

Corporate Social Responsibility of African and Middle East Mobile Operators towards Climate Change, and the potential impact of its Carbon Footprint

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by

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ABSTRACT

The current and future anticipated changes in the earth's climate are a concern that has captured business's and governments' global attention. Climate change and its potential impacts cannot be ignored as there is ample evidence that global warming is indeed the result of anthropogenic greenhouse gas emissions.

The mobile operator in Africa and the Middle East (ME) operates on continents and in parts of the world, predicted by scientists as the most vulnerable to the effects of climate change. The mobile operator in Africa and the Middle East is moreover an emitter of significant amounts of CO₂ and this exacerbates the serious environmental climate change problem that humankind faces.

This research paper addresses the Corporate Social Responsibility of African and Middle East (ME) mobile operators, and its Carbon Footprint. The main objectives of the research are to identify strategic risks and opportunities and the implications for the mobile operator and to determine its Greenhouse Gas emissions. The performance against targets and plans to reduce GHG emissions are also reviewed.

The research is based on the questionnaire of the Carbon Disclosure Project (CDP) initiative. A shortened and modified version of the CDP was designed and emailed to two major mobile telecom operators both operating in Africa and the Middle East.

It is postulated that the telecommunications industry is at an inflection point where significant changes must take place in the way energy requirements are managed. This in turn could have a positive effect on reducing its carbon footprint, benefit corporate reputation and at the same time earn "green miles" in the subscriber's minds.

The research reached the main conclusion that the mobile operators' investigated do not yet have strategies, systems and reporting in place to be counted as "good corporate citizens" concerning their environmental responsibility. The research further concluded that a proactive strategic intent is a necessity to achieve this goal. In short: *The Corporate Social Responsibility of African and Middle East mobile operators indeed has a positive effect on its Carbon Footprint.*

ACKNOWLEDGEMENT

I would like to express my sincere thanks and love to my dear wife Dianne for her support throughout this prolonged project, called MBL. It was a long, hard road with many, many sacrifices. Thank you my wife for believing in me and taking care of our four children all these years in my “absence” while working and studying at the same time. I trust that God will continue to provide the fruit in our lives from all this hard work.

To my children: thanks for your understanding and helping me to finish this project. I hope this successful project is also an encouragement for your future careers.

I certify that this Research Report is my own work and all references used are accurately reported.

R. Biewenga

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GLOSSARY AND DEFINITIONS

This report analyses the Carbon Footprint of the mobile operators in Africa and the Middle East. This research covers a broad spectrum of topics, industries and technologies, which is typified by many acronyms and abbreviations that would generally be new to the main audience of this report. Consequently a list of abbreviations and definitions is presented as reference.

Abbreviation	Explanation of Term
GHG	Greenhouse Gas
BSI	British Standards Institutions
CAPEX	Capital Expenditure
CDM	Clean Development Mechanism
CDP	Carbon Disclosure Project
CERES	Coalition for Environmentally Responsible Economies
CERs	Certified Emission Reductions
CO ₂	Carbon Dioxide
CO ₂ e	Carbon Dioxide Equivalent
EMS	Environmental Management Systems
EU ETS	European Union Emissions Trading Scheme
GDP	Gross Domestic Product
GRI	Global Reporting Initiative
GWP	Global Warming Potential
ICT	Information, Communication and Technology
IISD	International Institute for Sustainable Development
IPCC	Intergovernmental panel on Climate Change
IRRC	Investor Responsibility Research Center
ISEA	Institute of Social and Ethical Accountability
ISO	International Organisation for Standardisation
ME	Middle East
OPEX	Operational Expenditure
OPCO	Operational Country
UNEP	United Nations Environmental Programme
UNFCCC	United Nations Framework Convention of Climate Change
WRI	World Resources Institute
WWF	World Wildlife Fund

Anthropogenic greenhouse emissions

Greenhouse gas emissions resulting from human activities (UNFCCC, No date a)

Carbon Footprint

The carbon footprint is a measure of the exclusive total amount of carbon dioxide emissions that are directly and indirectly caused by an activity or accumulated over the life stages of a product. (GRI, 2000)

Corporate Social Responsibility (CSR)

A concept which encourages organizations to consider the interests of society by taking responsibility for the impact of the organization's activities on customers, employees, shareholders, communities and the environment in all aspects of their operations. Decisions made should be based not only on financial factors such as profits or dividends, but also on the immediate and long-term social and environmental consequences of their activities. (GRI, 2000)

Environmental Management System (EMS)

The part of the overall management system that includes organisational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy. (ISO14001, 2004)

Energy development

The ongoing effort to provide sustainable energy resources through knowledge, skills, and constructions. When harnessing energy from primary energy sources and converting them into more convenient secondary energy forms, such as electrical energy and cleaner fuel, both emissions (reducing pollution) and quality (more efficient use) are important. (GRI, 2000)

Environmental sustainability

Environmental sustainability is defined as the ability of the environment to continue to function properly indefinitely. The goal of environmental sustainability is to minimize environmental degradation without using up the resources faster than they can be replenished. (GRI, 2000)

Eco-efficiency

Eco-efficiency is a management philosophy that encourages business to search for environmental improvements that yield parallel economic benefits. It focuses on business opportunities and allows companies to become more environmentally responsible and more profitable. It is a key business contribution to sustainable societies.

Eco-efficiency is reached by the delivery of competitively priced goods and services that satisfy human needs and bring quality of life, while progressively reducing ecological impacts and resource intensity. The target level: an eco-efficient state is reached when economic activities are at a level “at least in line with the earth’s estimated carrying capacity.” (WBCSD, 2000)

Ecological Footprint

The ecological footprint measures human demand on nature. It compares human consumption of natural resources with planet Earth's ecological capacity to regenerate them. It is an estimate of the amount of biologically productive land and sea area needed to regenerate the resources a human population consumes and to absorb the corresponding waste, given prevailing technology. Using this assessment, it is possible to estimate how many planet Earths it would take to support humanity if everybody lived a given lifestyle.

Greenhouse Gases (GHGs)

The atmospheric gases responsible for causing global warming and climate change. The major GHGs are carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O). (UNFCCC, No Date a) Some greenhouse gases occur naturally in the atmosphere, while others result from human activities such as burning of fossil fuels, for example coal. Greenhouse gases include water vapour, carbon dioxide, methane, nitrous oxide, and ozone. (RI, 2000)

Global warming

Refers to the increase in the average temperature of the Earth's near-surface air and oceans in recent decades and its projected continuation (GRI, 2000)

Global Reporting Initiative

The Global Reporting Initiative (GRI) produces the world's de facto standard in sustainability reporting guidelines. Sustainability reporting is the action where an organization publicly communicates their economic, environmental, and social performance.

GHG Protocol

The most widely accepted standard for calculating GHG emissions. (GRI, 2000)

Kyoto Protocol

Is an international agreement standing on its own, and requiring separate ratification by governments, but linked to the UNFCCC. The Kyoto Protocol, among other things, sets binding targets for the reduction of greenhouse gas emissions by industrialized countries.

Mitigation

Mitigation in the context of climate change is the human intervention to reduce the sources or enhance the sinks of greenhouse gases.

CHAPTER 1

BACKGROUND AND PROBLEM

1.1 Introduction

In its editorial the WWF, (Wêreldnood, 2008) commented on the latest scientific findings : that the Arctic Ocean is losing sea ice up to 30 years ahead of the predictions made in 2007. These predictions were made by a leading group of nearly 4,000 scientists from more than 150 countries. Concern was further expressed by the South African Minister of Environmental Affairs and Tourism, Minister Marthinus van Schalkwyk, who stated that the latest information on climate science and the business of economics makes it clear that “business-as-usual” in the face of climate change is no longer sustainable.”

