ISBN: 978-989-8533-58-6 © 2016

GREEN IT MODEL FOR IT DEPARTMENTS IN GULF COOPERATION COUNCIL (GCC) ORGANISATIONS

Abdulaziz Albahlal
School of Information Systems – Curtin University, Kent St, Bentley WA 6102, Australia

ABSTRACT

Environmental problems such as climate change, pollution, non-sustainable energy, resource depletion, and recycling Information Technology (IT) devices considered the biggest glitches which are facing developed and developing countries. IT devices have become a critical issue due to the great amount of environmental damage caused by IT companies from consumption of resources, raw materials, energy, and waste disposal. To tackle this problem, sustainability strategies have become crucial in Information Technology (IT) organizations - private and public. Sustainability and Green Information Technology (Green IT) have been introduced to reduce these environmental issues and increase the sectors' needs in a direction away from older IT. Green IT and sustainability aspects are essential to reduce the environmental damages that run rampant in developed countries such as Australia, USA, and the UK. However, in developing countries such as Gulf Cooperation Council (GCC) countries, China, and India, there are difficulties in applying Green IT models since they were introduced to meet the developed countries' needs especially in GCC. Currently, the organisations in GCC countries do not consider sustainability in their strategy to reduce the environmental impacts; however, GCC countries are causing a great deal of environmental damage due to their economic growth in different sectors such as oil, gas, and telecommunications. Furthermore, GCC countries are sharing the same policies to achieve the financial stability and change in the oil market. Thus, this research aims to develop a Green IT model for GCC in IT departments to reduce the environmental impacts. A mixed-methods approach will be employed to assess the GCC's needs and to examine the new model.

KEYWORDS

Sustainability, Green IT, Model, GCC, IT department

1. INTRODUCTION

Green Information Technology (Green IT) is an essential term for organizations that wish to reduce their Information Technology environmental impacts. Currently, computer manufacturing consumes a great amount of raw materials, water, electricity and chemicals that generate hazardous waste (Murugesan & Gangadharan 2012). However, "Green IT benefits the environment by improving energy efficiency, lowering greenhouse gas emissions, using less harmful materials, and encouraging reuse and recycling" (Murugesan and Gangadharan 2012, 2). GCC is a group of countries comprising six Arabic countries: Saudi Arabia, the United Arab Emirates (UAE), Qatar, Oman, Bahrain, and Kuwait. "These countries own approximately 45% of the world's crude oil reserves and around 15% of the natural gas reserves" (Al-Kuwari 2009, 39). GCC countries are following a new domestic investments policy that focuses on petrochemical industries to minimize the investment in the oil (Sassanpour & Dept 1996). A recent research by KPMG International, comparing the "75 largest listed companies in Europe, the Americas and the GCC region, shows that only 11 percent of GCC companies have a stated sustainability strategy, policy or vision, compared with 85 percent in the Americas region and 95 percent in Europe" (Cooperative et al. 2012, 18). "The GCC region has the highest energy consumption in the world, and this trend is not expected to change as GCC countries increasingly rely on energy-intensive desalination plants"(Meltzer et al. 2014). In order to develop a Green IT model, the researcher has to investigate the GCC countries' needs and necessitates in terms of Green IT and sustainability. In this proposal, the researcher will critically discuss the brief historical background of Green IT and sustainability; and will demonstrate its benefits for business and how highly- rated companies save cost and reduce environment impacts by implementing a Green IT model. Also, the researcher will employ a mixed-methods research approach - qualitative and quantitative - to collect the data from GCC.

Currently, researchers in different parts of the world have been exploring the success of the development of the Green IT from large-scale firms, E-learning, E-government, and other variables that determine the effectiveness of Green IT (Coomonte et al. 2013; Cho et al. 2012). In addition, the changing nature of technological advancement requires scholars to investigate the recent challenges to IT greening process development on the basis of up-to-date information. Green IT tools are used to reduce the consumption of environmental resources and sustain the business process. For example, cloud computing can reduce the consumption of great amounts of hardware, electricity and hard paper. Also, using cloud storage tools will offer the wider availability of user's documents and reduce the use of USB flash drives. "Virtualization and cloud computing to increase the utilization ratio of already installed servers from 10% to more than 50%" (Mueen Uddin 2012). Computer Virtualization is another good computing service that helps organisations to become greener, which allows users to use a computer's services virtually, meaning that one physical server that runs in the datacentre will operate all users' virtual computers. "Virtualization enables data centers to consolidate their physical server infrastructure by hosting multiple virtual servers on a smaller number of more powerful servers, using less electricity and simplifying the datacentre" (Murugesan & Gangadharan 2012, 29). This paper aims to develop a Green IT model for IT department in GCC countries to reduce the environmental impacts.

