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A Review of Green ICT Readiness in the Insurance Industry in Developing Nations

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Abstract:
The greenhouse footprint has gone all the way to industries that have been otherwise regarded as clean such as the insurance industry. This paper reviews the preparedness of the insurance industry in developing nations towards adoption of green Information and Communication Technology (ICT). This preparedness, sometimes called Green Readiness (G-readiness) was surveyed on five insurance firms. In addition, a desktop survey was undertaken by the study of secondary data with regard to green computing. The study established that the existing frameworks of G-readiness may not necessarily apply in the insurance industry in developing nations. A modification of the existing frameworks is necessary for them to be applicable to the insurance industry in developing nations. The study recommends the formulation of a G-readiness framework that has its drivers aligned to the goals of the insurance industry in order to guarantee the insurance sector's contribution towards a clean environment.

Keywords: *Insurance industry, green ICT, G-readiness, environment degradation*

1. Introduction

Greening the environment is becoming a necessity in the face of wanton pollution with the world bank adopting a new vision – a green, clean and resilient world for all (The World Bank Group, 2012). Manufacturing industry is traditionally seen to be the main contributor to environment pollution with sectors such as iron and steel, textiles and leather, pulp and paper, petrochemicals, refinery and chemicals making large contributions (Xianghua, Ruirui, & Lei, 2003). With time, however, the attention is shifting to the industries that were not focused on. These include banking (Weber, 2016; Oyegunle & Weber, 2015) and insurance (Ahvenharju, Gilbert, Illman, Lunabba, & Vehviläinen, 2011).

There are several different definitions of green ICT. Elliot (2007) defines green ICT as the design, production, operation and disposal of ICT and ICT-enabled products and services in a manner that is not harmful and may be positively beneficial to the environment during the course of its whole-of-life. Green IS can also be defined as the IS or IT used to achieve environmental sustainability (Lei & Ngai, 2012). Molla (2009) define green ICT as an organization's ability to systematically apply environmental sustainability criteria (such as pollution prevention, product stewardship, use of clean technologies) to the design, production, sourcing, use and disposal of the IT technical infrastructure as well as within the human and managerial components of the IT infrastructure. Radu (2016), on the other hand gives a different perspective to the definition of green IT where green IT is defined as either the impact of IT on the environmental productivity of other sectors or the IT sector's own activity and its impact on environmental efficiency. Green IT can also be defined as the study and practice of designing, manufacturing, using, and disposing of computers, servers, and associated subsystems (Murugesan, 2008). In all these definitions, the key issue is conservation of the environment by responsible use of ICTs.

From a functional point of view, the manufacturing industry processes and the insurance processes are very different therefore it can be assumed that the motivation for adoption of green policy in manufacturing sector would be different from insurance sector.

Insurance companies play a key role in risk management in any country. In Kenya for example, there are 51 insurance companies with USD 1.73 Billion premium and USD 4.66 Billion asset base (Association of Kenya Insurers, 2015). Being agents of risk management, the insurance companies can play a major role in environment management since whatever adversely affects the environment increases the risks hence raising claim chances. To effectively do this, the insurance companies themselves must be agents of environment conservation from within.

This study sought to establish if there were any appropriate frameworks that could be used for adoption of green ICT in the insurance sector in developing nations, establish the impact of drivers leading to the adoption and how prepared the insurance industry was for green ICT adoption.

2. Literature Review

2.1. Insurance Industry

Insurance is essentially regarded as a shock absorbent agent (Aizenman & Ötker-Robe, 2013). When one buys an insurance cover, he/she essentially buys a promise that should something go wrong with the asset insured, the insurance company will do restitution.

This "shock absorber" role makes insurance companies guardians of wealth in the society. Therefore, they play a major contribution towards wealth creation and preservation by protecting communities, businesses and households from unexpected losses such as those resulting from natural disasters, currency fluctuations, policy shifts, illness or accident (Bacani, 2015).

Another key role of insurance companies, is capital management. Internally, insurance companies must effectively utilize the capital resources received from their clients. Prudent capital allocation ought to be done so as to ensure long term stable returns, especially for long term life insurers (UNEP, 2017).

The eventual role played by insurance companies in any country is creating macroeconomic resilience by providing protection from risks. This is done through a network of financial system linkages (UNEP, 2017), providing convergence between the various players in the financial industry and real assets.

Insurance business employs the use of ICT in many of its processes (Bazini & Madani, 2015). Some of the processes in the insurance business are internal, and some involve external parties. In Nigeria, ICT has spurred the development of the insurance industry by acting as a profitability catalyst (Fadun, 2013). Use of ICT has led to an increase in customer patronage in the Albanian insurance industry (Bazini & Madani, 2015). Increased customer expectations and market digital disruptions are leading drivers in IT adoption in insurance industry (Institute of International Finance, 2016). It is evident that use of ICT in the insurance industry is immense. The key aspects that make up insurance processes include underwriting process, claim process, customer service, investment management and commission processing all of which employ the use of ICT at one stage or the other.

ICT has had considerable impact in insurance. This has been broken down to performance improvement, service quality improvement, convenience in transaction processing and customer satisfaction (Choudhuri, 2016). In fact, going forward, ICT is likely to drive the growth of the insurance industry with focus on on-demand insurance, smart homes and property insurance, telematics and driverless car insurance, wearables and artificial intelligence and health insurance (Institute of International Finance, 2016).

With the shift towards more reliance on ICT in the insurance processes, pressure to deploy efficient ICTs will start piling. And with it, pressure to employ environment friendly ICTs, both aimed at conserving the environment and optimizing on costs.

