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Green E-Business Applications among the SMTEs in Tanzania: Analysis using the Green IT Reach-Rich Matrix

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Abstract

This paper is part of an ongoing study, which investigates the Green E-Business Applications among the SMTEs in Tanzania. The idea was motivated by the need to identify a set of processes involved in the development, adoption, use and disposal of ICT among the SMTEs in Tanzania. In pursuit of that, it employed the Green IT Reach-Rich Matrix to assess the IT activity chain from Sourcing, Operational practices to End-of-Life Management. The qualitative data collection technique, was used, an approach that was planned after the analysis of the quantitative data, such that the strongly featuring facts were subjected to a word of mouth explanations to get the whys and hows. The study revealed that Green E-Business was a new phenomenon and thus was not practiced by most of firms visited. Where it was, the initiatives were rather haphazardly and rudimentary conducted with no appropriate policies and regulations to guide. Consequently, regardless of the fact that, SMEs are resource and information poor there were no facilitating conditions from any part to ease the adoption. The study is opinion that, establishment of appropriate policies and regulation will assist to both persuade and reinforce the "green" behavior among the SMTEs. The study also calls for green entrepreneurs to venture into the e-waste management hence making one's discarded garbage, an entrepreneur's treasure.

1.0 Background Information

Of recently, ICT has changed the way firms transact business between its actors, partners and customers. ICT has turned businesses, electronic businesses (e-business). From its invention, ICT has demonstrated two sides-positive and negative. Positively, e-business not only promise for economic gains by enabling the execution of informational, operational & strategic business roles (Porter and Kramer, 2006), it is also a tool for environmental protection as it can be used to increase energy efficiency and reduce emissions through reduced commuting (Padayachee, 2008; Siikavirta et al., 2003) and reduced use of paper works (Masele, 2011). Mattern, Staake and Weiss (2010) reveal that in the business context, ICT also helps to come up with better decisions with respect to resources and energy consumption. Examples are as cited from Bowman and Staake (2009) which include optimization of production and supply chain processes or environmental information systems, large-scale simulation, and real-time control.

Nonetheless, the negative sides of it indicate that, e-business and its associated technologies use energy too and thus it can contribute to global warming and other environmental threats. Already there are estimates that indicate ICTs to account for 2% of global CO_2 emissions, which is equivalent to the amount the aviation industry generates, and it is projected that ICTs will be responsible for 3% by 2020 (Goasduff and Forsling, 2007; OECD, 2009). Molla et al (2009) argue that, each stage of the IT life cycle from manufacturing to usage and disposal has environmental negative implications. Besides, following increased mass of data storage and processing, consequences leading to a lot of energy consumptions in the data centers, are reported. That, if the ever-growing data amounts and performance expectations towards ICT as well as the migration of paper-based tasks to electronic data processing, are unchecked, they will continuously increase energy demands and waste streams, thereby raising attention to its global environmental impact (Lamb, 2009; Webber and

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Wallace, 2008; Velte *et al*, 2008; Harris, 2008). On top of that, e-waste is emerging as one of the fastest growing wastes filling land (Molla et al, 2009). Above all, there is increasing cost for electricity which is threatening the financial resources of organizations it serves, and, quite literally, is putting an ultimately unsustainable burden on the earth (Baroudi *et al*, 2009). One of the ways in which organization can reduce their carbon footprint, and lessen their harmful environmental impact is through adopting environmentally friendly IT practices. Such practices are frequently referred to as Green IT.

