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The Use of Information Systems to Prevent Global Warming

By

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CHAPTER 1: INTRODUCTION

Introduction

The greatest crisis facing humanity in the 21st century is the threat of global warming. The unabated release of greenhouse gases, CO2 in particular, into the atmosphere has caused the global climate system to slowly warm (Philander, 2012). Climate refers to the long term trends and patterns of weather conditions including land and ocean temperature, wind, air pressure, and water content in the atmosphere. Precipitation and weather elements are unique in any given location on earth and depend on many variables including incoming and outgoing solar electromagnetic radiation (EMR), and the variation in orientation and time period of earth's orbit. The study of pale climatology examines climate change over the course of earth's history. Proxy data such as analysis of ice cores, tree rings, sediment, corals, and other historical data are used to determine climate at given eras (Auweter, 2012). These studies indicate the earth has cycled through glacial-interglacial periods; intervals of warm, ice-free periods as well as epochs during which the earth was in a cooled state with ice-sheets covering vast continental and ocean areas (Fordham, Resit Akçakaya, Araújo, Elith, Keith, Pearson, & Brook, 2012, p. 1357). Without mitigation and with growing industrial practices the planet-wide global warming may reach a point of no return.

Objectives

The objectives of the study are:

1. To study the relationship of Information Systems to prevent global warming
2. To develop and Effective Action plan in order to prevent global warming through the use of information system for short-term and long-term initiatives

3. To study how global warming can be prevented from the industrial emission in order o achieve a low Carbon society.
4. To study the initiatives that are implemented globally by international organizations like UN for preventing global warming through an effective IS.
5. To compile a descriptive literature explaining the relationship if IS with global warming

Problem Statement

Since 1800s, the level of water and air pollution has dramatically increased by the combustion of fossil fuel (Senge, Smith, Kruschwitz, Laur, & Schley, 2010). Despite the growing awareness and understanding of the importance of reducing pollution, the levels of pollution have increased worldwide. Senge et al. (2010) stated four categories affected by the increased pollution rate, enhancing the global warming: (a) industrial waste, (b) consumer and commercial waste and toxicity, (c) non-renewable resources, and (d) renewable resources.

Industrial waste

The raw material extraction and production processes generate 90% waste and 10% effective gain. Significant production process' generated waste is dispersed through the groundwater, and airborne pollutants (Senge et al., 2010). The industrial airborne waste particles were responsible for 500,000 deaths in India from respiratory illness per year. At least 70% of the developing world dumps industrial waste into lakes, rivers, oceans, or soil, which is directly affecting the environment and resulting in global warming (Rosenzweig, Elliott, Deryng, Ruane, Müller, Arneth, & Jones, 2014, p. 3268).

Consumer and commercial toxic waste

Rosenzweig et al. (2014) stated more than five billion tons per year of carbon dioxide was emitted than can be absorbed by the biosphere. The excess carbon dioxide is a result from burning fossil fuels worldwide. Commercial and industrial electronics, packaging waste, and toxins embedded in everyday products are disposed of landfills (Senge et al., 2010).

Non-renewable resources

The consumption of fossil non-renewable resources is steadily growing in correlation with the population (Targowski, 2005, p.2). Oil, gas, and coal cannot be renewed. Coal stocks are expected to last 50 to 100 years. Coal is the biggest source of air pollution containing toxic elements (Rosenzweig et al., 2014). For example the United States consumes one fourth of the global oil. Eighty percent of the oil in the United States is imported (Senge et al., 2010).

Renewable resources

The quality and the availability of fresh-water have become degraded. One fifth of the earth's population does not have access to clean drinking-water (Fordham, Resit Akçakaya, Araújo, Elith, Keith, Pearson, & Brook, 2012, p. 1357). In the past 50 years over one third of the forests have disappeared, significantly reducing the atmospheric absorption of excessive carbon dioxide. The continuous growing waste and the natural resource reduction is reflected in environmental imbalances to regenerate (Fordham et al., 2012, p. 1359). The social imbalance increases the capability of developing countries to gain an economic advantage. While developing countries are struggling to provide food for survival for its population, developed countries are increasing their economic advantage.