ICT use and its impact on the environment is a complex and multifaceted (Houghton, 2009). Use of ICT to improve the environment can be viewed from three perspectives: green ICT organizations, greening of the ICT and greening operations with ICT (Hankel, Oud, Saan, & Lago, 2014). Insurance companies can make a deliberate decision to be green ICT insurance companies by having clarity on environmental considerations in their ICT strategies, ICT governance, e-waste policies and putting in place green ICT architectures. The ICT architecture can also be greened by introducing environment friendly computing, network and storage infrastructure and green software development. On the other hand, greening of operations with ICT is another way insurance companies can participate in environment conservation. Being a service business, traditionally, insurance companies kept a lot of ledgers in papers. Opportunities in greening operations using ICT exist in travel reduction, space reduction, energy reduction, paper reduction, and other savings that can be made using ICT.

Contrary to the assumption that the insurance industry has less impact on the environment, it is now clear that the processes in the insurance industry can grossly affect the environment. This is more so for the developing nations, where levels of automation are still low. Where automation has happened, the environment efficiency is low, hence negative impact on the environment. So, it is behaving that the insurance industry must participate in reducing environmental degradation in their ICT usage in their processes.

2.2. Green IT Readiness Framework

G-readiness is an organization's Green ICT capability as demonstrated through the combination of green attitude, policy, practice, technology, and governance in order to reduce ICT, business process, and supply chain-related emissions, waste, and water use; improve energy efficiency, and generate Green economic rent (Molla, Cooper, & Pittayachawan, 2011). It takes conscious steps for an organization to adopt green IT and the first step is to be G-ready. Once an organization is G-ready, it provides a platform for green ICT adoption.

There are many perspectives to what drives the adoption of green IT. Alena and Libor (2012) proposes a three-way approach to ICT adoption. These are ICT procurement, ICT use and end of ICT use. Their view is that ICT procurement must be driven by environment friendly producers, environment friendly distributors selling environmental friendly ICTs. The use of ICT must take into consideration efficiency and power consumption and that reuse, recycling and ecological disposal of ICT assets must be a consideration at end of life of ICTs (Alena & Libor, 2012). This view does not look at the motivation of adoption of ICT by businesses and therefore cannot be used as a framework for G-readiness in the insurance industry. The key drivers to ICT adoption in businesses are benefits and cost of adoption, the firm's ability to absorb knowledge from other firms and institutions, information spill-overs between firms, experience with earlier vintages of a

certain technology and (international) competitive pressure (Hollenstein, 2002). By not linking the g-readiness drivers to what drives a business to adopt ICT, there is no guarantee that a business will be interested in adopting green ICT.
According to Zoysa & Wijayanayake (2013), Green ICT adoption is viewed from the technological, organizational and environmental perspectives (Figure 1). The technological aspects are the technologies available and usable that can reduce environment degradation such as virtualization, power efficient servers and computers, thin computers and cloud computing. Organizational awareness is the internal organization structures that would support the adoption of green ICT. The environment in this context refers to any force external to the business that influences, affects or is affected by the adoption of green ICTs. These perspectives map perfectly to the drivers of ICT adoption in the insurance sector, that is, technology, customer expectations and digital disruptors (Institute of International Finance, 2016). Digital functionality in the insurance industry include product information, providing quotes, customer self-service, transaction/purchasing and claim processing (The Economist, 2015). All these circles around business volume growth and process efficiency. The implementation of which is hinged on the organizational awareness and technological capacity to achieve external environment pressure. However, Zoysa & Wijayanayake (2013), framework does not go deep into elaborating on the organizational awareness to bring out the finer details on internal governance.

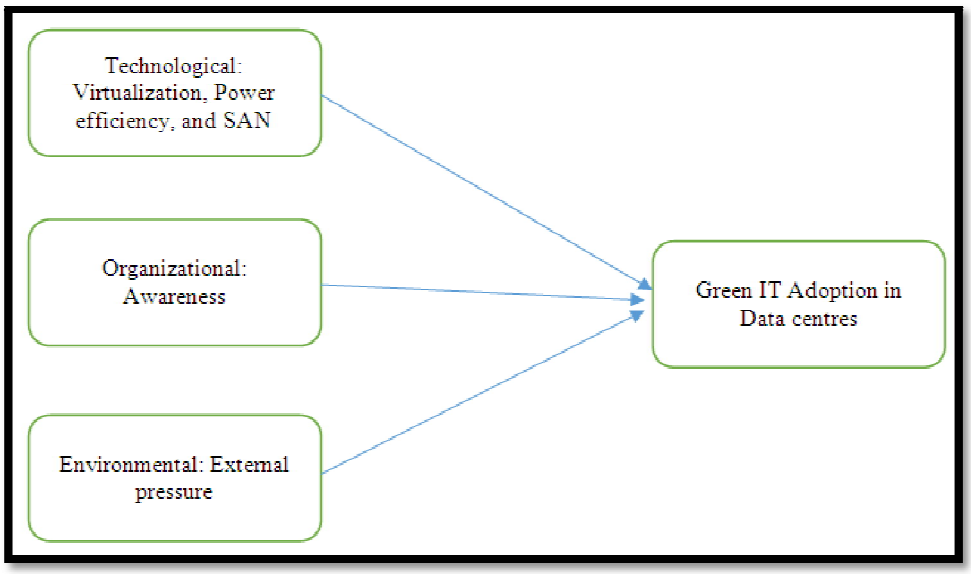

Figure 1: Factors Influencing Green IT Adoption
Source: Zoysa & Wijayanayake, 2013

G-readiness components that can be of interest to business strategy include operating strategy, organization strategy, information strategy and applications strategy (Olson, 2008). All these are internal structures, which would map onto the organizational awareness in the Zoysa & Wijayanayake (2013) framework. An expansion of the organizational awareness in this framework to take into consideration the operational strategy, organization strategy and information strategy would make it resonate more with business.