Businesses can therefore adopt Green IT either to minimize their ICT-related environmental footprint and/or to use ICTs as enablers of a broader sustainability strategy (Molla et *al*, 2009), to reap the existing potentials for their competitive advantage (Lamb, 2009; Dedrick, 2010). The benefits for going green are numerous. They include: reduced energy consumption; reduced equipment and systems management costs for data centers; reduces carbon footprint thus combating climate change; serves the environment hence bringing sustainable development; serves for corporate social responsibility (CSR); and in turn, it offers for competitive advantages (Haris, 2008; Murugesan, 2008; Molla *et al*, 2009; Lamb, 2009; Dedrick, 2010). Green E-Business is not only an informational, operational and strategic tool for improving tourism business performance; it is also an environment saving strategy. Baroudi *et al* (2009) assert that, the use of Green E-Business to transact may also be the shortest path to economic savings and the overall health of an organization. Yet, he (ibid) cautions that, becoming green in IT, is not an overnight issue; it is a process, and just the beginning of what's needed for true sustainability

Analysis of the IT activity chain has been one of the approaches towards setting in place interventions to minimize the organizations' IT impacts to the environment. According to Molla *et al* (2009), although firms' responses to environmental challenges vary, organizations IT activity chain permeates from *sourcing* through *operations* to *end-of-life of IT management*. Other scholars (Diez and McIntosh, 2009; Simula et al, 2009) have termed the chain as pre-use, in-use and post-use management. Scholars (Funk et al, 2007; Gomez, 2010) recommend for a holistic approach that assesses processes from raw material extraction through materials processing, manufacture, distribution, use, repair and maintenance, and disposal or recycling. However, unlike other authors, who also include design and development as one of pre-use stages, the pre-use in the end user (such as the tour operators in this case) will strictly look from a point of sourcing of IT by a firm and it will exclude the technology design stages. This approach according to Molla et al. (2009) is referred to as Green IT Reach-Rich Matrix (as explained in part 4.1 of this paper).

2.0 Problem Statement

Conceptualizing from various scholars (Diez and McIntosh, 2009; Molla et al, 2009; Funk et al, 2007; Gomez, 2010) the intended "green" achievement of Information System (IS), must be assessed along its lifecycle in order to identify a set of processes involved in the development, adoption, use and disposal of an IS. Despite the existing studies employing Life Cycle View, no study that has looked specifically at user's point of view. The few existing attempts to do so are from developed countries (Molla et al, 2009), while that from developing countries are not found. This study seeks to assess the Green E-Business applications, using the Green IT Reach-Rich Matrix to assess the IT activity chain from *sourcing, operations* and *end-of-life management* among the SMEs in tourism sector. The process of analysis not only involves the user firms of IT; it also assesses the impact of other practitioners towards Green E-Business and sustainability journey in terms of policies, regulations and facilitating conditions.

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3.0 Objective of the Study

This paper employs the use of Green IT Reach-Rich Matrix to assess the activity chain along the *sourcing, operations* and *end-of-life management* of IT processes by SMTEs in Tanzania, and their impact towards green and sustainability goals.

Specifically the study seeks to answer the following research questions: To what extent the sourcing, operations, and end of life management of ICT by the SMTEs in Tanzania have "green" considerations? And, how relevant are the available policies and regulations towards guiding and reinforcing the green behavior among the SMTEs? What is the role and extent of facilitating conditions in impacting Green E-Business adoption among SMTEs?

4.0 Literature Review

4.1 Green IT Reach-Rich Matrix

In defining Green IT and assessing its diffusion, Molla et al (2009) identified two dimensions of Green IT: Green IT Reach and Green IT Rich. Molla et al (2009) referred Green IT Reach to the extent to which Green IT permeates an organization's IT activity chain from sourcing through operations to end-of-IT-life management. They (ibid) exemplified that, firms' responses to environmental challenges vary. While some might just have environmental policies for public consumption, others green-wash their strategies through recycling practices. Still others might approach greening IT through either selective or comprehensive strategies making significant investment in greening their technological infrastructure. Molla et al (2009) therefore referred Green IT Richness, to the extent of maturity of Green IT *polices, practices and technologies* (PPT). The combination of the two dimensions forms a 'Green IT Reach- Richness Matrix' (Molla *et al*, 2009) as shown in Table 1. Maturity in Green IT Reach and Richness can demonstrate the depth of a firm's Green IT strategy and commitment to the main goals of eco-sustainability, pollution prevention, product stewardship and use of clean technology (Hart, 1997 cited in Molla et al, 2009).