To exacerbate the problem further, the global population is increasing and thus, so is consumption.(of what) While this may be good for certain businesses, the reality is that there is a trend posing serious problems for the organisation’s leaders all over the world. According to Tin (2008), basic resources on which the economy is reliant are being depleted at accelerating rates, while climate change is threatening every aspect of doing business It is now predicted that the summer sea ice could completely disappear between 2013 and 2040 – something that has not occurred in more than a million years (Tin, 2008).

Arguably global warming must now be taken seriously by all socially responsible individuals and corporations. This concern has been expressed on various levels and one reaction to these changes is that consumers and investors have become more critical of business than ever before and, in many cases, their views are being translated by governments into regulations (Cogan, 2006).

There are indications that Information, Communication and Technology (ICT) have an important impact on environmental sustainability, but well-researched evidence is unfortunately scarce (Arnfolk, 2004). According to Arnfolk *et.al* (2004), there are many single case studies on the impact of ICT on isolated

aspects of sustainability - such as electricity consumption. However, there is little coherent integrative research on the impact. Arnfalk *et al.* (2004), has conducted a comprehensive literature review of the relationship between ICT and environmental sustainability. They concluded that the impact of ICT on the environmental indicators is relevant, and should be taken into account by environmental policies.

Africa is a continent of developing nations that historically do not have any formal obligation to reduce Greenhouse Gas Emissions., The telecommunications industry, and, likewise, many other businesses, remains very much reliant on diesel generators to supply most of its energy needs. As available grid power is a major problem in most African Countries

Given this historical lack of formal obligations, the question arises as to Africa's mobile operator's perception of the impact of Greenhouse Gas Emissions and, therefore, also their commitment to Corporate Environmental Responsibility. More pertinently for this research: is there anything mobile operators in Africa and the Middle East can do to significantly reduce its Carbon Footprint? This research will review some of these issues.

1.2 Orientation

Since the late eighties, there has been an increasingly global realization around the impact of climate change on life on earth (Winkler, 2005). Business in general is experiencing the effects of climate change in one way or the other, and it is no longer a topic reserved for the scientific community. The Stern Review, commissioned by the Chancellor of the Exchequer in the United Kingdom and undertaken by Sir Nicholas Stern, an ex-World Bank Chief Economist warns that "*climate change threatens the basic elements of life for people around the world – access to water, food production, health, and the use of land and the environment*". (Stern, 2006)

Given these warnings, it is not surprising that during the last several years, climate change has emerged as a top concern for companies, investors and governments. The validity of the science supporting climate change is no longer debated. The atmosphere is warming and human activity is a primary

cause. The year 2005 was the warmest year on record as shown below in Figure 1.

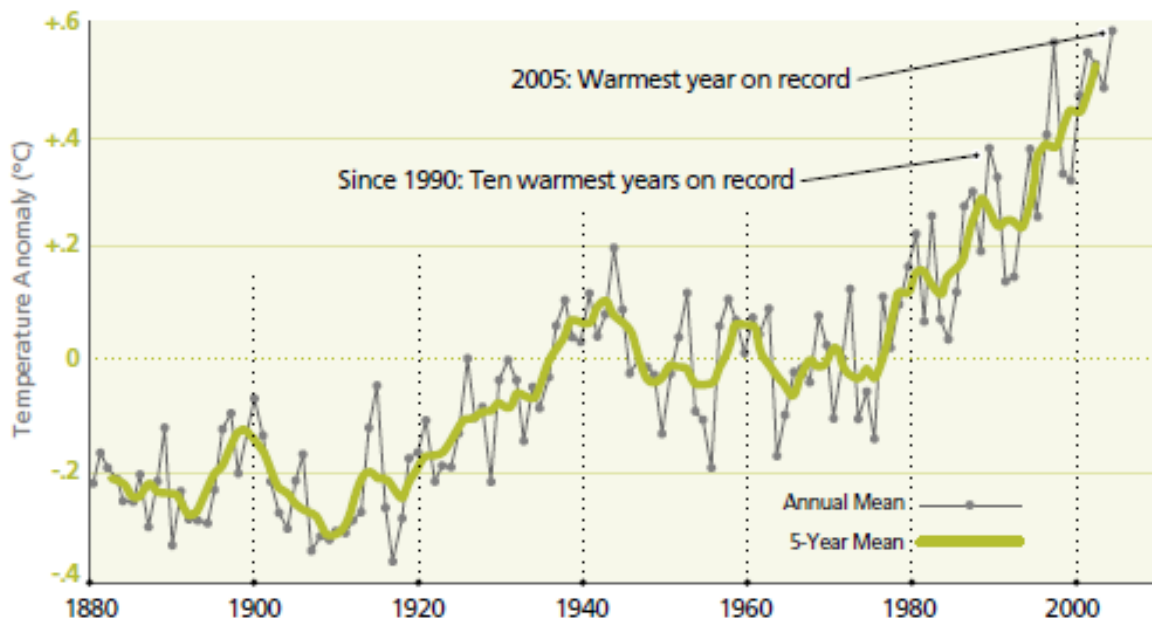


Figure 1 Global Temperature: Land-Ocean Index (Cogan, 2006)

It is particularly alarming to note that following a moderately little or no increase in temperature from 1940 to around 1980, there has been an almost exponential increase from 1980 to date. If this trend continues the global average temperatures could increase such that by the end of the century the summer polar ice cap could disappear entirely. This could raise sea levels and flood low-lying regions (IPCC, 2007) “Business as usual” for everyone on our planet is thus no longer an option.

The impact on the carbon footprint is, however, not limited to temperature escalation alone. The earth’s soil, water, forests and minerals are limited yet are under attack from the increasing demand for increasing and higher production (Cogan, 2006). The key thought is that there is no longer any option but to ensure that farms, industries, homes and lifestyles become more sustainable. However, in order to be sustainable, technological advancement must rather improve economic efficiency, protect and restore ecological systems and enhance the lives of all people as opposed to draining the limited resources even further.

The situation on the African continent does not, appear to reflect these concerns. Climate change, although obviously serious global problem and given that many of the large industrialised countries of the world have signed the Kyoto Protocol, thus demonstrating a commitment to reducing carbon emissions, there remain no or very little incentives for the African and the Middle East (ME) mobile operators to take climate change seriously. This is a particular indictment against these countries, given that global temperatures are forecast to increase dramatically in the next 100 years and that CO₂ emissions, directly related to temperature increases, are more rapid in the developing countries. International corporate momentum has, however, been building up for years to mitigate GHG emissions through setting CO₂ reduction targets. It can be expected that such increasing public and political awareness of climate change and the dramatic effect of climate change itself will rapidly also affect the mobile operators in Africa and the Middle East. There is therefore a need to respond now, and hopefully this research will add value to the understanding of some of these issues.

Historically however, the view is not very optimistic. For many years, especially in the first few years of networks' start-up, mobile operators in Africa and the Middle East took the view to "*just build the network with generators producing tons of carbon dioxide, is OK*", as they perceive having had "*no other choice*". The matter was exacerbated by the fact that mobile operators in the beginning of network roll-out were cash strapped and relied on the expertise and site building practices of its vendors and contractors. There was only one goal and that was to build as many base station sites as possible, in the shortest time with the least amount of money. But the landscape for mobile operations in Africa and the Middle East has moved on and is still changing rapidly. Now, with high energy prices and the factors of climate change, some leading mobile operators are creating a new mindset of "*OPEX (operational Expenditure) is high, climate change is a problem, what we can do?*" Although still commercially driven, the mobile operators in Africa and the Middle East are "again" seriously considering renewable power as an option for powering radio base stations. However, the backlog is enormous and. Research is thus essential to identify viable options.