The components of green IT framework according to Molla, et al., (2008) are attitude, policy, practice, technology and governance (Figure 2). According to Molla et al, (2008), the attitude must be right – the business attitude and IT attitude. Governance has also to be right. The environmental governance and IT governance, driven by the operational demands, customer demands, regulatory requirements and legal requirement have a great bearing on corporate governance in the Molla et al (2008) framework. With the right governance environment, policies supporting green IT will be put in place, supported with correct practice and technology. This framework however makes an assumption that the insurance companies must use ICT and that the only concern is how that ICT is going to be deployed. This is far from the truth. The insurance industry in Kenya has been in existence since the days when there were no computers, and some could still be running semi-automated processes. The first concern would be, what are the drivers to ICT adoption in the insurance industry? Why do insurance companies need ICT? Some of the reasons given are increased speed and quality of service, increased speed and quality of data entry, reduced fraud and reducing on operating costs (Salatin, Yadollah, & Eslambolchi, 2014). The Molla framework also does not look at the regulator and competitor influence on the adoption of green ICT, yet this is a key driver in the insurance industry in developing nations. In fact, the fact that the framework has not been tested in the insurance industry makes it hard to establish empirically to what extent it can fit in determining G-readiness of insurance companies.

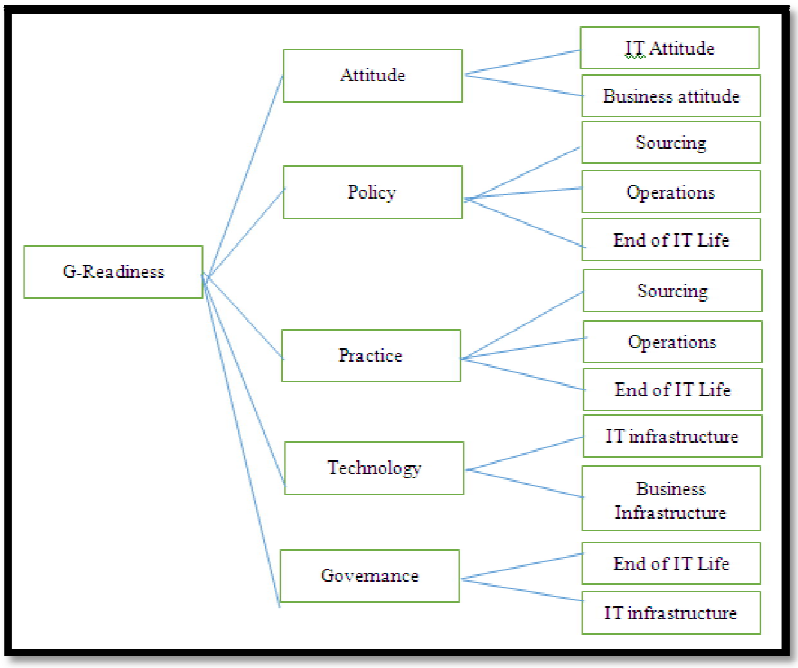

Figure 2: The G-readiness Framework
Source (Molla, et al., 2008

An extension of this framework was done to include ICT personnel as a component of green IT readiness framework (Wabwoba, Omuterema, Wanyembi, & Omieno, 2013) – Figure 3. This framework extends the Molla et al (2008) framework by considering the role ICT personnel play in making organizations ready for green ICT. However, focusing at ICT personnel alone may be limiting since in the current business environment, ICT issues are not driven solely by ICT personnel. In fact, many businesses have ICT steering committees which to a great extent determine ICT matters, and these committees are not led by ICT personnel. In fact, with the current rise in outsourcing trends and cloud computing (Hirakawa, 2017), and the increased uptake of bring-your-own-device (BYOD) (Vandelannoitte, 2015), many corporates have started seeing a shrink in ICT departments with the ICT agenda being set by business leaders. In fact, the industry is experiencing more user-led ICT innovations (Eriksson, Niitamo, & Kulkki, 2005) and the use of user-driven programming is shifting the power from the ICT department to the user. Some companies have reduced the ICT department to only manage the infrastructure whereas most of the technical decisions are made by business. Maybe, looking at staff in general would have given a more holistic view to the organization's readiness to adopt green ICT. However, the framework also inherits the limitations in the Molla et al (2008) framework, the limitation of looking at the adoption of ICT with a bias to technology.

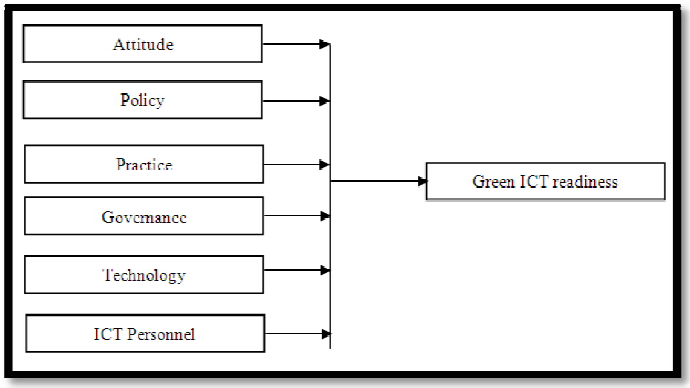

Figure 3: Green ICT Readiness Model for Developing Economies
Source: Wabwoba, Omuterema, Wanyembi, & Omieno, 2013