Table 1: Green IT Reach-Richness Matrix

		Green IT Rich Dimension – PPT (Depth)		
Green IT Reach Dimensions : Cradle-to-Grave (Breadth)		Policies	Practices	Technologies and Systems
	Sourcing	The extent to which an organization has articulated a guideline(s) for an environmentally preferable purchasing of IT	The practice of analyzing the Green track record of IT hardware, software and services providers, incorporating Green considerations in IT procurement decisions	Information systems that track monitor and analyze the carbon footprint of supplies such as supplier sustainability assessment tools.
	Operations	Encompasses the extent to which Green issues are encapsulated in policy frameworks governing the development and use of the IT assets and infrastructure of an organization.	Green IT operation practices refer to eco-considerations in operating the IT and network critical physical infrastructure in data centers and beyond and operational actions designed to improve the energy performance of corporate IT assets.	New technologies and systems for (a) reducing the energy consumption of powering and cooling corporate IT assets (such as data centers) (b) optimizing the energy efficiency of IT assets (c) reducing IT induced Greenhouse gas emissions (d) supplanting carbon emitting business practice and (e) analyzing a businesses' total environmental footprint.
	End of IT Life Management	End of IT life management policy	Practices in reusing recycling and disposing IT hardware	Information systems that track the disposal of IT in an eco-friendly way.

Source: Molla *et* al (2009)

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A combination of organizational motivation and institutional forces can influence the breadth and depth of Green IT adoption. Such factors can help to gauge a firm's approach to sustainability; eco-efficiency, eco-effectiveness and eco-equity (Chen *et al*, 2008). This paper adopts the Green IT Reach and Richness Matrix in examining Green E-Business adoption among the SMTEs in visited firms. The analysis will comprises of the *sourcing*, *operations* and *end-of-IT-life management* processes, of IT activity chain against the available policies, facilitating conditions and regulations to guide, reinforce, and persuade the green practices in with respect to technologies and systems in place.

The Green IT Reach and Richness Matrix can be explained that, where the sourcing, operations and end-of life management are done under well sought policies, put into actions with the aid of Technologies and Systems it will to a great extent avoid the consequential environmental effects that might be caused by the ICT in transacting business. It may be possible to track, monitor and analyze Green record of IT hardware, software and services to be sourced (Molla et al, 2009). OECD (2009) connote that the policies may include setting environmental requirements for ICT procurement, an act that will not only reduce the environmental impact of own ICTs, but they can also use their purchasing power to increase competition and innovation among ICT providers. The policies are also important to operations and end-of-life management (re-using; recycling, and disposing) of ICTs, and network critical physical infrastructure in data centers and beyond and operational actions designed to improve the energy performance of corporate IT assets. With the aid of technologies and systems, firms may be able to optimize the energy efficiency of ICT assets through analyzing a businesses' total environmental carbon foot print; monitoring and reporting capabilities, to deploying computerized models to increase energy efficiency and reduce IT induced GHGs emissions (Molla et al, 2009). In doing so firms may be in position to supplant carbon emitting business practices; and, track the disposal of IT such that it is in an eco-friendly way.