2. RESEARCH LITERATURE REVIEW

2.1 Governance

"Green IT governance helps companies structure their Green IT responsibilities" (Schmidt & Kolbe 2011). There were different Green IT model that takes on account governance to have a successful implementation government organise the responsibilities and gives the authority to the implementers. For instance, Green IT Readiness (G-readiness) is a Green IT model adopted by Molla et al (2009) , G-readiness model has been divided into five main sections: Green IT Attitude, Policy, Practice, Technology and Governance. "G-readiness is an organization's capability as demonstrated through the combination of attitude, policy, practice, technology and governance in applying environmental criteria to its IT technical infrastructure" (Molla et al. 2009). Furthermore, "Contingency Model" is a Green IT model developed by Schmidt & Kolbe (2011), which focuses on governance. The model gives clear design instructions on how to legalize a new Green IT approach to force a company's shift to greener practices. "The flexible Green IT governance model presented allows a company-specific design of Green IT governance" (Schmidt & Kolbe 2011, 5). "Businesses face higher energy costs, and they may also incur additional government levies if they don't address the environmental implications of their practices" (Murugesan & Gangadharan 2012, 26).

2.2 Information Technology

In general, sustainability is the ability make something sustain itself or to be maintained. "A sustainable policy, in general, is one that we can continue to follow in the long run" (Bonevac 2010, 85). Historically, in 1987, sustainability as a term became familiar in order to achieve public policies; however, sustainability as a term has become more diverse and become involved in different areas (Kuhlman & Farrington 2010). One of the most popular common definitions for sustainability is the Brundtland definition: "Humanity has the ability to make development sustainable to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development 1987, 16). Extrapolating from all definitions, it is the sustainable ability to use something continuously without harming the environment. Sustainability as a term became more popular during the environmental movement and was applied throughout the 1990s, that made business processes or practices more environmentally friendly; many industries including manufacturing, auto, steel, cement, and electric power began to bring environmental considerations into the decision-making process from early concept designs to final production (Starik & Marcus 2000). At the beginning of 2000 the "green" term start to appear in media worldwide linked to environmental business practices. Then, the green business shifted from an unknown practice to a significant activity for organizations. However, some of green business adopters realized other benefits of adopting green methodology in earlier stages. Thus, some of these new

green business are referred to as window dressing or green washing (Ganesh 2007). According to Boudreau et al (2008), Green IT and Green Information System (IS) are the main factors for supporting sustainable economies worldwide and Green IT and IS are nowadays involved in many business processes . Thus, giving attention to the IT sector will lead to increase eco-efficiency, and to reduce the energy consumption, as this is the main issue in most IT departments. Green IT mainly focuses on energy efficiency and equipment utilization; Green IS focuses on the information management and design that help to improve the greening process (Boudreau et al. 2008). The importance of Green IT first rose in early 2000, synchronously with the new technology revelation. The new technology has made mass damages on environmental resources, due high demand of new technology worldwide. People and experts from different technology area have started to spread the disadvantages of using new technology through the media. However, attention is never given on how to minimize the damage. A BBC environmental report found that "manufacturing a 24 kg PC with a monitor needs at least 240 kg of fossil fuels to provide the energy and 22 kg of chemicals. Add to that, 1.5 tons of water, and your desktop system has used up the weight of a sports utility vehicle in materials before it even leaves the factory" (Hirsch 2004, 1). These issues create opportunities for IT and business researchers to start to build new business models that reduce environmental damages and improve productivity.