Deng and Ji (2015) organization's preparedness for the adoption of green IT framework in Figure 4 highlight key drivers as technological drivers, institutional pressures and internal motivations. The technological drivers in the Deng & Ji (2015) framework are relative advantage created by deploying ICT, the technological complexity - a negative attribute of using ICTs and technological compatibility. The second driver which is institutional pressures is comprised of mimetic pressure, coercive pressure and normative pressure. Mimetic pressure comes from other similar organizations that have adopted a certain technology. This puts other companies in that industry to consider adopting that technology. Coercive pressure is brought about by customers, government and regulators. They may impose upon the industry to adopt certain technologies or standards. In the quest for organizations to adopt quality standards or professionalism, they become

subject to normative pressure. This happens especially in large organizations. The third driver is internal motivations, which Deng & Ji (2015) describe as top management support. Other than top management support, there are cultural issues and the strategic intent to be considered.

Most of the insurance companies in the developing nations are private business entities, apart from cases where government have stake. However, the underlying motive in all of them is underwriting and operating profit. Therefore, the Deng & Ji (2015) framework, putting more focus on sustainable competitive advantage as an outcome of the adoption of green ICT would be more appealing to insurance companies.

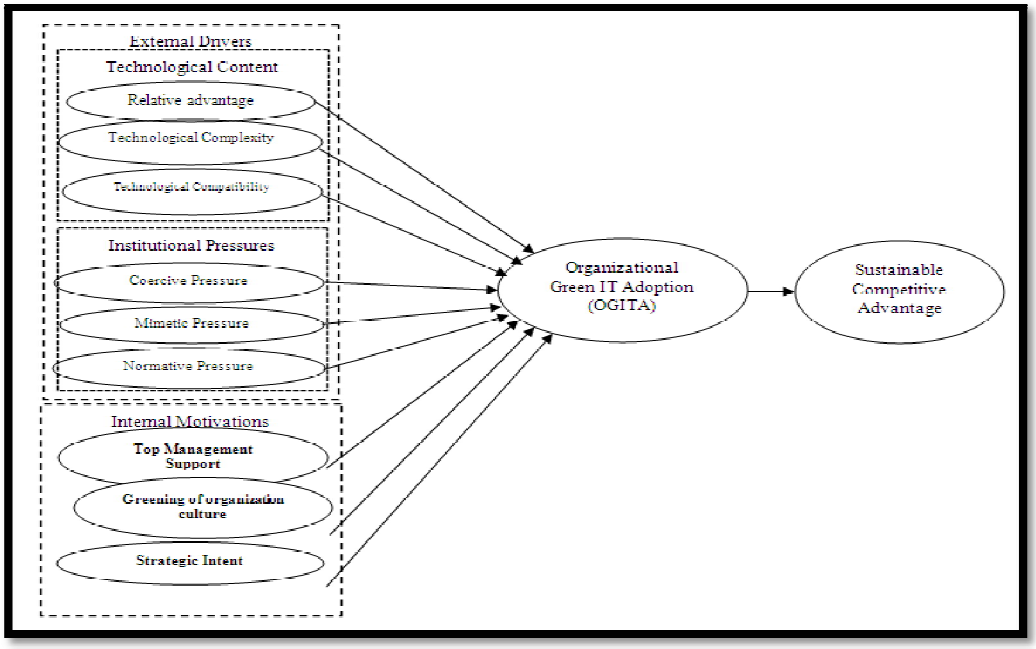

Figure 4: Organizational Green IT Adoption Drivers
Source: Deng & Ji, 2015

Drivers to Green ICT Adoption

The main motivations for adoption of green ICT in organizations can be classified into four categories: eco-effectiveness, eco-responsiveness, eco-legitimacy and eco-efficiency (Molla, 2009). Alternatively, they can also be classified as external drivers and internal drivers (Deng & Ji, 2015).

Table 3 shows a comparison of the drivers according to Molla et al (2009) and Deng & Ji (2015). In the comparison, there is a close correlation of the drivers. However, Deng & Ji (2015) comes out clearer and more precise on the strategic intent and internal cultural awareness as a driver in G-readiness. The research uses a comparison of these two approaches to determine the insurance sector G-readiness.

	Molla (2009)	**Deng & Ji (2015)**
Internal Drivers	Eco-effectiveness • Own corporate strategy • Environmental considerations • Social acceptance as concerned entities of global and local communities	Internal Motivations • Top management support • Greening of organization culture • Strategic intent
External Drivers	Eco-efficiency • The cost of greening IT • IT cost reduction considerations Eco-responsiveness • Competitor's actions • Pressure from IT vendors • Clients'/consumers' pressure Eco-legitimacy • Government incentives • Green IT uptake by more and more organisations • Industry associations	Technological context • Relative advantage • Technological complexity • Technological compatibility Institutional pressures • Coercive pressure • Mimetic pressure • Normative pressure

Table 1: Comparison of Molla et al (2009) and Deng & Ji (2015)

The eco-effectiveness drivers include own corporate strategy, environmental considerations and social acceptance, what is known as good corporate citizenship (Muthuri & Gilbert, 2010). Corporate strategy in the insurance space in Kenya is driven by corporate governance structures which should prioritize and focus on green ICT. Corporate citizenship has become a norm rather than exception in business management and is well embraced by insurance companies (Muthuri & Gilbert, 2010). With proper understanding of green ICT, it is expected that corporates will incorporate more of green ICT initiatives in their corporate social responsibilities.

