

The Effect of the Green IT to the Productivity of the Business

Kim, Taeh-hwan*

ABSTRACT

The development of green IT for business will open up exciting opportunities for finding new and efficient way of doing businesses. This study is to contribute to a better understanding of green IT by carrying out the survey among IT userson the factors of green IT. Based on the literature study, a conceptual framework of green IT will be developed to investigate the relationship between green IT and the user's perception of the IT productivity.

Key Words : Green IT, IT Perception, Productivity

I . Introduction

Green computing or Green Information Technology (GIT), refers to environmentally sustainable computing or IT. It is the 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 (Murugesan, 2008). Greening our IT products, applications, services, and practices is both an economic and an environmental imperative, as well as our social responsibility (Murugesan, 2007). Therefore, a growing number of IT vendors and users are moving toward green IT and

* ManagementInformation Systems, Dankook University, thkim@dankook.ac.kr

thereby assisting in building a green society and economy. The goals of green computing are similar to green chemistry; reduce the use of hazardous materials, maximize energy efficiency during the product's lifetime, and promote recyclability or biodegradability of defunct products and factory waste.

The purpose of this study is to contribute to a better understanding of businesses' perception on the green productivity by carrying out the survey among businesses on the factors of green IT. Based on the literature study, a conceptual framework of green productivity is developed to investigate the relationship between green productivity factors and businesses' perception on them. Using the factors identified a research model was developed to measure the businesses' satisfaction on green business.

II. Green IT

The main purpose of IT is to make businesses more productive and efficient. They will have to learn to use less electricity, using green - sustainable - computing to save money. Major changes in IT user behaviors and policies will be demanded for achieving this goal. As energy costs continue to increase, and as environmental considerations become more prevalent, there is a need for a power-based IT optimization strategy. We need to bring a power right to the IT policy, thereby impacting the end-to-end architecture, hardware and software, and on all of the processes undertaken everyday. This could force the adoption of new infrastructure, and will increasingly inform decision making when new platforms are procured, or when decisions are made about IT strategies - whether to centralize or whether to adopt a more distributed architecture. Other companies will have to take more modest steps, simply making sure that desktop PCs, monitors and printers are turned off at night, and/or using more effective power-saving modes on unused equipment. New dual-core processors are faster than traditional chips and yet use less energy, and the latest generation of dual-core processors promises to consume about one third less power than their predecessors while offering up to 80% better performance.

Businesses will have to learn to use less electricity in just the same way, using green computing to save money. Some will opt for modest steps; others for more energy-efficient components. There is a real need for a power-based IT optimization strategy. Some companies may benefit from moving away from distributed computing based on individual desktop PCs to small, thin client server architecture. It has been suggested that a 10-user system could save about 3,200kWh per year in direct electricity costs. The total production and operating cost savings over the three-year life span of a 10-user system would be more than 33 tones. In an existing server environment, there is significant cost savings associated with any reductions in cooling requirements, and keeping server rooms and computer workspaces at the right temperature is critical. Virtualization and server consolidation can allow users to ‘do more with less’, allowing one large server to replace several smaller machines. This can reduce the power required and the overall heat produced.

Fortunately, business is getting outside support as it struggles towards greener computing. The US Environmental Protection Agency’s Energy Star program is already promoting more energy-efficient IT infrastructures and policies, while IBM, Hewlett-Packard, Sun Microsystems and AMD have joined forces to launch the Green Grid environmental lobby, aimed at reducing energy consumption at computer data centers by encouraging and improving power-saving measures. ‘Green IT’ - the next burning issue for business. Some companies may benefit from moving to small, thin client server architecture. Virtualization and server consolidation can allow users to ‘do more with less’.

II. Conceptual Framework

The Wikipedia.com (2009) suggests that a holistic approach should be adopted and the entire IT lifecycle should be made greener to comprehensively and effectively address the environmental impacts of IT by addressing environmental sustainability along the following four categories – Green use, Green disposal, Green design, and

Green manufacturing.

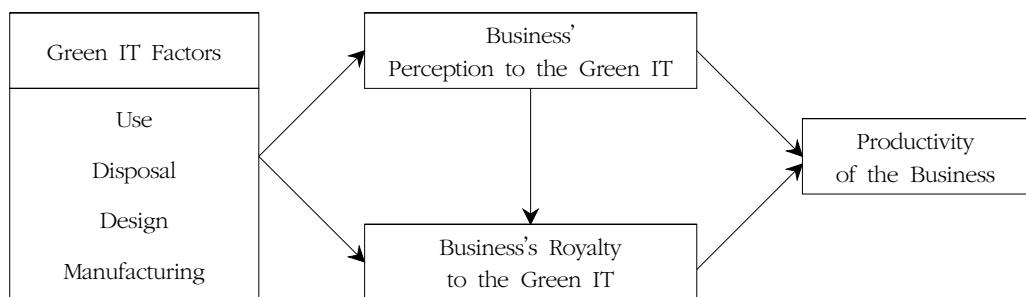
<Table 1> Green IT Categories

Green use	reducing the energy consumption of computers and other information systems as well as using them in an environmentally sound manner
Green disposal	refurbishing and reusing old computers and properly recycling unwanted computers and other electronic equipment
Green design	designing energy-efficient and environmentally sound components, computers, servers, cooling equipment, and data centers
Green manufacturing	manufacturing electronic components, computers, and other associated subsystems with minimal impact on the environment