A superficial view is that the barriers to change are challenging. Available grid power is often unreliable or it is in some instances prohibitively expensive to gain access. Future mobile subscriber growth in Africa will thus be heavily dependant on off-grid power sources. Currently deployed diesel generators are the predominant off-grid power source. Diesel generators are however very costly to run, require regular fuel distribution and maintenance, and have a negative environmental impact. However, given that "business as usual" is not an option, alternatives have to be found. The mobile operator in Africa and the Middle East is perhaps at a Strategic Inflection Point (refer to

Figure 2 point A) concerning its site building practices and use of energy. Grove (1999) ex-CEO of Intel coined the phrase "*Strategic Inflection Point*" and refers to this point when the life of the business fundamentals is changing. This point is usually reached when there are major technology changes, but the demand is for more than just a technology change (paradigm shift). The way in which business is conducting its operations has to change radically as well, and sometimes its hard to really pinpoint exactly what has changed, business just know that something has. This will be discussed further in section 3.2 of Clayton's (1997) Disruptive Technology Model.

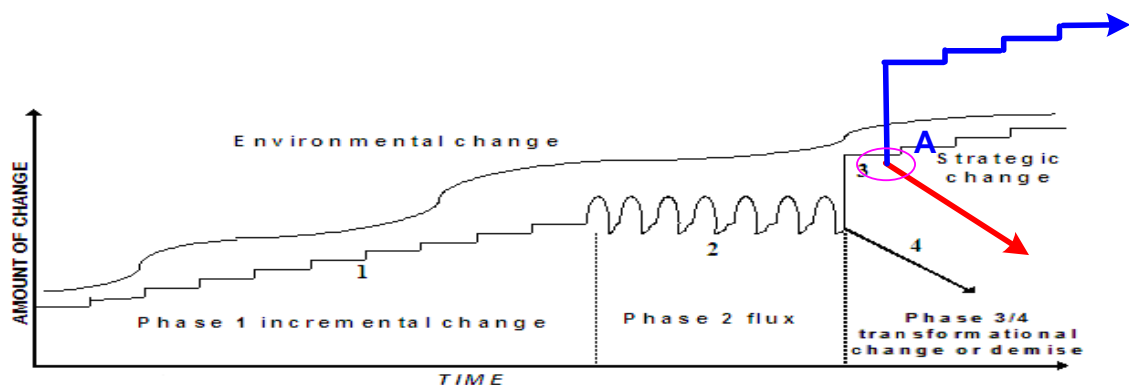


Figure 2 Strategic change (Johnson, 1987)

Given this push for change on the environmental and human endeavour front, it is not surprising that CSR policy and an integrated systems design view towards energy efficiency is currently the major agenda item of the mobile

operator in Africa and the Middle East. These aspirations are supported by a movement in business management circles to the realisation that although the creation of shareholder wealth was once considered the ultimate “bottom line” yardstick for the organisation, it is now overshadowed by a broader concept of organisational success. Heslin and Ochoa (2008) state that business leaders are increasingly concerned about how the organisation can prosper from addressing social environmental challenges. In 2006 about one in every US \$ 10.00 of assets in the US were invested in companies that rate high in CSR.

According to van Dijken (2007), there are two classic situations whereby the market system does not lead to the interest of society in a whole. This is when there is not enough competition and when externalities exist. Pollution is a good example – if it is not “priced,” this “good” will tend to be in oversupply. Global warming is a potentially very significant externality that governments have failed to address up to now. (The Guardian, 2006)

This research follows the tenet that the environmental responsibility that the organisation and society in general has towards protecting the environment is a social responsibility and a sustainability issue. Acknowledgement of the climate change problem, the strategic planning and action of it and the reporting on it are all CSR considerations faced by management. The CSR issues currently on the desk of the Telecommunications CEO may well change in the next few years as pressure groups, employees, customers and other stakeholders change from being onlookers to participants in the debate on climate action. Furthermore, these stakeholders may take action and the organisation should, therefore, be far advanced with its own plans and reputation building. Brammer and Pavelin (2004) assert that there is a strong positive link between the organisation’s corporate reputation and its social performance. The organisation’s current reputation is determined mostly by the signals that the public receive according to its behaviours.

Falck and Hebllich (2007), state that effective CSR is a long-term proposition and an investment in the company’s long-term future. This investment builds the company’s reputation and increase the value of the brand. Werther and Chandler (2005) conclude that strategic CSR is a *global brand insurance*.

This research will investigate some of the current issues surrounding Africa's global operators in their move towards their climate change social commitment.

1.3 Problem Statement

The purpose of this study is to research and understand two related problems i.e. "two sides of a coin."

On the one side of the coin, there is a climate change problem, which affects all business, including the mobile operator: It is an emitter of substantial amounts of CO₂ and this adds to the serious environmental climate change problem humankind faces. The question can be asked: Does the mobile operator understand its corporate environmental responsibility by knowing its carbon emissions with verifiable and available data? Furthermore, once this information is available, will there be a commitment to effective action, given that corporate social responsibility practices are mainly motivated by business reasons and companies often fail to address their impact on the environment through the ways they do business, including their consumption patterns. (Málovics, Csigéné and Kraus, 2008) The question of responsibility can be illustrated by the NIMBY (acronym for *Not in My Back Yard*) phenomenon, which is the human denial of responsibility for the misuse of the environment. It is an attitude saying "I'll create an environmental problem, but I want to have as little as possible to do solving it" (Carroll and Buchholtz: 2000:361). This research will hopefully reveal that there is a real need for business to integrate their corporate environmental responsibility with their overall business strategy in order to make its operations more sustainable.

The second problem (and the other side of the coin) is how to address the climate change problem with mitigation measures. The mobile operator faces serious power supply challenges in the African and Middle Eastern markets and the question can be posed: What options does the mobile operator have to address this problem effectively? For various reasons, most mobile operators seem to be slow to adopt technical solutions at its disposal to execute a carbon footprint reduction. Business does not seem to be able to

find solutions for sustainable development themselves. (Málovics, Csigéné and Kraus, 2008)

This research will attempt to address only the first of these two problems. It is worthwhile to mention that Africa and the Middle East have their own set of peculiar problems relating to power availability with reference to developed markets like the United States of America and Europe. Much of the published research is for developed markets. Throughout this research report we will endeavour to highlight any specific references to the developing markets of Africa and the Middle East.

Given this preamble the Research Problem Statement is given as:

A positive commitment to Corporate Social Responsibility of African and Middle Eastern mobile operators can have a corresponding positive effect on its Carbon Footprint.

1.4 Research Objectives

The objectives of this research are:

1. To identify strategic risks and opportunities and their implications for the mobile operator in Africa and the Middle East.
2. To determine actual absolute Greenhouse Gas emissions
3. To review if the mobile operator in Africa and the Middle East report on its GHG Emissions have appropriate data available? (If yes, then the Carbon Footprint calculations and the performance against targets and plans to reduce GHG emissions can be done.)
4. To determine mobile operator responsibility and management approach to climate change

The information gathered as part of this research aims to provide the mobile operator with a reference source of comparison of what performances regarding GHG Emission reduction of other similar firms are, as well as a source of reference for the mobile operator for further strategy development and taking action on addressing climate change in “their own applicable operational space”. The research can be seen as a form of a “reference

framework” for decision-making and a platform for further academic research for Telecommunications in Africa.

1.5 Importance of the Research

The debate on climate change is permeating every level of society. The global climate is changing and the discussion around the environment and the new impact are noticeable trends. Consumers, governments and organisations alike are taking the agenda forward.