Global water management

Water management has been driven by local desire and unchained growth (Layzer, 2008). Local water limits were petitioned to obtain rights to distant water sources, regardless whether the depletion of remote fresh water sources negatively impacted the environment or local eco-system. Layzer (2008) stated that economists argue that current implemented government rule-oriented mechanisms encourage reactive resource damage, and do not reflect variations in local ecological protection. Freshwater regulation and quality control require a nationwide overview of potential pollution, scarceness, and consumption levels (Glennon, 2009). Drinking water is shared through lakes and rivers crossing cities, states, and countries. Recent estimates revealed 3.5 million Americans become ill each year from contaminated sewer water dumped in rivers and lakes (Glennon, 2009). The local scientists and governmental bodies are aware of the root cause and potential solution in their own microcosms. The criticality of the problem has not been classified as a national problem in the United Kingdom and United States, and has remained subject to reactive resolution. The resolutions put in place are targeted to solve an existing problem reactively rather than to keep the problem from occurring (Layzer, 2008). Freshwater availability is subjectively treated state by state and country, by country because an overall nationwide impact has not thoroughly been analyzed (Dudgeon, Arthington, Gessner, Kawabata, Knowler, Leveque, Sullivan, 2006, p. 165). Different incompatible interest groups are not concerned to protect the freshwater diversity.

Importance of Information Systems to prevent Global Warming

In a global competitive business environment, organizations must endure in a changeable world of limited resources while sustaining an economic posture. The advancements of Information technology have transformed most of the world's businesses

into an electronic-based economy. Information technology has become essential in the modern business world, allowing organizations to grow and to profit from broader market opportunities (Dudgeon et al., 2006, p. 165). Information technology demand natural resources for their development and consume a tremendous amount of energy resources for operating. As the world populations continue to grow, developing countries will demand greater use of natural resources (Molla, Cooper, Deng, & Lukaitis, 2009a, p. 13). Global warming and climate change coalescing with limited availability and increasing costs in energy pose serious challenges for sustaining the digital global economy.

Information Society and Knowledge

Targowski (2005) stated that the modern economic growth is directly related to information-communication technology advances. Information handling and processing in the information society is considered to be the solution to problems created by the Post-industrial manner of working (Drucker et al., 2008, p. 65). According to Targowski (2005), information handling is formed by the following seven trends: (a) politics in the post-Cold War Era, (b) democratization and peacemaking, (c) globalizing information, (d) globalizing economy, (e) population growth and health threats, (f) global environmental threats, and (g) a new path for development.

Information and politics

The new world order formation after the Cold War led to a decentralized international society (Molla, Pittayachawan, Corbitt, & Hepu, 2009b, p. 45). The physical decentralization of nations requires methods and technical realization to integrate, share, and federate the information among the members (Chin, 2006, p. 149; Molla et al., 2009b, p. 47). The

consolidation of information and sharing knowledge requires the similar architectural framework information governance structure used to share knowledge.

Information and democratization

Societies require unrestricted access to information in a particular field of interest. Free consumption and sourcing of information is the basis of building knowledge and reducing information recycling (Targowski, 2005). Understanding and collective mindset is determined by culture and social codes of ritual, custom, behaviour, and the textual codes (Corbitt et al., 2006, p. 51; Lewis, 2006). Providing a method to capture information and make it readily available supports global knowledge management (Allman & Paxson, 2007).

Information globalization and economy

Information-communication technology drives the transnationalization of the global economy (Molla et al., 2009a, p. 13). Targowski (2005) stated that information in a computer-mediated society will merge all national markets into one international market. The premise for successful information sharing requires the creation of a structural framework to reduce incorrect information interpretation in different cultures.

Information and population growth

The world's population is growing and is expected to reach 9 billion people in 2025 (Targowski, 2005). The amount of information processed and shared will double by 2025. To reduce information recycling, information must be captured in a meta-structure framework (Corbitt et al., 2006, p. 52). Information growth implies requirements of the capacity of information-technology communication and the capture of associated Meta information

(Mello, 2010, p. 46). The increase in population and information to be processed and shared creates a challenge to sustain drinking water reserves.

Information and environmental threats

The most serious environmental threat is the lack of unpolluted drinking water (Glennon, 2009). Global ecology monitoring requires active knowledge sharing with cross-border and economic restrictions (Lewis, 2006). To succeed in solving international ecological problems, leaders have to lead, manage, motivate, and inspire followers to fight against isolation or insularity.

Information and development

Knowledge and learning societies foster the need for more education and research on water pollution (Krishnamurthy, Fisher, & Johnson, 2011, p. 143). Because ecological problems affect sustainable human development, new global information governance is required to close the gap between developing and developed countries. Barros, Stocker, Qin, Dokken, Ebi, & Mastrandrea (2012) stated the governance focus of the information society requires: (a) information organization to support more individuals to innovate and learn; (b) consensus; and (c) strategic use of knowledge supporting leadership in the lifelong learning process.