Eco-responsiveness focus on competitor actions, pressure from IT vendors and client/consumer pressure (Molla, 2009). By virtue of low access to ICT, in most developing nations, there isn't much pressure from IT vendors to have insurance companies adopt green ICT. However, there is pressure from clients (insureds) to have insurance companies adopt online portals and mobile apps. Many companies have adopted motor insurance portals, travel insurance portals and marine insurance portals. Other services such as claims reporting and transactions with service providers are also gradually moving to the e-commerce portals. The adoption of e-commerce portals, being pushed by clients and service providers is in a great way contributing to green ICT adoption by insurance companies in developing nations. With this pressure from insureds and service providers, across the industry, insurance companies are forced into green ICT adoption through the action of competition.

The eco-legitimacy, according to Molla, (2009), would be driven by government incentives, regulators' actions and industry associations such as Association of Kenyan Insurers (AKI). The reporting requirement and continuous adoption of best standards from international standards by regulators is pushing insurance companies to adopt green ICT without necessarily knowing it. The regulators have been on the forefront in implementation of corporate governance, solvency requirements and accounting standards, which put insurance companies under the pressure to reduce on cost, and improve on their reporting requirements. This makes the insurance companies invest in cost effective ICT infrastructures, in the course of which environment considerations are addressed. AKI also is alive to industry challenges such as claims fraud and to this end, it has put in place information sharing platforms, which in the course of their usage, realizes the benefits of green ICT. These are institutional pressures (Fig. 4) which can be summarized as coercive pressure, mimetic pressure and normative pressure (Deng & Ji, 2015).

The greatest motivation for insurance companies in developing nations to consciously adopt green ICT however would be the eco-efficiency. The efficiency brought about by the adoption of green ICT, which include reduction in paper use through use of electronic document management, lower electricity consumption through use of virtualization, grid computing and blade servers among others would be a quick motivation for insurance companies to adopt green ICT. The challenge has always been that the communication of these gains to the boards is usually not very effective (Governance Institute, 2006). The key balance here is the cost of greening ICT and the savings derived from adoption of green ICT (Molla, 2009). This requires top government support, setting of green culture and strategic intent (Deng & Ji, 2015).

2.3. Insurance Opportunities for Green ICT

To see the opportunities for green ICT in the insurance sector, it is first important to see what ICT brings into the insurance industry. The role of ICT is seen as that of automating new business, improving claims management and delivering superior customer service (Miller, 2011). From a global perspective, a view covering most of the sectors, the benefits businesses look forward to achieving by reengineering their processes include cost efficiency, business agility, compliance, customer centricity, staff satisfaction and return on investment (Capgemini, 2012). Indeed, if an organization has to be ready for any form of ICT, green ICT included, the factors discussed in the preceding section are key considerations.

As discussed in preceding sections, the parallel given of Deng & Ji (2015) framework and Molla et al (2009) framework is used in the research as appropriate frameworks (Table 1). Deng & Ji (2015) framework focuses on the drivers to the adoption of green ICT in a two-prong manner the first being internal drivers and the second being external drivers. Most of the factors in the other frameworks reviewed are taken care of, but this approach gives a better mapping to the perceptions and the actual situations in the insurance processes in developing nations. Another framework that draws a close parallel to this framework is the Hsu & Tan (2012) framework which focuses on regulatory measures, competitor pressures, customer pressures and socio-cultural responsibility as drivers. Discussion of how these drivers map onto the Deng & Ji (2015) framework is made in the following sections.

2.4. G-Readiness of Insurance Companies in Developing Nations

2.4.1. Internal Drivers

According to Deng & Ji (2015), the internal drivers are top management, greening of organization culture and strategic intent. In the extended g-readiness model, ICT personnel preparedness is key to the adoption of green ICTs (Wabwoba, Omuterema, Wanyembi, & Omieno, 2013). The ICT personnel should have the correct technical capacity and attitude to support green ICT adoption. A report by IDC shows that the technical capacity in ICT has grown considerably, driven by increasing demand (IDC, 2011). ICT skilled staff make up 7.9% of the staff complement in the insurance industry (IRA, 2012). This is an adequate complement to the insurance business, and with the right skilling, the staff are able to set and drive the green ICT agenda (IRA, 2012). Other than the ICT staff, the top management team have to be properly aligned to the green IT agenda. Most of the IT direction decisions are made either at management committees or ICT steering committees comprising of the top management. Boards also have vast powers in determining ICT investments.

From the survey, of the companies with the board ICT committees, none have any ICT professional in the board committees.

It is the top management that guides boards on the importance and the benefits of going green IT way. It is not a corporate governance requirement in many developing nations for insurance companies to have ICT board committees, or ICT agenda retained as standing agenda in the board meetings. However, some insurance companies have adopted the good practice of having the board ICT committees. This arises from the fact that the insurance companies' investment in ICT is usually very large and the operations are largely driven by ICT. King IV corporate governance standard provides for technology governance and security in very explicit manner (Institute of Directors, 2016). Section VI of the Sabanes Oxley act also provides in very clear terms the responsibility of boards on technology review, compliance, inspections, examinations, market regulation, and investment management (SarbanesOxley Oxley Act of 2002, 2012). These two corporate governance standards provide a clear forum for ICT discussions in boards, making it easier for boards to deliberate on green ICT matters. This lacking of corporate governance standards or regulatory guidelines on ICT governance makes the insurance industry in developing nations readiness to adopt green ICT very weak from a governance point of view. 40% of the companies surveyed have board ICT committees.