According to Sir Richard Stern *“climate change is global in its causes and consequences and the response to it must be international. It presents a unique challenge for economics: It is the greatest and widest-ranging market failure ever seen.”* (Stern, 2006)

From a global humankind perspective, the survival of millions of people is important. Climate change has to be addressed and, as it is a global phenomenon, every person, every company and every country should take progressive action. The global climate change trends and impacts mentioned in this study present enormous risks and yet also opportunities for companies. The regulatory environment is shifting, and, especially in the United States of America and in Europe there are increasingly demands from NGO’s and governments for environmental legislation and for organisations to implement energy reduction measures, set targets and then report on these from a corporate governance perspective.

As commercial entities as well as being “corporate citizens”, companies have to not only acknowledge climate change but also act with mitigation measures. These are the new demands from society and governments all over the world. For organisations, climate change is a financial problem that presents significant economic and competitive risks and opportunities. An understanding and then an acknowledgment of the problem are necessary before companies can take action. A “burning platform” is perhaps required before internal change can take place. Large companies in general are slow-moving “organisms”, and change does not normally come quickly or easy. Africa presents a dichotomy in this regard as Africa is one of the continents

with the fastest growth of mobile subscribers and thus there should be pressure to respond to this climate of change. Operating however in a developing continent, mobile operators in Africa and the Middle East perhaps have far more pressing issues on their agenda than to be concerned about climate change. It is, however, important that the mobile operator in Africa and the Middle East take leadership and interact with these stakeholders to protect the environment.

There is in particular one major mobile operator in Africa and the Middle East that in 2007 took the first move to implement “quick” power reduction measures. Other operators are now following, but the true scope of understanding and implementing “green power” technologies are still lacking to a great extent. Many of the mobile operators in Africa and the Middle East however, got a “rude awakening” when the oil price went through the \$100 per barrel barrier in 2008. Several new initiatives and noticeably the GSMA, are creating forums and initiatives to share knowledge, investigate technologies and ultimately implement energy saving measures for the mobile network.

Incite CDP (2008e) reported that low emitter companies such as Pick & Pay and MTN are still refining their *systems and methodologies* for calculating their GHG emissions, as these low emitter companies do not report on their global emissions. There is a great hope by the CDP that these companies’ paper would be more representative of their global performance and allow for valid comparisons. This research paper addresses this for the mobile operator in Africa and the Middle East.

As the researcher believes the mobile operator in Africa and the Middle East is at an important inflection point about its energy policies, it is hoped that this research will help to generate more discussion in the telecommunications industry in Africa regarding climate change and the technology options that are available to reduce energy usage. The researcher trust that this research will provide a good contribution to the body of knowledge for best practices in energy efficient network roll-out, measures that will help to reduce the mobile operator’s carbon footprint significantly.

An objective of this research is to measure perceptions in the “minds of the mobile operator” and will therefore help to gauge further academic research and assist industry decision-makers with choices in planned action.

1.6 Research Methodology

The research is based on the questionnaire of the Carbon Disclosure Project (CDP, 2008) initiative. The bibliography on page 91 only includes references to actual sources included in this research report.

Since climate change is a relatively new topic on the world agenda, only limited specific academic research could be found applying existing CSR and CER theories to the telecommunications industry and climate change.

A general overview of the research is illustrated in Figure 3. As discussed in Section 1.3, this research will attempt to address only one of two related problems – the Carbon Emissions problem. These are shown on the left and right hand of the picture. (Figure 3) The four main objectives this research paper will address are graphically shown: Risks and Opportunities, Accounting, Performance and lastly Governance. More information on the research methodology is provided in Chapter 4.

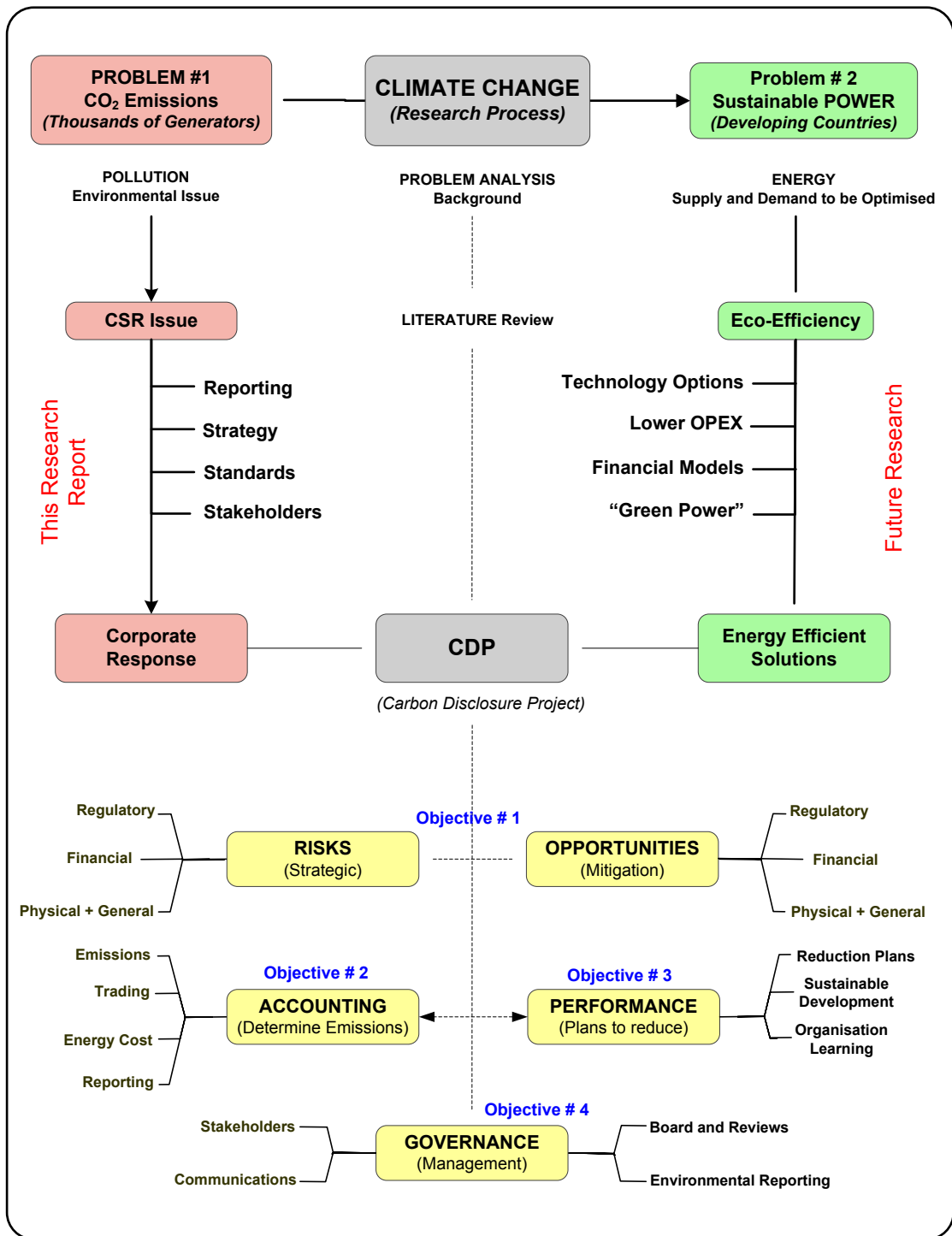


Figure 3 Graphical Overview of Research Process

1.7 Delimitations

The scope of the study will be limited to mobile operators in Africa and the Middle East. The mobile operator in South Africa is not included in this study.

One of the reasons for this delimitation is that in most of the Africa countries diesel generators are the norm and not the exception.