Motivation of the Study

Information technology continue to be an integral part in every activity in modern life and businesses, as information gathered from local communities is one source to help identify frequency and exposure to natural disasters and global warming. This local knowledge and input has the potential to assist governments in the development of structural and economic

policies to aid in global warming management & mitigation, emergency response, and recovery. Developing countries have little risk mitigation and adaptation capacity, and global warming policies may require humanitarian relief to cope with extreme events and recover from the disasters (Barros et al., 2012, p. 18). Vulnerabilities are much greater in regions with populations in the poorer economic classes. These populations live in substandard housing more susceptible to extreme event damage (Krishnamurthy et al., 2011, p. 147). The poor may not have the financial means to purchase adequate insurance policies that compound disaster recovery efforts. The urban poor settle in informal communities consisting mostly of undocumented or illegal residents. Often, they migrate in groups, generally to empty low lying areas, along the coast, riverbanks, and canals prone to flooding (Baker, 2011). Scrap building materials found on construction sites, mostly concrete and brick, are used to construct temporary shelters that become permanent homes. Evacuation plans and emergency shelters may reduce devastating impact of global warming over time (Blake, Landsea, & Gibney, 2011, p. 147). Efforts are hampered when inadequate transportation infrastructures cannot effectively evacuate populations, or when people refuse to vacate the danger area (Krishnamurthy et al., 2011). Coastal population vulnerabilities continue to increase as more people migration to coastal cities (Frey et al., 2010, p. 96). Thus, this study intends to analyze the relationship of information system to the reduction global warming, while the information systems are used and suitable policies for its effective integration are enforced by the government.

Purpose of the Study

In the 11th century, Europe experienced a warming period while the western United States contended with a tendency for drought. During the 17th century, a cooling period occurred in Europe and the western United States experienced wet conditions (Pita, Pinelli,

Gurley, & Hamid, 2013, p. 1049). Examination of urban and rural infrastructure and services are also required to assess vulnerability. Transportation systems, utilities (electrical, water, sewer), critical and essential facilities (medical and public safety response capacity) require the capacity to meet demands during disasters. Governing functions, personal and public building infrastructures as well as access to basic living necessities such as food and provisions need to in sufficient quantities for survival during the recovery process (Frazier, Wood, Yarnal, & Bauer, 2010, p. 409). Development of vulnerability and capacity assessment maps (Krishnamurthy, Fisher, & Johnson, 2011) assists in identifying possible impacts of disasters and extreme events. Short and long term economic wellbeing, physical infrastructure (housing, public systems, roads and safety shelters) and population risks should be determined for the accumulated natural disasters, occurring due environmental changes and global warming. Thus, the purpose of this study is to propose the short and long term initiative that have been implemented by the international organisation to address the issue of global warming, in relation to the gaps identified and opportunities encountered with the implemented information system usage.

Contribution

Over the course of earth's history, climate has varied greatly with extreme cooling and warming events. There have been many predictions for global warming with respect to sea level rise, ocean acidification, and food insecurity. However, the level of CO2 already in the atmosphere will lead to additional global warming. It is also certain that the increased level of CO2 in the atmosphere results from human activity, primarily the burning of fossil fuels (Blake, Kimerlain, Berg, Cangialosi, & Beven, 2013, p. 134). Global temperatures have been increasing in recent decades and are contributing to more extreme weather events on earth. Governments are now considering global warming issues and analyzing its impacts on

the future environmental policies. However, “global warming” and “climate change” deniers exist in many levels of government as well as the general public. Reconstruction of surface temperatures from coral fossil and other proxy data indicates climate warming and cooling events varying regionally (Blake et al., 2013, p. 138). Therefore, the prime aim this research is to contribute to the global warming field of study and advocating the advantages of information system for determining the various prospects that can dramatically affect the climate, environment, and help reducing the global warming

Limitations

One limitation of the current study was the length of time or duration of the study. More time might have revealed more detailed information that might have led to a modified interpretation. Therefore, time appeared as a barrier to limit the scope of study with respect to the literature research and analysis of the past information technological advancement in the field of environmental science and global warming. Although, large amount of literature is available on the selected research topic; however, there were few databases and libraries not accessible to the research, which may have affected the secondary data analysis.

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