From an internal perspective, the desire for insurance companies to be good corporate citizens could also be a driver to adopt green initiatives. Molla, Cooper, & Pittayachawan (2011) define green ICT policy as the environmental criteria and frameworks an organization puts in place to guide the sourcing, use, and disposal of the ICT technical infrastructure and the activities of ICT people. Policies are put in place as a result of conscious decisions to take a certain direction. Conscious of saving on costs, the insurance companies actively pass policies that are geared to reduce on the expenses on ICT. It is coincidental that some of the policies and initiatives put in place, in the name of saving on costs, end up being environment friendly. For example, in the effort to reduce on server room cooling costs, insurance companies may decide to adopt blade servers and virtualization of servers, or in an effort to reduce on power consumption and cost of end-user computing, they may decide to adopt thin clients and virtual end user computers. Both efforts are aimed at reducing costs, but have favourable impact on the environment. It is also becoming a necessary thing for companies to be good citizens (Muthuri & Gilbert, 2010). Corporate citizenship essentially delivers shareholder value and at the same time delivering on societal value (Nelson, 2005). This concept ensures that there is a balance between quest for profitability and providing general social good to the society in which the corporates exist. This corporate citizenship drives companies to be more conscious of the impact of their activities on the environment. Insurance companies are therefore in this context corporate citizens that have responsibility to the societies in which they exist.

The ICT attitude and business attitude should be right for a business to be considered to be G-ready. Business attitude could also be driven by industry attitude (Radu, 2016), that is, the thrust given by the industry players, regulators, and associations. The attitude here refers to the IT people's sentiment, values, and norms towards climate change and the role IT plays in it (Molla, Cooper, & Pittayachawan, 2011). Insurance and reinsurance business are usually affected by climatic change to a large extent. This started becoming evident to insurance companies between 1980s and 1990s (Haufler, 2006) and has eventually found traction with regulators (NAIC, 2008). The fact that climate is central to the business being underwritten by insurance companies, and the fact that insurance companies also insure themselves, makes the attitude to be very alive amongst the insurance companies. In a situational paper done by AKI (2016), mass defaults caused by weather shocks is one of the key risks in agricultural insurance. Indeed, climate is a major consideration when writing many insurance policies. However, it is yet to be confirmed if the knowledge of the effect of climatic changes on the insurance business influences the ICT attitude of the insurance companies in developing nations.

Policies and attitude direct practice. Driven by the desire to reduce operational costs, many insurance companies in Kenya have adopted energy efficiencies in their data centres, adopted the use of laptops and thin clients all in the effort to reduce energy consumption. There have been notable benefits from such practices and these energy conservation efforts can be seen as a sign of readiness for green ICT by the insurance industry from a practice point of view.

2.4.2. External Drivers

The second set of drivers according to Deng & Ji (2015) are external drivers. The external environment is defined by two broad categories – technological context and institutional pressures.

2.4.3. Technological Context

Technology is usually useful to a business if it can provide the competitive advantage, and while at it, the key considerations in the adoption of any technology will be the technological complexity and compatibility (Deng & Ji, 2015).Relative advantage and technological compatibility will positively impact an organization's adoption of green ICT and that technological complexity will negatively impact the adoption of green ICT by organizations. The focus here is on the technology supporting the reduction of power consumption and cooling (Molla, Cooper, & Pittayachawan, 2011). Technology to reduce on greenhouse effect that can be used by insurance companies abound. Virtualization of server and desktop (Shahriar, Rahman, Methila, & Rahman, 2017), grid computing and cloud computing (Patel, Sharma, Gupta, & Kumar, 2013), use of blade servers and data deduplication (Yan & Wu, 2015) are all common technologies in practice by insurance companies in developing nations. From a technology point of view, the developing nations insurance sector is ready for green ICT.

2.4.4. Institutional Pressures

Deng & Ji (2015) focus on three sources of pressure that can influence an organization towards the adoption of green ICT. These are coercive pressure, mimetic pressure and normative pressure.

Coercive pressure would ordinarily originate from government and regulators (Deng & Ji, 2015). This means that organizations find legitimacy by complying to imposed regulations (Lei & Ngai, 2012). In Kenya for example, the body mandated to regulate the conservation of the environment, National Environment Management Authority (NEMA) has put in place green points initiative (NEMA, 2018). It is however not a compliance requirement, and as such, most insurance companies in Kenya do not bother to comply. However, section 6 of the energy management regulations, (2012) require the owner or occupier to carry out an energy audit of the facility by a licensed energy auditor at least once every three years. Ghana also has a similar law (Environmental Protection Agency Act, 1994) that provides for inspection and enforcement of environmental issues from corporate entities in Ghana. This gives the insurance companies, most of whom own the premises they operate from, the motivation, from a legal point of view, to implement green initiatives.

The challenge faced by businesses is lack of uniform standard of measuring gains from green initiatives. Mimetic thinking is that organizations will follow leading organizations which have realized benefits from being the first movers in the industry (Deng & Ji, 2015). This means that if these energy audits were to be publicized, the insurance companies trailing in the gains from the conservation would be keen on adopting the green IT to follow the leaders. But as it stands, these audits are not working as envisaged and so it is not accurate to say insurance companies are green IT ready from this perspective. In developed nations, fusion of carbon pricing in insurance premium pricing is getting traction. For example, in Canada, environment pollution forms one of the metrics in actuarial risk pricing model (Grigg, 2014). This forms part of mimetic pressure in the sense that insurance companies that may have not incorporated the green pricing in premium pricing look up to the ones that have as leaders. In developing nations, environment considerations are more of concentrated in manufacturing and transport and hence insurance industry is left out.