4.2 Generic Characteristics of SMEs

Despite their heterogeneity, the SMEs often have many characteristics in common which influence their approach towards environmental issues and the use of environmental technologies. Because of being information and resource poor, mostly, SMEs consider investments for saving environment as costly and that they require a perceived large amount of resources to be surrendered. Although the introduction of firm regulations and strictly implementing them is oftenly featured in literature (Hoevenagel, et al., 2007; Porter and van der Linde, 1995; Noci and Vergandi, 1999; Lee, 2008), as a solution, other good number of literatures (Hoevengel et al. (2007; UNCSD, 1999; Infante and Smirnova, 2009) acknowledge on the role of incentives to all industries if they are to go "green" in order to encourage potential adopters, through lessening the costly accompanied with long time paybacks relating to environmental investments. This is because, SMEs are often denied in obtaining funding to finance expansions (Venkataramaniah and Parashar, 2007) or integration (Yu and Bell, 2007) or for training and development purposes (Zutshi and Sohal, 2004). Besides being resource poor SMEs tend to be risk averse (Braun, 2002; Moran, 2002) thus short term focused, and reluctant to adopt costly and longtime taking, and risky technologies (Hoevengel et al, 2007), given the relatively small economic size of their enterprises.

To the SMEs new environmental technologies would only be regarded successful if they resulted in a substantial reduction of the total costs within a certain time span (mainly three years or less). This means any invention, intervention or support to be done, must be towards the development of less risky technologies and the implementation of measures to at least partially offset these risks.

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5.0 Methodology

The findings of this paper are from qualitative data collection techniques; a phase that was planned after the analysis of the quantitative data. The technique was sought important in attempt to get a word of mouth explanation including the whys and hows (Saunders et al., 2007) of those appeared interesting issues and those loaded strongly in the quantitative analysis of the study's model basing on the Goodness of Fit (GOF) indices criteria, the constructs co-efficiency of score and the significance and strength of relationships. The interview was conducted to a multi-sectorial approach involving; tour operators, environmental management authoritative & regulatory bodies, computer sellers, e-waste dealers, and NGOs. With the exception of Dar es salaam from which the study managed to have only three tour companies for interview, Zanzibar, Kilimanjaro and Arusha had respondents from five tours operators each. The authoritative bodies involved include the MNRT, NEMC, VPO-Environment division, TANAPA, TTB, ZCT, TBS, and TCRA. Of the ICT dealers, both brand new and used computer sellers were visited for interview. For brand new computer sellers, they included the Simply computers , Office Solutions, Agumba Computers Ltd Tanzania , Computer connections Limited , Mitsumi Computers Garage Ltd, Power Computers Telecommunications, Office Depot, and Infosys IPS. The Digital Links Tanzania and Just Computers Ltd represented the used computers sellers. Only three e-waste managing companies namely, Chilambo General Trade Co. Ltd, Harmonic Biospheres, and Digital Links Tanzania were identified who involve themselves with e-waste collection, refurbishing and exporting. The NGO visited was the Clean Production Centre Tanzania (CPCT), as it has been working very closely in advocacy, training and general management of e-waste and other environmental related issues. The choice of Tours operators was based on the richness of information, willingness to cooperate, information and accessibility (Yin (2009). Set of techniques used including: Face to Face Interviews; observation, and, documentary review and analysis.

6.0 Findings

6.1 General overview of findings

The findings presented in parts 6.2, 6.3, 6.4 and 6.5 are based on research questions advanced by this paper. They detail on the existing situation regarding IT activity chain from sourcing, operational practices, and end-of-life management, including the recommendations to improve the situation.

6.2 Sourcing

This study revealed through face to face interview and other documentary review that, there is recently no ICT manufacturer in Tanzania, rendering that all the ICT equipment are imported. Nonetheless, there exists no regulation and standards in place to guide importation of ICT for both hardware and software. Nonetheless, although the Electronic and Postal Communication Act (EPOCA) of 2010, empowers the TCRA to establish standards for any electronic communications equipment to be connected to any communication network; and undergoing equipment type approval certification, these standards were not followed. Was this requirement been implemented, it would be possible for TCRA to test for environmental quality standards conformance through spot checking on imported communications equipment. Although there are a number of initiatives related to, counterfeit communications equipment reduction; a number of challenges exist, including; user

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awareness with majority of Tanzanians in regard to opting for low cost (which is eventually low quality and most counterfeits) communication equipment.