Secondly the rest of Africa seemingly lacks the CDP initiative and since these perceived gaps exist, this study wishes to focus more on these developing countries.

More information on the study delimitations is provided in Section 4.

1.8 Assumptions

The first key assumption is that the mobile operator in general does not take climate change seriously, because few operators have a CO₂ reduction strategy in place and thus the calculation for publishing its carbon footprint data is not available.

The second key assumption is that there are technologies for exploitation available to the mobile operator to utilize immediately, to show its commitment for CO₂ reduction.

1.9 Summary

This chapter has merely opened up the potential concerns and provided a overview of the developments in carbon emissions and the impact on the Carbon Footprint and the potential role of mobile operators. Furthermore it has drawn attention to the emerging role of these operators in Africa, the topic of the next chapter.

CHAPTER 2

CLIMATE CHANGE IN CONTEXT

2.1 Introduction

The previous chapter has unlocked a number of broad issues with respect to climate change, carbon footprint and the challenges facing Africa's mobile operators. This chapter will discuss these issues, i.e. climate change and the mobile telecoms sector in Africa, in more depth.

2.2 Climate Change

Greenhouse gases like Carbon Dioxide (CO₂) has always been present in the earth's atmosphere and it plays the vital role of trapping the sun's heat to make life on earth possible. Figure 4 (IPCC, 2007) shows that these levels of CO₂ have been increasing steadily from the time of the industrial revolution to date. Carbon dioxide in the atmosphere has risen from 280 parts per million since the start of the Industrial Revolution in 1750 to nearly 380 ppm today— its highest level in at least 420,000 years.

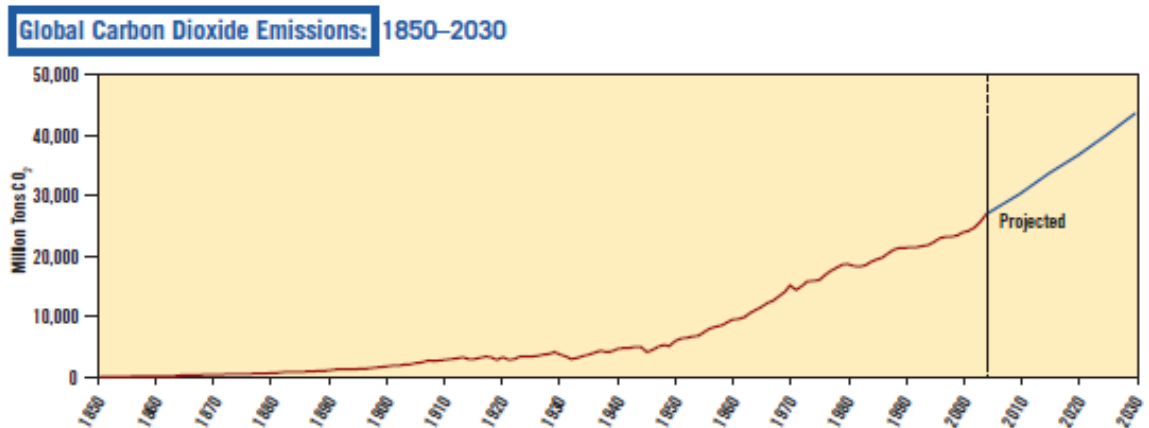


Figure 4 Global CO₂ Emissions over the Last Century (IPCC, 2007)

Global GHG emissions due to human activities have increased by 70% from 1970 to 2004, while deforestation is reducing the planet's ability to absorb these excess emissions (IPCC, 2001). More and more heat is being trapped in the earth's atmosphere, exacerbating the natural greenhouse effect. If fossil fuels continue as the dominant energy source, and their carbon emissions are

not contained, atmospheric CO₂ is expected to surpass 550 ppm by the middle of the century and may possibly reach 1,000 ppm by the end of the century—almost four times pre-industrial levels. (Refer to Figure 4)

The increased level of greenhouse gases (listed in Table 1) in the atmosphere has resulted in a rise in the global temperature, confirmed by scientific consensus to be caused by human activity (Oreskes, 2004). Global average temperatures have risen on both land and in the oceans with widespread melting of snow and ice (IPCC, 2007). There are other observed impacts under continuous scrutiny by the media: polar ice is melting; glaciers around the globe are in retreat; storms are increasing in intensity (i.e. hurricane Katrina); ecosystems around the world are reacting, as plant and animal species struggle to adapt to a shifting climate, and new climate-related threats emerge (IPCC, 2007).

Table 1 Greenhouse gases as defined by the Kyoto Protocol (See, 2001)

CO ₂	Carbon dioxide
CH ₄	Methane
N ₂ O	Nitrous oxide
HFCs	Hydrofluorocarbons
PFCs	Perfluorocarbons
SF ₆	Sulphur Hexafluoride

According to the IPCC (no date) the average temperature of the earth's surface has risen by 0.74 degrees C since the late 1800s, and it is expected to increase by another 1.8° C to 4° C by the year 2100. Careful observation over the last three decades shows that that this rise in temperature has discernibly affected many natural (physical and biological) systems (IPCC, 2007). Although the earth's climate is complex and any new climate change observations and modelling take time, it is generally agreed that serious *trends* in sea level rise, widespread flooding, temperature increases, wider temperature fluctuations, a greater number of extreme weather events such as hurricanes and droughts, and changes in precipitation patterns can be

expected. In its Summary for Policy Makers, the IPCC (2007) lists examples of some specific projected impacts for Africa because of climate change:

- By 2020, between 75 and 250 million people are projected to be exposed to increased water stress due to climate change.
- By 2020, in some countries, yields from rain-fed agriculture could be reduced by up to 50%. Agricultural production, including access to food, in many African countries is projected to be severely compromised and will adversely affect food security and exacerbate malnutrition.
- Towards the end of the 21st century, projected sea level rise will affect low-lying coastal areas with large populations.
- The cost of adaptation could amount to at least 5-10% of Gross Domestic Product (GDP)
- By 2080, an increase of 5-8% of arid and semi-arid land in Africa is projected under a range of climate scenarios.

The UNFCCC acknowledges (UNFCCC, 2008) that some scientists have doubted the scientific basis of the Kyoto Protocol, claiming that there is not a clear connection between increases in GHG emissions and climate change. The Fourth Assessment Report (IPCC, 2007) of the Intergovernmental Panel on climate change (IPCC) has brought forth such compelling evidence that discussions regarding climate change since then has been around positively accepting the climate change connection. Prepared by scientists from all over the world, the Fourth Assessment Report placed the reality of human-induced climate change beyond any doubt - 95 % confidence levels. What makes this report significant is that governments endorsed the IPCC's Fourth Assessment Report by consensus, making it a solid foundation for sound political decision-making.

To reduce the earth's vulnerability to the effects of climate change, one has to consider adaptation measures as well as explore the possibilities of how to avoid further Greenhouse Gas build-up. Both of these are massive challenges in it selves and will come at a high cost and effort. A wide array of adaptation options are available, but more extensive adaptation than is currently occurring is required to reduce vulnerability to climate change (IPCC, 2007). On the

mitigation side, new technologies and practices can be employed in the areas of energy supply, transport, buildings, Telecoms industry and agriculture to prevent a further build-up of GHG.

One way of understanding our natural living and social limits on earth is imagining humanity being poured into a funnel, where the one side represent the declining ability of nature to provide products and services, and the other side represents demand, i.e. the increase in the world's population and resource consumption. According to Chambers, etc. (2008:05) the funnel helps us “conceptualise limits and the strategies we might need to overcome them” (See Figure 5). As humanity enters the funnel it finds itself in stressful conditions as there is intense competition for the remaining resources. As the walls of the funnel close in, the challenge is not to place more demands on the environment than can be sustained. This is done by reducing our impact on the environment, i.e. to live within environmental limits. As the work progresses in restoring capacity of the environment, the walls are able to open up again.