Source : Wikipedia, 2009

Based on the factors identified, research framework is developed. In developing the framework, it is important to know what factors the Green IT effort offer to the business's productivity. This structural model also set the two intermediate variables - Business' Perception to the Green IT and Royalty to the Green IT. Four variables will eventually connect to the dependent variable - Productivity of the Business.

[Figure 1] Research Framework



III. Methodology

In order to reach a proper subset of businesses for this research, about a hundred businesses were chosen for this study. To determine the relations among research constructs, a questionnaire were developed. The questionnaire consisted of two parts. The items in the first part were designed to find out the relationships among IT factors for the green environment and business's satisfaction for the green productivity. A five-point Likert scale was employed with "Strongly disagree" on one extreme and "Strongly agree" on the other. Second, the questions about the characteristics of the sample businesses are designed to find out the demographics of the sample. It examined the businesses' characteristics with a semantic differential scale. Based on the questionnaire explained above, two groups and three of research hypothesis were identified.

Green use is to reduce the energy consumption of computers and other information systems as well as using them in an environmentally sound manner. Green disposal is to refurbish and reuse old computers and properly recycle unwanted computers and other electronic equipment. Green design includes process benchmarks involving interactivity, collaboration, and continuing assistance throughout the class period. Green manufacturing suggests manufacturing electronic components, computers, and other associated subsystems with minimal impact on the environment.

The reliability of the model is first examined by checking Cronbach alphas. The use of structural equations modeling allows us to test the reliability of the model by testing a series of confirmatory factor analysis (CFA). As opposed to components analysis, it is possible to test models that more closely resemble the hypothesized construct and its relationship to other constructs (Long, 1983). Rather than merely specifying the number of components and items to be analyzed, CFA allows the researcher to specify the exact relationship between common factors and the items used to measure them as well as the linkages among the factors.

IV. Expected findings

The research model used for this study contains five hypothesized relationships. The results of the study are expected to show how the main constructs of the model that will eventually interact for the business perception on Green IT process. These results obtained have two practical implications for both the business and academic community; (1) a solid foundation for the development of other research models relating to the study of Green IT environment, and (2) application of factor analysis to the multiple constructs model of Green IT. The contribution of this study will be to inform the firms any Green IT success factors and suggest possible improvement in deploying Green IT process for various businesses. For the IS research community, the model poses several opportunities for further inquiry into the variables and the processes that impact the Green IT research. Alternative measurement approaches associated with each of the components of the model need to be investigated.

References

- [1] Doll, W. Xia and Torkzadeh, G., "A Confirmatory Factor Analysis of the End-User Computer Satisfaction Instrument", MIS Quarterly, Vol.18, (1992) 453-461.
- [2] Hair, J.F., Anderson R.E., Tatham, R.L., W.C. Black, Multivariate Data Analysis, Prentice-Hall, Englewood Cliffs, New Jersey, 1995.
- [3] Jarvenpaa, S.L., and Todd, P.A., "Consumer Reactions to Electronic Shopping on the World Wide Web," International Journal of Electronic Commerce, Vol.1, No.2, Winter (1996~1997) 59-88.
- [4] Murugesan, S., "Going Green with IT: Your Responsibility Toward Environmental Sustainability." Cutter Consortium Business - IT Strategies Executive Report, Vol.10, No.8, August(2007).
- [5] Murugesan, S., "Harnessing Green IT: Principles and Practices," IEEE IT Professional, January-February (2008).

- [6] Tebbutt. D., Green IT for Dummies, West Sussex, England, John Wiley & Sons, Ltd., (2009).
- [7] Velte, T.J., Velte, A.J., and Elsenpeter, R., Green IT, Reduce Your Environmental Impact While Adding to the Bottom Line. New York: McGraw-Hill (2008).
- [8] Wikipedia, http://en.wikipedia.org/wiki/Green_computing (2009).

제목없음

김 태 환*

■ 요 약

비즈니스 환경에서 그런 IT- 청정 정보기술-는 기업을 운영하는데 있어 여러 가지 새롭고 효율적인 기회를 제공하고 있다. 본 연구는 정보기술 사용자들을 대상으로 문헌에서 조사된 그런 IT의 요인들에 대해 설문조사를 실시하여 그런 IT에 대한 이해도를 높이는 데 기여하고자 한다. 또한, 그런 IT와 정보기술의 생산성에 대한 사용자인지도를 조사함으로써 개념적인 그런 IT 연구모델이 제시되었다.

핵심 주제어 : 그런 IT, 정보기술 인지, 생산성

* 단국대학교 경영학부