Besides, the Public Procurement Act (PPA) emphasizes on cheaper products. Environmental friendliness is yet to be included as a one of the specifications. Besides, it doesn't allow procurers to state the brand or vendor from which the ICT equipment will be procured. While the act might be established out of good will to offer equal chance for all providers and to avoid colluding with only few vendors for personal interests, with its provision, it could be easier to spot out vendors with green track records. Currently, the ICT customers are secured through procurement process stated by GPSA (Government Procurement Services Agency). Under the GPSA regulation, qualified bidders are published online and/or in any government gazette for all government institutions to easily see and choose among the many registered dealers. Unless the environmental specifications are incorporated as conditions for procurement the current arrangement end up victimizing environment welfare. This inclusion may involve purchasing of recyclable, reusable, and energy efficient components which are necessary for production of energy and materials efficient products. Studies by OECD, (2009) for example established that, by setting environmental requirements for ICT procurement, it will not only reduce the environmental impact of acquired ICTs, but they can also use purchasing power to increase competition and innovation among ICT providers. This study supposes the same such that the Greening of E-Business can be controlled right from the sourcing point of view.

6.3 ICT Operational Practices

The study also found that, Green IT was generally a new terminology, not a priority, and thus it was not practiced. Where it does, Green E-Business applications were haphazardly, and limited to switching off computers in idle times, re-using papers and printing in both sides. Others are sharing printers and more use of laptops than desktops to improve energy efficiency and to save operational costs. Of very small percentage; virtualization, i-cloud, and use of smart phone were in their launch. The available virtualization practices observed in some companies for example involved using one host server to virtually control the *domain controller* (for controlling PC connections in an organization) and *exchange server* (for mailing controlling). Nonetheless, all these initiatives were meant to save the organization operational costs, while an environmental consideration came afterward. Although these initiatives were said to be saving a significant amount of energy (a fact which is actually true), the exact amount that is being saved, couldn't however be told.

Nonetheless, promising initiatives were underway and some managers appeared to be so motivated and committed to ensure that Green E-Business was finally a usual business practices. For example, some companies in Arusha had dedicated to responsible tourism in order to fulfill their underlying mission of promoting ecotourism and environmentally friendliness. The managing director of the company for example narrated, *"In our office we have adopted a number of policies, on reuse, recycle and conservation whenever possible. There include: paper conservation efforts such as two sided printing; changes to energy efficient lighting; powering off computers during idle times; using recycled papers where possible; and providing information by emails and internet to reduce print works"*. A similar argument was presented by an MD at one of tour firm in Kilimanajro, who also seemed to be so positive in not only Green E-Business use but also on general environmental protection related matters. He revealed his company's philosophy regarding Green E-Business as "Reuse, Reduce, and Recycle; with No/Less printing". He added, *"…all information is communicated through networks, and no printing is allowed, unless is very necessary to do so. We monitor "the no printing" bylaw, and whoever violates, he/she has to pay for it"*. The MD interestingly, further

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narrated *"To avoid printing of too many business cards for each and every tourist, our company has introduced the use of magnetic cards which can be easily postured on any magnetic surface in office and/or at home for everybody to see in a shared manner. Moreover, introduction of smart phone in the company has simplified business processes, as one is not forced to go to office, switching on electricity to access a file for business transactions. This can be done wherever one is, at 24 hours…"* According to Molla et al (2009), the relevance of Green IT and organization's positive attitude to reduce, re-use and re-cycle can be expected to transfer to real commitment towards Green IT. However, when the firms were asked to reveal their budgets commitment to Green IT and the environment, most responded to have no idea, and only few who did, the responses were highly vague. Besides, majority (*except three companies*) had no written policy. Majority proclaimed to be abiding to general policies according to the responsible authorities such as the MNRT and NEMC, and at company levels, the policies were mainly implied. Nonetheless, a number of environmental projects including tree re-planting, and rain water harvesting etc. were underway.