Normative pressure comes about as a result of professionalism in a certain field. Normative pressure is fairly less formed in the insurance industry when it comes to environment matters. Environment matters do not form the core of underwriting and as such the normative effect may not be as pronounced as mimetic and coercive pressures.

3. Methodology

Survey was done on five insurance companies operating in Kenya with operations in a number of other developing nations. Since there practices were same across several developing nations where they operate, they were found to be fairly representative for the study unlike those that operated in Kenya only. The table 2 below shows the company's presence in terms of other nations other than Kenya.

Company	Presence in No. of Countries
A	3
B	7
C	4
D	36
E	3

Table 2: Insurance Company Presence in Developing Nations

The survey sought to establish the drivers with high impact towards the adoption of green ICT in the insurance sector in developing nations. It also sought to determine the level of preparedness towards adoption of green ICT. This was proceeded by a search of papers with keywords green ICT that returned 430 papers. The search on the 430 papers was then focused on those that did discuss Green ICT readiness and they were further reduced the number to 148. A further sifting was undertaken remove working papers, books and book chapters reduced the papers to 48 that were analysed to determine if there exists an appropriate framework for green ICT adoption for the insurance sector. The approach according to Senyo, Addae & Boateng, (2017), is an accepted literature search method in research.

Of the focused papers reviewed, 8.33% of the papers had their application area in government, 12.5% in small and micro enterprises (SME), 4.17% in banking, 4.17% in travel and tourism, another 4.17% in business process outsourcing and the remaining 66.67% were general in nature. There was none that was specific to the insurance sector. There has been no specific study focusing on G-readiness in the insurance industry. In terms of geographic consideration, this study targeted developing nations. Of the focused literature surveyed, 37.5% the papers came on developing nations, 4.17% from developed nations, and the remaining 58.33% were general.

This research therefore proceeded to consider the existing G-readiness frameworks and with findings from the survey to determine their applicability in the insurance industry in developing nations, given the gap in literature.

4. Findings of the Study and Discussion

4.1. ICT Governance

The study first of all sought to establish if the companies had specific Board committees addressing ICT matters and the findings were as presented in table 3.

Company	ICT Board Committee	Chair of ICT Committee ICT Professional	Any ICT Professional in the ICT Committee	Presence in No. of Countries
A	Yes	No	No	3
B	No	N/A	N/A	7
C	No	N/A	N/A	4
D	No	N/A	N/A	36
E	Yes	No	No	3

Table 3: Board Involvement in ICT decisions

From the survey, it was found that two (A and E) of the five companies had specific board committees looking into ICT matters and of the two that had ICT board committees, none of the members was an ICT professional. From a further interview conduct on the professions of the members to the board it was established that all the members are non-ICT professionals. It was further also found that one of the three companies that did not have an ICT committee had in its place had a strategy and investment committee that had ICT as a standing agenda however its constitution had no ICT professional.

4.2. Drivers of Green ICT in Insurance Industry

Response from management on the importance of the various drivers to green ICT adoption indicate process efficiency, insurance company's strategy, stakeholders' support, external pressure on good corporate citizenship and the cost involved as the top five drivers. The full detail of the priority as detailed by the respondents is detailed in table 4.

Green ICT Drivers	A	B	C	D	E	Combined Mean (Total)	Standard Deviation	Rank
Reduce costs of ICT	3.3	3.6	4.3	2.2	3.3	3.34	0.757	5
Use as a corporate strategy	3.3	4	3.7	2.8	3.4	3.44	0.451	4
Environmental considerations	2.3	3.4	3.2	2.5	3.2	2.92	0.487	9
Social responsibility	3.4	3.3	2.8	2.4	3.6	3.10	0.490	7
Investment cost in greening IT in insurance	3.8	3.4	2.6	3.8	3.9	3.50	0.539	3
Government regulations	1.6	1.8	2.2	3.2	2.1	2.18	0.618	15
Government incentives	1.4	1.1	2.6	2.2	1.9	1.84	0.602	14
Clients' / customers' pressure	3.5	3.4	2.4	2.1	3.3	2.94	0.643	8
Green ICT uptake by more organisations	3.5	3.1	2.5	3.2	2.2	2.90	0.534	10
Industry association	2.3	2.4	3.2	3.5	2.6	2.80	0.524	11
Competitors' actions	2.7	1.8	2.8	3.5	3	2.76	0.619	12
ICT vendors' pressure	2.1	2.8	2.2	3.5	2.8	2.68	0.563	13
Process efficiency	4.1	3.9	3.1	3.1	3.8	3.64	0.422	1
External pressure on good corporate citizenship	3.3	3.9	2.7	2.9	3.2	3.20	0.458	6
Stakeholders support	3.9	4.3	3.4	3.4	3.1	3.62	0.476	2

Table 4: Drivers of G-Readiness – Survey of Insurance Industry in Kenya

Considering 3.5 as the average acceptable index for normal, then only Process efficiency (at 3.64) and Stakeholders (at 3.62) are slightly above the minimal value for the insurance industry. All other index values of drivers are below average value. Company A has five drivers moving it towards green ICT readiness being Process efficiency (4.1), Stakeholders support (3.9), Investment cost in greening IT in insurance (3.8) and Clients' /customers' pressure with Green ICT uptake by more organisations having the same index of 3.5. Company D and company B are the next in more drivers taking it towards green ICT with its highest index being at 3.8 on Investment cost in greening IT in insurance that is followed by three drivers all at 3.5 being Industry associations, competitor's actions and ICT vendor pressure with Company B stakeholders support leading at 4.3 followed by external pressure on good corporate citizenship and process efficiency both at 3.9 and finally reduce costs of ICT at 3.6 respectively. In the fourth position towards with each having three drivers equal to or above the normal index of 3.5 is company B and E. Company E has leading driver being Investment cost in green IT in insurance at 3.9, followed by process efficiency at 3.8 and finally social responsibility at 3.6. Company C had only reduced costs of ICT at 4.3 and use as a corporate strategy at 3.7 having indexes above that of normal. From the table 4, Environmental consideration, government regulations and government incentive did not have any of the five companies score above normal index. It is, therefore, observable that Environmental consideration, government regulations and government incentive hardly play any significant role in driving the insurance industry towards green ICT readiness.

