeting the business expansion

demand. The increasing cost of energy consumption gives disadvantages for a company, since it will reduce profits and cause energy inefficiency.

One of the essential keys to reduce power consumption is using virtualization, where a software application enable physical server to become the host of several virtual servers. Nevertheless, virtualization has a drawback which is the complexity that needs tools to have been invented by several IT companies which are more energy efficient (Murugesan 2008, p. 29; Ruth 2009, p. 76).

**Telecommuting.** Telecommuting is a way where people work from alternative workplaces other than office. According to a research by Roth et al. (2008, p. 5), telecommuting brings positive impact to the energy saving and the result is multiplying by the increasing frequencies of this activity. Moreover, Dick and Ducanson (1999, p. 1-2) state that there are some additional benefits of doing this activity, such as reducing travel time and transportation cost, offering flexible work time for employees, and reducing road and parking area congestion during rush hour. In addition, Williams (2003, p. 149) affirms that the key environmental benefit expected from telecommuting is to cut down the consumption of energy in commercial building. Nonetheless, he argues that this will increase the energy consumption in residential buildings because there is shifting of work space from office to home. However, telecommuting will help to lessen the work space needed in office buildings, minimize the need to provide electronic appliances for work, and most of all reduce the cost of electric power consumption which indirectly would increase the company's profits.

Other contentions related to telecommuting are lack of employer support and supervision, isolate feelings of employees, and less of privacy when home is used as work place which requires inspection from employer. There is also a skeptical issue stating that telecommuting gives more benefits to telecommunications and computing companies for providing internet connection and computer appliances (Dick & Ducanson 1999, p.2). However, involving in

support and a regular maintenance. In spite of this, virtualization will increase energy efficiency, increase automation where several tasks can be monitored and handled by software, and retrieve underutilized machines. Moreover, virtualization will reduce electric consumption and floor space. Another approach to conserve the energy on data centers is to use more innovative cooling systems

that telecommuting will give positive public relations for the company, for being aware of people and environmental needs, especially in conserving the energy. At the end, the success implementation and acceptance toward telecommuting depends on several aspects such as; the cultures of the company for being able to accept the changes; philosophies and attitudes of managements to be able to accept that there will be less control and power over the employees; besides the concern of employees of their responsibility to the company although they are not under direct supervision (Prystash 1995, p. 98).

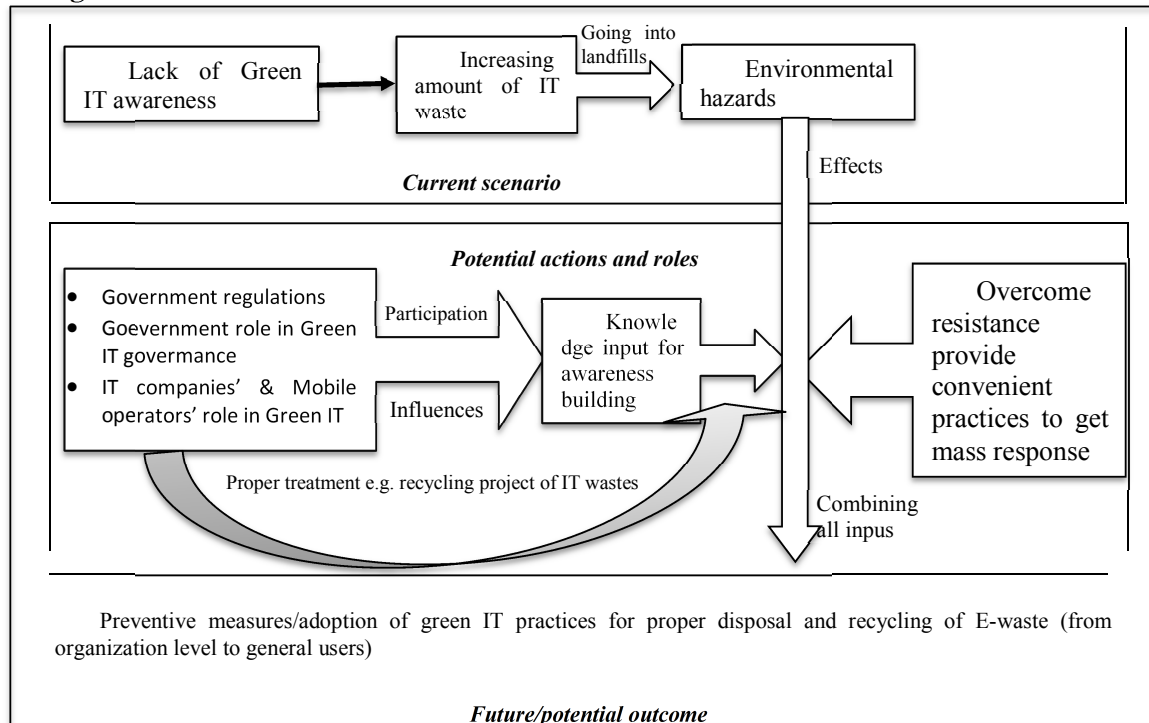
**Green Disposals.** The phase that has direct impacts to the environmental conservation is the disposal phase, which is the stage where used and unwanted electronic equipment will be thrown away. Bachour and Chasteen (2010, p. 2) claims that rapid growth and innovation of IT hardware are the reasons that caused an increasing amount of electronic waste (e-waste), and as a result the expected life cycle of electronic products has become shorter. Indeed, most of the e-waste consists of computers, mobile phones and game consoles that are very dangerous to the environment. Ruth (2009, p. 74) states that "seventy percent of all hazardous waste is e-waste, which is bulky, complicated to recycle, and sometimes contains unsafe levels of heavy metals and other dangerous chemicals".

