Utilizing E-Commerce and M-Commerce Applications to Address the Effect of Global Warming

Keshnee Padayachee
School of Computing
University of South Africa
Unisa, South Africa

Abstract

The impact of global warming is particularly significant to African countries with growing economies. The process of reducing carbon emissions has the potential to negatively impact emerging economies. However the use of web technologies and mobile technologies may be a way of reducing carbon emission without adversely affecting the economy. Unlike developed countries, developing nations are less reliant on fossilized fuels and thus have the ability to change and adapt to this growing concern. In this preliminary research paper, the relationship between the use of e-commerce and m-commerce technologies relative to the reduction of carbon emissions is investigated within the South African context.

1.   Introduction

The impact of global warming is particularly significant to African countries with growing economies. Firstly reducing emissions will impact significantly on their emergent economies. Secondly, it appears that African countries will be the most affected by the consequences of global warming, such as droughts and the spread of infectious diseases. Unlike developed countries, developing nations are less reliant on fossilized fuels - accordingly they have the ability to change and adapt to this escalating concern. In this paper, the relationship between use of e-commerce and m-commerce technologies relative to the reduction carbon emissions is investigated. However using technology does not fully reduce the problem and the technology itself needs to be used in an energy conserving manner.

'Global warming' is a phrase that refers to the effect on the climate of human activities, in particular the burning of fossil fuels (coal, oil and gas) and large-scale deforestation, which cause emissions to the atmosphere of large amounts of greenhouse gases', of which the most important is carbon dioxide.' [5]. There is a wealth of evidence asserting that global warming is a real threat. Consequently there is a need to port to low-cost, carbon-free energy systems [7]. It is evident that increased climate variability will have major repercussions on the ability of Africa to alleviate poverty [10]. Aside from ecologists, information technology communication specialists need to urgently consider how to apply their skills and knowledge towards minimizing carbon emissions. South Africa has signed the Kyoto Protocol on Climate Change, an indication of the government's commitment to carbon emission reduction. However rallying support from the private sector will guide the process.

This paper considers how e-commerce and specifically m-commerce might used to reduce carbon emissions in South Africa. 'The process of buying, selling and promotion of information, services and products via computer networks is commonly known as electronic commerce, or e-commerce. Whereas mobile commerce, or m-commerce, is a special area of e-commerce, where mobile devices are used for buying, selling or advertising.' [8].

2. The Positive Effects of E-commerce and M-commerce on the Environment

Transportation is responsible for about 25% carbon dioxide emissions [7]. It is often thought that using bio-fuels rather than fossilized fuels would reduce carbon emissions. However, using bio-fuels could have an unexpected side effect, where staple foods could become unaffordable. 'In the United States, the growth of the bio-fuel industry has triggered increases not only in the prices of corn, oilseeds, and other grains but also in the prices of seemingly unrelated crops and products' [13]. In Africa, this could lead to mass starvation. It is obvious that reducing the number of commuters is one way of reducing the level carbon emissions. The use of e-commerce and m-commerce applications is a means of conducting business without actually commuting.

Many South Africans shop and bank online. This in itself reduces the number of commuters on the road. If more business transactions could be conducted online, this would significantly reduce this number even further. The total spent on online retail goods in South Africa in 2005 was R514 million, however the industry is growth rate has slowed due to the 'high cost of broadband Internet access in South Africa' [3]. These figures exclude the sale of air tickets online, which dwarf the numbers for online retail. The four South African airlines selling tickets online account for R1.8-billion in e-commerce in 2005, more than doubling the 2004 figure of R850-million, and more than three times the size of conventional online retail [3].

Business may further reduce their carbon foot print, by allowing their employees work in virtual offices. For example, IBM in one its most ambitious programs in corporate America use laptop computers and other information technologies to allow a significant fraction of its sales and service organizations to work outside IBM's buildings (i.e. to telework) [12]. Many institutions in South Africa have the capacity and infrastructure to allow employees to work from virtual offices. There are several known technologies such that are available that may allow such organisations to exist where most traditional business interactions can be conducted online.