Some managers were so pessimistic and reluctance in taking a lead into Green E-Business to avoid some risks accrued from it. For example, one manager from one tour firm in Dar es Salaam connoted, *"…it is not a good idea to be a first mover in such new and risk technologies as it may back fire on you…"*This is among other reasons, indicating why most of tour operators had not yet adopted the Green E-Business applications. Some were even not aware of what Green E-Business and they had heard it for the first time from the researcher during the interview. Prices charged and services offered were the main differentiating market factors bringing Green E-Business and environmental issues behind. Environmental considerations have not yet been an issue for competition. This study calls for awareness creation and user education on Green E-Business adoption and what it constitutes, in order to confront the emerging demand for sustainable development.

6.4 End-of-Life Management

Like the sourcing and operational practices, similar findings were revealed with the ICT *end-of-life management*. There existed neither a green disposal policy nor e-waste management stipulated procedures. Although, recently in 2009, a regulation on hazardous waste has been established (URT, 2009a; URT, 2009b) under the EMA (URT, 2004) which among others includes e-waste management, the act emphasizes on handling, classification, packaging, labeling, transporting and movement. There is no e-waste management specific regulation yet. The disposal policy available insists that public offices must dispose their assets through tendering procedures. Moreover is the section 257(1) of the Public disposal regulation of 2004 which instructs that, office equipments including ICTs (should be tendered in open spaces and anybody interested and willing to buy is welcome to compete. Tough this end-of-life management practice might be out of good will; especially for ICT, it consequently has serious negative environmental effects. This is because, in those auctions, anyone (from internal or external) can buy the used ICT product for his/her own intended use. As a result, some users end up taking just small parts of the bought product and the rest is thrown away in very unfriendly manners. Yet with this procedure, it is difficult to monitor the end of life use (disposing off) of the purchased item.

As a member of the Basel Convention e-waste dealers in Tanzania must seek for a notification to grant the permit under the Vice Presidents office (VPO) division to import and export e-waste (for whatever reason including dismantling, refurbishment or exporting). Under the convention, the guideline rules that, one must communicate with the countries the shipped e-waste pass including the destination. Although, to some extent it controls the importation and exportation of e-waste, hence protecting the environment and their respective consequences, the complicated and bureaucratic procedures were reported to be among the impediments for e-

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waste management activities in Tanzania. For example, while discussing with an MD from one of the mentioned e-waste collecting and refurbishing firms, he complained about complicated and bureaucratic procedures of not only securing the licenses but also permits for exporting the e-wastes, and lack of proper established centers for the purpose.

Besides is the inadequate number of e-waste dealers. The only companies dealing with e-waste management revealed by this study included the Harmonic biospheres; the Chilambo General Trade Co. Ltd; and, the Digital links Tanzania. The companies are involved in refurbishment, dismantling and exporting the e-wastes. Yet, these enterprises were not popular among the SMTEs visited for interviews. The most reported end of life management practices by the tour operators included: offering old PCs as charity to schools, churches etc., friends, and employees or transferring the obsolete computers to other companies or within same company but to different departments which doesn't require sophisticated quality PCs. It also included, storage of the obsolete ICT equipment in special rooms waiting for the tendering procedures. This study cite this gap as an important opportunity for Green Entrepreneurship venture, that besides exploiting the need for environmental protection, it is an income generating activity, creating opportunity for employment and poverty alleviation. As what Melay and Kraus, (2012) quote from Berle's (1991) book, "One man's garbage is another man's treasure". Nonetheless, bettering the Green Entrepreneurship atmosphere is another issue that needs to be considered, including making procedures less complicated and less bureaucratic.