According to a study of green IT practices related to mobile phones in Bangladesh, as Ansari et al. (2010, p. 381) describe in Figure 2, there is less awareness of people that led to the increasing amount of e-waste, hence creates unsafe impacts to the environment. However, they argue that the impacts to the environment could be prevented if government imposed regulations with penalties, and

perform campaign to increase people's awareness. Likewise, in general, companies must also involve in this effort as a part of their social responsibility response, thus as a

goal will increase awareness, prevent dangerous impacts to the environment and improve practices in green IT.

**Figure 2. Green IT Overview in Bangladesh**



Source: *Green IT awareness and practices: results from a field study on mobile phone related e-waste in Bangladesh (Ansari et al. 2010, p. 381)*

According to Murgesan (2008, p. 30), there are three approaches that could be done in minimizing e-waste impacts to the environment. The first is to reuse, which is the way where companies make the best use of their computers if they still can function properly, or else, give the unwanted computer to another person or organization that can make use of it. The second is to refurbish, that can be done by repairing and substituting the malfunction part. However, as computers and IT appliances become obsolete rapidly, these products will become outdated very quickly. The last approach is to recycle which can be an alternative when people find that there is no other way for them than to dispose of their electronic

appliances. Recycling is a proper way to reprocess IT equipments into materials that can be used again. By disposing IT equipments properly a company can contribute in conserving the environment and save the environmental cost of waste production.

## CONCLUSION

The development of IT sector in supporting business practices cannot be detached from the impacts it cause to the environment. Green IT can help the company to conserve the environment by designing energy saving equipments that are

environmentally safe and have a long life time; conducting a manufacturing process that has the least impact to the environment; using IT equipments and implementing activities that conserve electric power that can minimize the negative impacts of IT equipments without causing danerous to the environment.

Green IT has become an essential part of company strategies which is beneficial, not only to the company itself in generating profits, but also to the environmental consevation. Nonetheless, there might be a concern about the costs and benefits of this practice. Green IT will require an initial investment that needs to be paid back to supply the company with energy-safe IT hardware, software and system, to substitute for old machines and system that consumed a considerable amount of energy which is harmful for the environment. However, the benefits that a company could gain from this practice outweigh the costs it sacrificed. This is because there is a shift among the consumers who prefer more environmental friendly product, which can be an opportunity for the company to gain new market. Besides, government and IT industries have initiated several regulations to be imposed for IT equipments and practices to meet energy saving requirements.

As the environmental issues become popular and attract more attention, green IT practices will persistently evolve. There will be more innovations in IT sector to help conserving the environment even better, creating more opportunities for the company to invent environmentally safe products and services to obtain more profits while at the same time helping to sustain the environment.

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