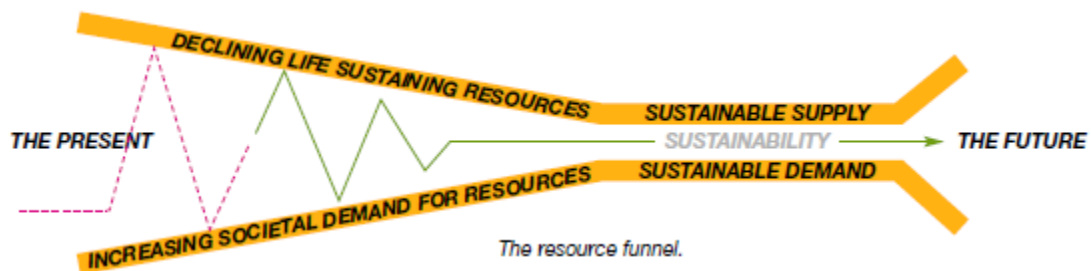


Figure 5 Resource Funnel (Chambers, 2008)

As is graphically illustrated in Figure 6, the past few years have seen a surge in corporate “eco-promising” – the practice of making claims and or reports about the environmental attributes of products (i.e. the mobile operator providing calculations on the Carbon Footprint of a Mobile Phone, or the “take-back” programmes of used phones and batteries). All industries have practically the same goal: to attract customers with an eco-label and to build the reputation and the brand of the company at the same time, as innovation in environmentally friendly business practice can improve a company’s public reputation (Porter and Mark, 2006).

Life-cycle analysis measuring environmental impacts or driving innovation in order to make supply chains more sustainable is another form of “eco-promising” to create a link between “green credentials” and a positive, attractive lifestyle. However, the essence lies further than this as companies need to impart this new driving force of increasing demands and assurances of evidence for environmental eco-efficient practices to all stakeholders (Chambers, 2008).

According to Arnfalk *et al.* (2004), government and industry policies have an important role to play in realising the positive environmental outcome of Information, communication and Technology ICT applications, and this affects the mobile operator greatly. This research addresses the problem from an Africa and Telecommunications industry perspective while the researcher perceives that very little formal research in this industry domain has been performed.

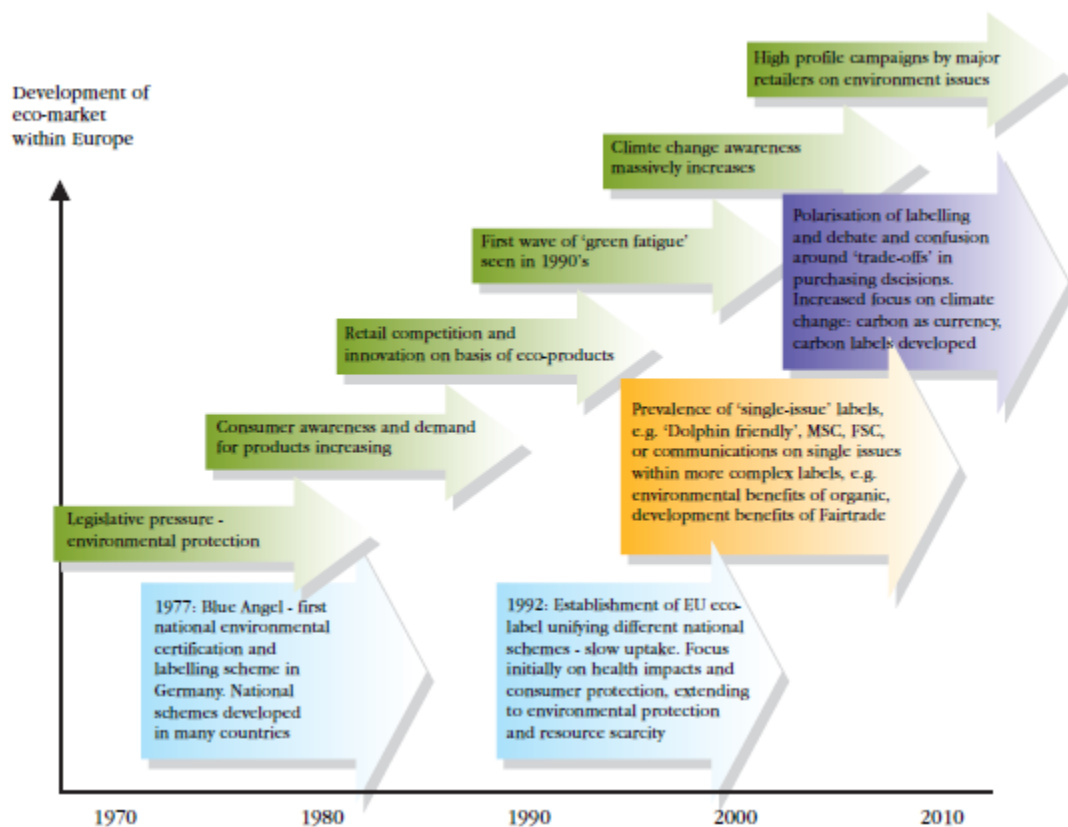


Figure 6 Development of eco-markets (Eco-promising, 2008)

The digital revolution is transforming the way we communicate, and, although the Information, Communication and Technology ICT industry has its own complexities to deal with in becoming sustainable, it has several opportunities to provide for customers and consumers in general to reduce their own impact on the environment. There are four areas in particular of the “making it, using it and applying it” approach according to Forum for the Future (2008), and these are shown in Figure 7. The contribution the ICT makes to the world, for example to “telework” through travel substitution, can reduce the burden on transport infrastructures and help to reduce CO₂ significantly.

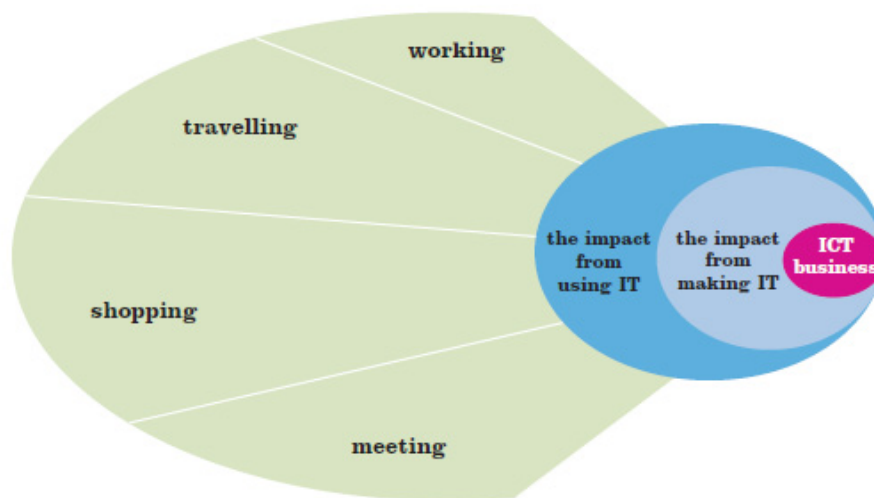


Figure 7 Sustainability Opportunities for ICT (Forum for the Future, 2008)

Consumers, commerce and governments are seeking new ways to create a sustainable future, minimizing the negative environmental impacts while still producing opportunities for growth. According to ETNO (2006b) mobile technology services could provide environmental savings, for example by using mobiles to remotely manage energy-using appliances or by reducing travel needs through electronic commerce and video-conferencing. (For example, if 20% of business travel in Germany alone was replaced by ‘non travel solutions’ such as video-conferencing, 5.2 million tons of CO₂ emissions would be saved, 37.1% of total emissions from Germany). Nokia (2008) believes that advanced communication technology can play a significant role to help society to function more efficiently. Thus by using mobile phones, an individual’s personal environmental impact may be reduced. According to ETNO (2006b) further research is necessary to understand the potentially

positive impacts associated with the behaviour of mobile users. Mobiles are “aspirational” devices and have powerful brands. As we discussed in section 1.2, CSR is potentially the mobile operator’s “global brand insurance”, and using a mobile phone is an excellent opportunity to educate consumers about the environment.