2.3 Social and Cultural

“The level of commitment to sustainability communicated in both a firm’s CSR reports and its social media outlets may yield important insights into the values underlying a firm’s culture” (Reilly & Weirup 2011, 4). Social media is considered as one of the very powerful tools that have helped people to become greener, lately. Social media has different advantages, such as allowing people to share information and ideas using a computer network. For instance, making a virtual meeting using social media will prevent people having to travel, reducing travel expenses and environmental resources. “Many corporations have become active users of social media in communicating their sustainability change initiatives” (Reilly & Weirup 2011, 3). In addition, lately social media creates new business environments for users, which reduce high expenses for small businesses. “Developing countries are highly concerned by e-waste problem and that Green-IT offers opportunities and allows for economic, social and environmental benefits” (Hanne 2011, 426).

2.4 Green Management

Green IT is not limited to technological innovations such as energy-efficiency, green data centers, cloud computing, and server virtualization. Green IT also included within new organizational strategies and practices such as management and e-waste (Harmon & Auseklis 2009). For example, Green IT organizations have a waste management program that take dumped IT equipment to be reused by other IT departments or sent to recycle management. As part of green management Adobe came up with a green solution to working with IBM to move from traditional physical servers to being fully virtualized and having cloud computing (IBM Green Report 2012). Adobe removed more than 120 physical servers from their data centre by using five virtual, powerful IBM servers instead. This green strategy will make them reduce environmental damages and save more than $60 million in five years due to reductions in the cost of energy bills, server maintenance, and software license fees. Thus, management is essential to apply after implementing a green model, since they offer high business productivity and reduce environmental damage. Some organizations have successfully implemented Green IT solutions in their business processes.

3. RESEARCH METHOD AND RESEARCH QUESTION

Environmental damage is a worldwide problem that just keeps getting worse and needs to be addressed immediately. This research will provide a thorough investigation of different Green IT model and will conclude with a Green IT model that suits GCC. This study aims to address and answer the following question, How can a Green IT Model meet the GCC Countries requirements. Both qualitative and quantitative research with multiple levels of employees to obtain data pertaining to their opinions, routines, areas of improvement, and willingness to learn the new system. The entire process will take up to three years, but will forge a path for future resources savings and excellence of service.

4. THE RESEARCH OUTCOMES

Thus, the outcome of this research is a Green IT model for GCC countries to reduce the environmental impacts produced by IT departments. The researcher proposed a framework based on the current literature review namely: governance, social and cultural, Information Technology and green management. To achieve the objective of this research, the researcher will expect factors to be unclear until the information is examined more closely. For instance, this research expects that the IT department in a telecom company uses very advanced technology compared with midsize business IT departments. In this case, the factors will differ due to the business's needs. In addition, this research is unlimited to the current researcher's factors, which might be updated during the stage of data collection and investigation, which will thus help discover more contributing factors. This research will reveal policies for recycling and choosing suppliers. Involving customers in the IT strategy plan will contribute to taking the client's feedback, needs, and innovations into account. One of the research factors is developing a green policy for this particular business firm.

5. CONCLUSION

In conclusion, the primary outcome of this research will help organizations in GCC countries to become more sustainable. The research studied different Green IT models to find the gap between current models and GCC's needs. To make this research more accurate, the researcher will employee mixed method approaches namely: interview and online survey for IT department in GCC. The Green IT model will discuss an approach for Green IT called Social and Cultural. Moreover, the research will provide the management, decision makers, and strategic planners in business firms who will be undergoing these processes with the overall concepts. It can also allow the business firms to understand that the IT greening process is not necessarily a smooth process in all instances, thus giving rise to a proactive approach to the management, while still incorporating IT greening processes into the firm. The research will provide managers, as well as scholars, with up-to-date information about the issues related to developing a new Green IT model in a developing country, thus indicating that the research tends to make a valuable contribution.

REFERENCES

Al-Kuwari, D., 2009. Determinants of the dividend policy in emerging stock exchanges: The case of GCC countries. *Global Economy & Finance Journal*, 2(2), pp.38–63. Available at: http://www.cba.edu.kw/fmudhaf/FIN327_Articles_files/Determinants of the dividend policy in GCC (2009).pdf.

Bonevac, D., 2010. Is Sustainability Sustainable? *Academic Questions*, 23(1), pp.84–101.

Boudreau, M.-C., Chen, A.J. & Huber, M., 2008. Green IS : Building Sustainable Business Practices. *Information Systems Journal*, 76, pp.1–15. Available at: http://globaltext.org/books.