It is only recently the TCRA have started working to come up with a policy guideline on the matters relating to e-waste. Besides, the Electronic and Postal Communication Act (EPOCA) enacted in 2010, empowers the TCRA to establish standards for any electronic communications equipment to be connected to any communication network; undergoing equipment type approval certification process including laboratory tests while making it illegal to distribute or sell any communications equipment without warrant (at least 12 months). Kibacha, (2011) argues that, with locally established type approval laboratory, it will be possible for TCRA to do spot check on imported communications equipment in Tanzania and test them for quality and standards conformance. In doing so, counterfeit communications equipment and probably environmentally harmful, in the country can be reduced.

6.5 Role and Extent of Facilitating Conditions

Despite the pivotal role the SMEs provide to the economy, they are surrounded by a number of hassles that confront their ability to go green. SMEs are both resource and information poor, something which make them risk averse to go for investments that are costly and longtime taking (Mallett et al, 2011; Yu and Bell, 2007; Boons and Wagner, 2009) such as Green E-Business. They thus require a provision of facilitation conditions to ease the adoption burden. In this study, there was however a blurred picture on the existence of facilitating conditions. Very meager, though a plausible job was from some Civil Societies and NGOs, which are involved in a number of activities including research, advocacy and training. For example, the Cleaner Production Centre Tanzania (CPCT) was found dealing with promoting pollution prevention; audit on environment; policy advice, training, and information dissemination. The other NGO was the Pingo forum which was involved with offering training on aspects related to general environment protection to tour operators. The banks such as the CRDB bank were reported to have sponsored some training on ICT among tour operators in Kilimanjaro. Yet, nothing was reported to have been conducted on matters relating to Green E-Business, with exception to only one seminar that was recently conducted concentrating on renewable energy. Besides, nothing was reported to have been given by the government. One of the informants lamented for example, *"…nothing comes from the government. It doesn't actually work with Tanzania government.*

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There should be incentives to encourage green uptake by more firms and individuals because Green E-Business is a cost" indicating the government role on the matter is not appreciated. Facilitating conditions could be in form of financial incentives in order to assist with problems related to funding (Mallett et al, 2011). Haskin (2009) study for example, reveals that SMEs are subject to lower priorities in accessing to investment funds offered by the regulatory authority. Revell and Rutherfoord (2003) argues that in order to encourage participation of SMEs in creating a sustainable development, the role of government and environmental policies is important, failure to which could create imbalances in the economic ecosystem. The government is also called to intervene into the pace through subsidies provision to make the necessary Green E-Business hardware and software available and affordable. An interview with e-waste management companies, called for establishment of e-waste collection centers full furnished with dismantling and refurbishing facilities for managing obsolete and used ICT products. The government is responsible for formulation of both policy and regulations it is also responsible for implementing them. While appropriate policies and regulations would assist in guiding processes from sourcing, to operations, to end-of-life management, they would also lay a framework related to facilitating conditions so that it could lessen the burden the SMTEs may face in their pursuit to adopt and use Green E-Business.

7.0 Conclusion

This paper appreciates the presence of ground works on Green E-Business adoption by the tour operators. Nonetheless, these initiatives are rather haphazardly conducted with no appropriate policies and regulations to guide. On the other hand although the government has a number of initiatives including having institutions for foreseeing issues related to environmental protection, they are lagging behind when comes to the issues related to Green ICT. The study calls for formulation of appropriate policies and regulations that would assist in guiding processes from sourcing, to operations, to end-of-life management through provision of facilitating conditions and exerting required pressures to reinforce the Green E-Business behavior. This may include establishment of infrastructure and provision of incentives related to financing and subsidizing importation of hardware and software, sponsorship for training in Green IT, and other matters relating to ICT use and environmental protection not only in tourism sector but also in other sectors. Moreover, is the call for removal of complicated and bureaucratic procedures relating to importation of Green IT, and approval for startup businesses relating to collection, dismantling, refurbishment and exportation of e-waste. As this could be another entrepreneurial venture, it will not only help green entrepreneurs to employ themselves and earn income out of the business, it will also be a smooth way to diffuse the Green E-Business sprit among business firms and the society in general.

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