Increasingly, climate change is seen as an opportunity rather than a liability. A recent report from CERES provides this optimistic view:

“Companies at the vanguard no longer question how much it will cost to reduce greenhouse gas emissions, but how much money they can make doing it. Financial markets are starting to reward companies that are moving ahead on climate change, while those lagging behind are being assigned more risk.....Shareholders and financial analysts will increasingly assign value to companies that prepare for and capitalize on business opportunities posed by climate change” (Cogan, 2006:1).

Large corporations like BP with its “*Beyond Petroleum*” and GE with its “*Eco Imagination*” indicate that some business is taking climate change seriously.

2.3 The Mobile Telecoms Sector in Africa

The mobile telecommunications industry in Africa and the Middle East includes network operators (such as MTN, Orascom, Etisalat, Vodafone, Orange, Moov, Millicom, Vodacom and Zain), phone manufacturers (such as Sony-Ericsson, Motorola, Nokia, Huawei and Siemens) and network manufacturers and vendors (such as Alcatel-Lucent, Nokia-Siemens-Networks, Ericsson, Motorola and Huawei). The GSM network roll-out is supported by a large contingent of site builder companies on the one hand and a range of service companies which provides content, software, billing services, marketing and management services across the industry. The value of listed companies in the telecoms sector is around 5% of the global stock market. (Berry and Goodman, 2006)

The mobile telecommunications industry is growing in size, reach and impact. The number of phone subscribers in the world has grown at nearly 20% a year

over the past five years to around two billion (Berry, 2006). Over 600 million new phones were sold in 2005 with the number of network base stations also growing rapidly. There are thousands of network base stations in Africa. The evolution to 3G networks will require significantly more equipment with a subsequent increase in energy use.

2.3.1 Mobile Telecoms and the Environment

All mobile operators have an environmental footprint and thus also a responsibility towards it. This is all acknowledged by the industry associations like the International Telecommunications Union (ITU), Global System for Mobile Communications Association (GSMA) and the European Telecommunications Operators Association (ETNO) from a browse on their internet websites. The Africa Telecommunications Union, (ATU) is noticeably absent in any reference or initiatives regarding concerns about climate change. There are several collaborations and initiatives to support the industry members in their goals of energy efficiency and sustainability. For example, ETNO and WWF (World Wildlife Foundation Fund) embarked on a joint initiative they termed "*Saving the climate @ the speed of light*". According to ETNO (2008) this project assumes: (1) the need to act now; (2) a strategy to ensure that ICT can combat to reduce CO₂; (3) the need for a clear focus and (4) to activate existing applications which are delivering good results.

Figure 8 depicts the industry from the perspective of its environmental impacts, and illustrates three key elements – networks, phones and offices (Berry, 2006). It also illustrates four key life-stages: material extraction, manufacture, operation / use and end-of-life management.

It might be argued that the mobile industry's energy use is relatively small compared with other industries. Figure 9 shows that Vodafone is directly responsible for much less energy use (and CO₂ emissions) on a per employee basis than mining-manufacturing, but slightly more than the average company in the service sector (Berry, 2006).

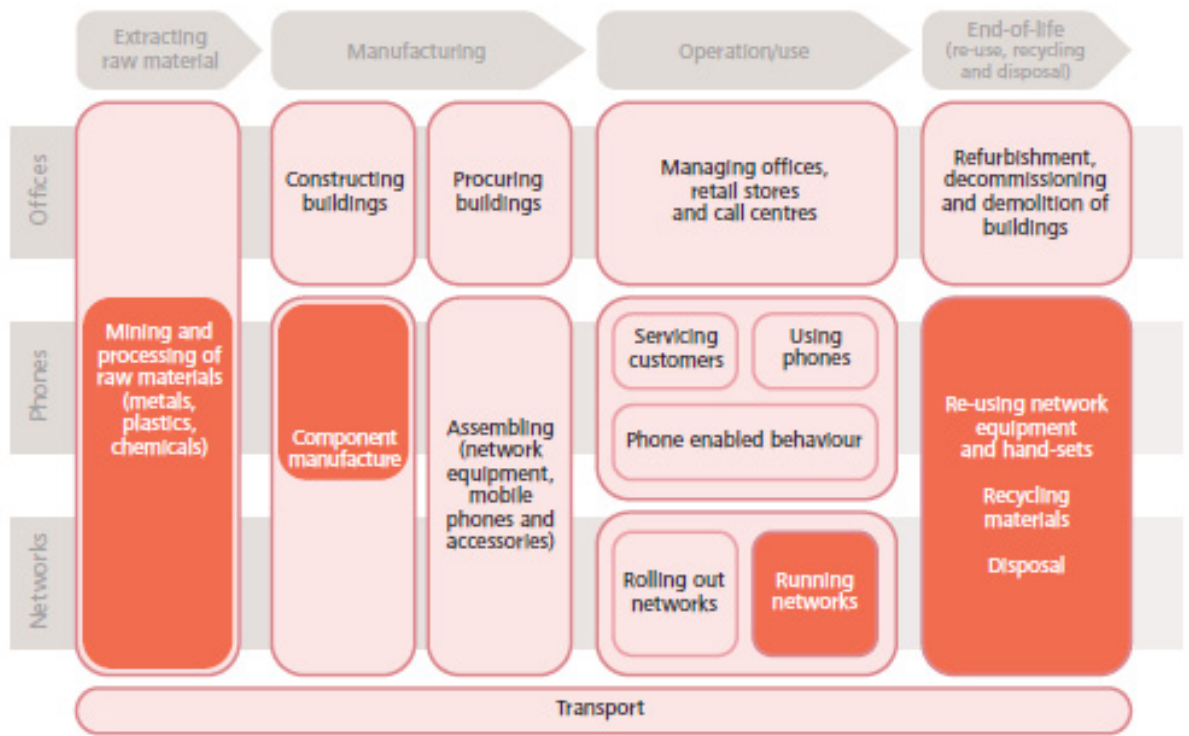


Figure 8 Mobile Telecom Industry and environmental impact areas (Berry, 2006)

Studies by Ericsson (2007) indicate that each mobile subscriber is responsible for around 25 kg of CO₂ emissions per year. Arguably these figures are significantly higher for the African mobile operator, as the Vodafone UK figures do not include the wastage of thousands of generators.

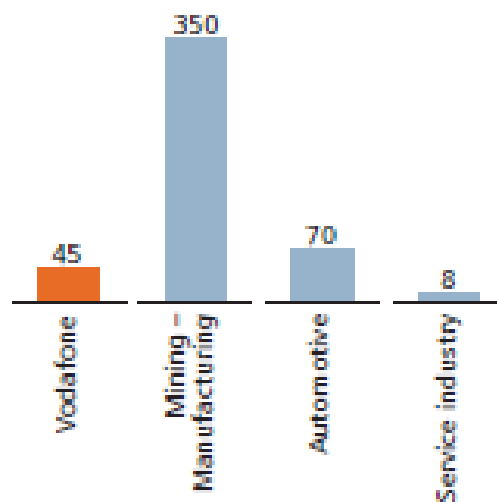


Figure 9 Different industries' energy use (Mwh= CO₂) per employee (Berry, 2006)

Combined emissions for the entire global mobile sector, including the two billion global subscribers, are equivalent to about 0.1% of the total global sum of CO₂ emissions, or 26 million cars in the UK (Berry, 2006).