The number of internet users in South Africa grew to 3 million in 2002 and is serviced by over 200 competing Internet Service Providers [9]. In 2005, 10.75 out of every hundred South Africans have internet access and approximately 10 per 100 have a fixed land lines. Interestingly 71.6 of 100 in South Africans have mobile phones [6]. With options such as 3G (Third Generation) and GPRS (General Packet Radio Service) which offer access to the internet, it implies that more than 70% of the population have the potential to access the internet or the very least perform basic business transactions using their mobile phones. The growth in the number mobile telephone users is significant as it implies that m-commerce could be used for buying and selling goods and services for transactional and business-related communications

among individuals and companies [11]. For instance, Mobile Banking is currently performed using SMS (Short Message Service). Unlike fixed line internet access, these wireless mobile devices are ubiquitous, affordable, portable and have location-awareness [8]. Location-based wireless services could be deployed to leverage a shopper's profile in order to guide the present shopping experience. This could be added incentive for a consumer to opt for online shopping.

Deforestation also contributes to global warming therefore moving to a paperless society would be advantageous. There are several ways in which digital transfer of information could be useful. Typically billing and advertising are paper-based. For example, in typical advertising, marketers hand out paper flyers but this can be avoided using blue tooth technologies. Billing statements can be sent via SMS or e-mails. Currently several airlines in South Africa as known as 'ticket less airlines', operate by sending tickets via e-mails to customers and do not carry the cost of printing tickets. This in turn also saves the consumer money.

Consumers may also benefit as they no longer to have to pay for the operating costs of a businesses. For example, there is no need to rent office space, or send out bills via the traditional more expensive means. Further recyclable packaging of goods will further benefit the environment. In May 2003, South Africa introduced legislation intended to decrease plastic bag litter. It combined standards and price-based economic tools in an attempt to reduce the public's demand for plastic bags [4]. If a customer does online shopping, the packaging the goods are delivered in could be removed, and reused by the service provider.

3. Counteracting the Negative Effects of Technology on the Environment

Obviously computers use energy, but computers are actually relatively energy efficient. The 'average PC and monitor use about 150 watts of power; this dips to 50 watts or less in energy-saving modes. Printers and peripherals tend to be spread over a great many users and do not increase this average very much. Laptop computers, a key growth segment, are particularly low energy users; some new laptops use under 30 watts. Moreover, computers are getting more energy-efficient every year because of steady improvements in technology driven in part by the growing market for portable equipment (and by the IT sector's desire to reduce its environmental impact)' [12] . A handheld cell phone operates on about 0.75 to 1 watt of power. However the use of technology does have a negative impact on the environment when it is cumulative.

There is a trend in the computer industry to develop more energy efficient and more recyclable products. This process is known as "green" computer design [2]. Hence porting to m-commerce or e-commerce involves considering how to reduce its negative impact on the environment as well. However cost of using computers and peripherals can be further reduced by using computers that are energy efficient. For example, "Energy Star" computers and monitors can be programmed to automatically "power-down" to a low power state when they are not being used. [1]. For instance users of technology need to be educated on the basics such turning off computers when they are not in use.

The waste products produced by m-commerce and e-commerce need to be recycled to further protect the environment. For example, printer toner and ink jet cartridges and batteries could be reused. Instead of tossing these in the garbage, they can be recycled, saving resources and reducing pollution and solid waste [1].

4. Conclusion

The environment does not have to suffer at the cost of the economy. Web technologies result in businesses actually reducing costs. The survivability of business may very well be dependent how well they can balance profit against reducing carbon emissions. As more organisations go online there is the potential to share business strategies and resources and thereby further increasing the incentive to go online. South Africa has a unique of opportunity as a developing nation to move in this direction as it is evolving rather than a developed nation that has to function within the current infrastructure. With wireless protocol the gap of the digital divide is lessening.

In the future, as consumers become more sentient of the devastating effects of global warming, they may demand to conduct business with organisations that enforce an ethical stance to reducing carbon emissions. Further there could be fiscal implications such as fines and taxes which may be imposed on businesses that are negligent. In fact, the survival of a business may depend on embracing strategies for reducing carbon emissions.

The Goldstruck Report [3] asserts that the biggest obstacle to growth of e-commerce and m-commerce in South Africa is the speed of Internet access, and more specifically lack of affordable access to broadband.

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