Examination of drivers that were scored above the normal value of 3.5 in more than one company ended up giving only four. Process efficiency had over 3.5 in three companies being A (4.1), B (3.9) and E (3.8). Investment cost on greening

IT in insurance also had values above 3.5 in three companies namely A (3.8), D (3.8) and E (3.9). Stakeholders support was scored above 3.5 in two companies being A (3.9) and B (4.3) while reduce costs of ICT was also scored by two companies B (3.6) and C (4.3). From this finding then it implies that a good model for leading insurance companies towards green ICT readiness should front financial cost as the main driver. All the four drivers appearing in more than one company have a financial element in them.

Based on the combined mean values of the five companies, it is evident that process efficiency ranks number one priority as a driver, stakeholders' support as number two and cost of greening ICT as number three. The fourth, fifth and sixth positions respectively are occupied by insurance company's strategy, reducing costs of ICT and the external pressure on good citizenship. This could be probably as a result of the profit margins of insurance companies being very narrow and any cost element becomes a great concern. The fact that insurance companies sell a promise (to pay claims in the event of a loss) makes public opinion and corporate citizenship key. Strategy and cost elements are well defined in the Molla et al (2009) framework. The process efficiency, stakeholder support and external pressure on good corporate citizenship as drivers are not discussed in the Molla et al (2009) framework. These turn out to be very important drivers in the insurance industry G-readiness. The Wabwoba, Omuterema, Wanyembi and Omieno (2013) framework brings forth an important driver to G-readiness – ICT personnel, however, from findings it is clear that the key decisions on going green are made by non-ICT personnel (40%) hence making it important to expand the ICT personnel to cover all personnel.

4.3. Green ICT Readiness of Insurance Companies in Developing Nations

The study sought to establish the green ICT readiness levels for the insurance companies and the findings were as presented in Figure 5.

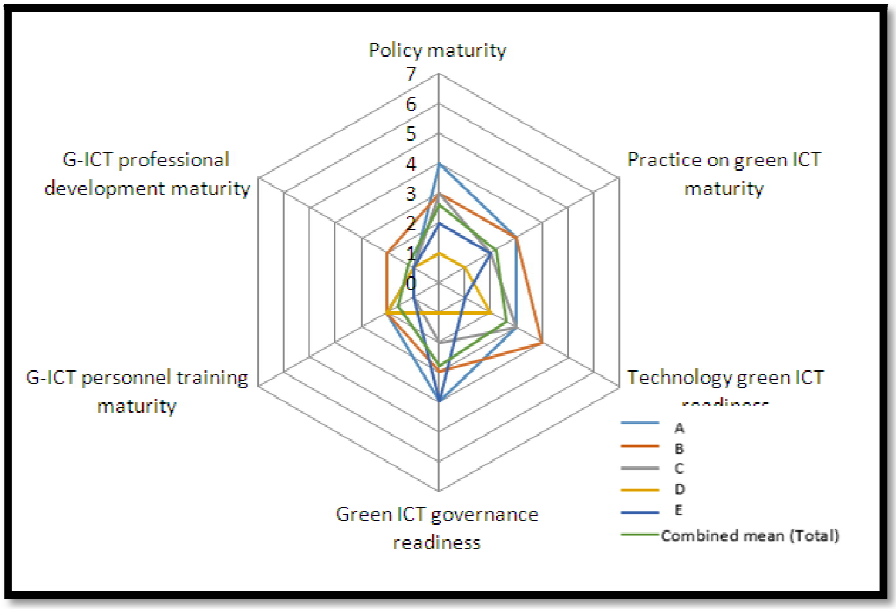

Figure 5: Insurance Industry G-Readiness Level

From the figure 5 above, it can be observed that all companies have their readiness index below the average of 3.5 except for A on policy maturity which is at 4, B on Technology green ICT readiness at 4, and both A and B on green ICT governance with both at 4. Basing on the five companies mean, none of the indexes is even below 3. From the figure, it is apparent that the insurance industries readiness level is very low.

5. Conclusion

The study established that most of decisions with regard to ICT within the Insurance companies in the developing nations are made by the non-ICT professionals. In all cases where companies have some type of committee making decisions on ICT matters, they were composed of non-ICT professionals.

The insurance industry in the developing nations was at a very low level of adoption, since in all aspects the mean values obtained were below the average value of 3.5.

It was further established that no single green ICT framework and model reviewed in the study would fully be applicable in driving the industry towards adopting green ICT in developing nations.

The drivers with the highest impact towards green ICT adoption in the insurance sector in developing nations in order of highest down were process efficiency, investment cost on green IT, stakeholders support and reducing costs of ICT.

This paper proposes further studies to be done in developing an appropriate framework that takes in consideration of the identified unique needs of the insurance sector in terms of drivers and components to enhance its readiness level in the developing nations.

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