Cho, J., Lim, T. & Kim, B.S., 2012. Viability of datacenter cooling systems for energy efficiency in temperate or subtropical regions: Case study. *Energy and Buildings*, 55, pp.189–197. Available at: http://dx.doi.org/10.1016/j.enbuild.2012.08.012.

Coomonte, R. et al., 2013. How much energy will your NGN consume? A model for energy consumption in next generation access networks: The case of Spain. *Telecommunications Policy*, 37(10), pp.981–1003. Available at: http://dx.doi.org/10.1016/j.telpol.2013.09.002.

Ganesh, S., 2007. Sustainable development discourse and the global economy: Promoting responsibility, containing change. *The debate over corporate social responsibility*, pp.379–390.

Hanne, F., 2011. GREEN-IT: Why Developing Countries Should Care? *International Journal of Computer Science*, 8(4), pp.424–427.

Harmon, R.R. & Auseklis, N., 2009. Sustainable it services: Assessing the impact of green computing practices. *PICMET: Portland International Center for Management of Engineering and Technology, Proceedings*, pp.1707–1717.

Hirsch, T., 2004. Computers "must be greener." *BBC environment corresponden*. Available at: http://news.bbc.co.uk/2/hi/technology/3541623.stm [Accessed May 20, 2015].

IBM Green Report, 2012. *Adobe improves scalability and performance with SAP applications and IBM cloud-based solutions*, Available at: http://www-01.ibm.com/common/ssi/cgi-bin/ssialias?subtype=AB&infotype=PM&appname=STGE_SP_SP_WWEN&htmlfid=SPC03405WWEN&attachment=SPC03405WWEN.PDF.

KPMG, 2012. *Future-proofing business in the GCC: Opportunities for sustainable growth*, Swiss. Available at: http://www.kpmg.com/NL/nl/IssuesAndInsights/ArticlesPublications/Documents/PDF/High-Growth-Markets/Future-proofing-business-GCC.pdf.

Kuhlman, T. & Farrington, J., 2010. What is sustainability? *Sustainability*, 2, pp.3436–3448.

Meltzer, J., Hultman, N. & Langley, C., 2014. *Low-Carbon Energy Transitions in Qatar and the Gulf Cooperation Council Region*, Available at: http://www.brookings.edu/~/media/Research/Files/Reports/2014/03/low-carbon-energy-transitions-qatar-meltzer-hultman/low-carbon-energy-transitions-qatar-meltzer-hultman-full.pdf.

Molla, A., Cooper, V. a. & Pittayachawan, S., 2009. IT and Eco-sustainability : Developing and Validating a Green IT Readiness Model. *ICIS 2009 Proceedings*, 1, pp.1–17. Available at: http://aisel.aisnet.org/icis2009/141.

Mueen Uddin, 2012. Green Information Technology (IT) framework for energy efficient data centers using virtualization. *International Journal of the Physical Sciences*, 7(13), pp.2052–2065.

Murugesan, S. & Gangadharan, G.R., 2012. Harnessing Green It: Principles and Practices. *Harnessing Green It: Principles and Practices*, (February).

Reilly, A. & Weirup, A., 2011. Sustainability initiatives , social media activity , and organizational culture : An exploratory study. *Journal of Sustainability and Green Business*, pp.1–15.

Sassanpour, C. & Dept, I.M.F.M.E., 1996. *Policy Challenges in the Gulf Cooperation Council Countries*, International Monetary Fund. Available at: https://books.google.com/books?id=gJQIaN0TCUEC&pgis=1 [Accessed November 25, 2015].

Schmidt, N.-H. & Kolbe, L., 2011. Towards a Contingency Model for Green IT. *ECIS 2011 Proceedings*.

Starik, M. & Marcus, A.A., 2000. Introduction to the Special Research forum on the Management of Organizations in the Natural Environment: A Field Emerging from Multiple Paths, with Many Challenges Ahead. *The Academy of Management Journal*, 43(4), pp.539–546. Available at: http://www.jstor.org/stable/1556354.

World Commission on Environment and Development, 1987. Report of the World Commission on Environment and Development: Our Common Future (The Brundtland Report). *Medicine, Conflict and Survival*, 4, p.300.