Although some might perceive telecommunications as an environmentally friendly technology, ETNO (2006a) however signifies that telecommunications do use large quantities of energy and thus exert a significant impact on Climate Change.

2.3.2 Mobile Telecom Networks

Based on their energy use, operating a mobile network accounts for over three-quarters of a network's Climate Change impact and currently more than half of this energy is used to regulate the temperature in base stations to cool equipment - and in particularly the stand-by batteries (Berry, 2006).

Although networks have become more efficient over time, Ericsson (via Berry, 2006) estimates that the energy use per average subscriber to a typical network base station has decreased by 70% over the last decade. However, the increase in numbers of base stations has outweighed this improvement of efficiency. Network energy usage is still cited as one of the most critical aspects, far outweighing the energy used by the billions of customers' phones.

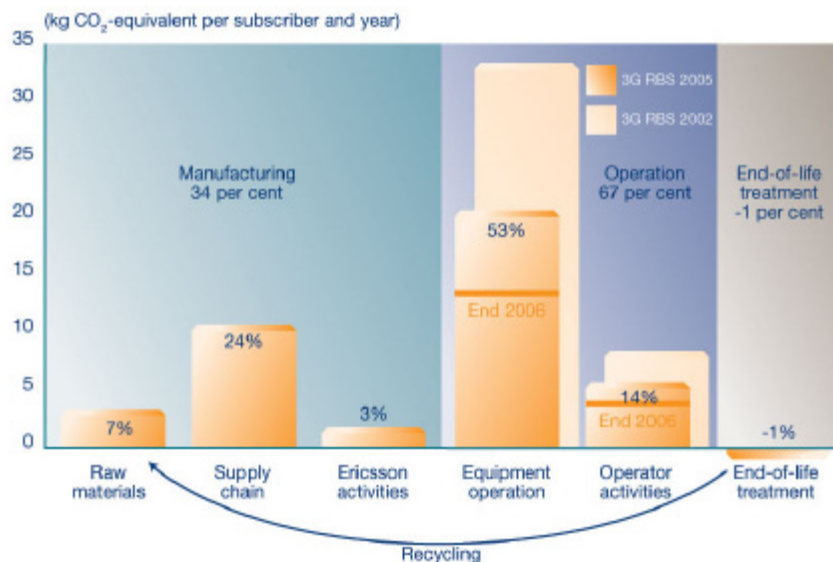


Figure 10 Life cycle assessments of mobile networks. (Ericsson, 2007)

According to Ericsson (2007), life cycle assessment (LCA) can be used to analyze the total environmental impacts associated with the network. It

provides an overview of the relative significance of each phase of a life cycle. Their LCA tool covers four main life cycle phases: supply chain; vendor; use phase and end-of-life. Ericsson (2007) gathered field data from over one-third of all GSM networks worldwide, and their studies have found that the largest individual contribution to environmental impact comes from equipment operation (as shown in Figure 10).

2.3.3 Energy Consumption and CO₂ Emissions

Electric power is mandatory to operate and manage the communication network. Most of the energy used in Africa comes from combustion of fossil fuels. This causes high emissions of CO₂ and other pollutants. Energy consumption is the single largest environmental impact of all mobile operators (ETNO, 2006c) and this is set to continue to grow significantly with the advent of the third generation mobile, and beyond. Figure 11 shows that from an environmental perspective, the move to 3G could quadruple the impact of network base stations over their lifetime.

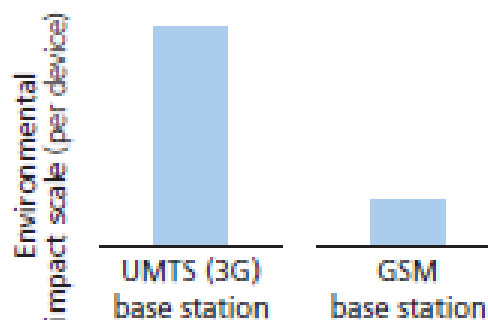


Figure 11 Comparative impacts of base stations: GSM vs. 3G (Berry, 2006)

ETNO (2006b) believes that a recommended energy policy will contribute to reducing this impact, and suggest the following guiding best practise principles to create greener energy consumption to reduce the effects of global warming:

1. Monitor and measure all types of energy consumption effectively: (a) identify areas for improvement and (b) set quantitative improvement targets
2. Identify, monitor and measure all major GHG emissions from direct and indirect activities related to running a telecommunications business

-
3. Improve energy efficiency in networks and buildings: Design energy efficiency into all new equipment and services
 4. Where possible use energy from renewable sources and give preference to energy suppliers with less GHG emissions per energy unit
 5. Incorporate energy efficiency criteria in supplier selection, purchasing, and subcontracting processes. Work in partnership with suppliers to minimise equipment energy consumption
 6. Educate employees, customers and partners about energy issues: (a) Explain what they can do to help; and (b) Share knowledge and good practice with other mobile operators
 7. Create an energy performance sustainability report
 8. Comply with all applicable legal requirements, regulations and standards

To reduce energy usage, the mobile operator has to continue investing in technological efficiency measures. Operators could share base station sites and network equipment where possible. The mobile operator could support the renewable power industry and help it to grow with renewable energy from the grid or through investing in renewable energy sources for network base stations. For example, in 2005/6 10% of Vodafone's energy needs came from renewable sources (Berry, 2006).

2.4 Summary

The focus in chapter 2 has been to provide a broad picture of current status and issues in the ICT carbon footprint debate. No attempt has been made to qualify any issues although this background will be cross-referenced once the results of this research are available.

CHAPTER 3 LITERATURE REVIEW

3.1 Introduction

Chapter 1 and 2 have provided a focussed view of the issues facing Africa's mobile operators. This chapter aims to broaden that view and holistically establish the global view of such issues as Corporate Social Responsibility, Environmental Reporting, Sustainable Development and Environmental Management.

3.2 The Disruptive Innovation Model

According to Christensen (2003) innovation is the result of breakthrough innovations in technology that transform the fundamental economics of a business and, ultimately, an industry. Although the Disruptive Innovation Model has as one of its primary objectives to explain why organisations' business model sometimes fail when a disruptive technology is replacing existing models, the model is also relevant here and provides a framework for reflection around the technology changes the mobile operator is currently facing. The model suggests that organizations generally "see" the disruption coming, but do nothing until it is "too late". It is hoped that this research will provide some impetus for mobile operators to "react before it is too late".

Sustaining innovations are incremental improvements to existing products, while disruptive innovations are substantial improvements. "Innovation leaders *look at the entire value chain of activities - from the time a new product is developed, to when it is manufactured and distributed, to when it is sold and serviced, over the lifetime of the product*" (Kouda, 2004:10).

The Disruptive Innovation Model is shown in Figure 12 below. Christensen (2003) explains that a disruptive technological innovation is one in which the standard product performance trajectory (Line B) is actually shifted downward (Line C), and the technology becomes disruptive to industry incumbents when its performance improves enough to also address additional, and perhaps nearly all, segments of the marketplace.

The upward trend of Line B suggests that companies usually focus on catering for their most profitable customers and focus on investments where profits are the most attractive, as this is what CEO's are suppose to do! Christensen (2003) postulates that companies also innovate at a much faster rate (Line B) than the absorption rate of their innovations in the marketplace (Line A), causing incumbent companies to overshoot what the marketplace is willing to pay.

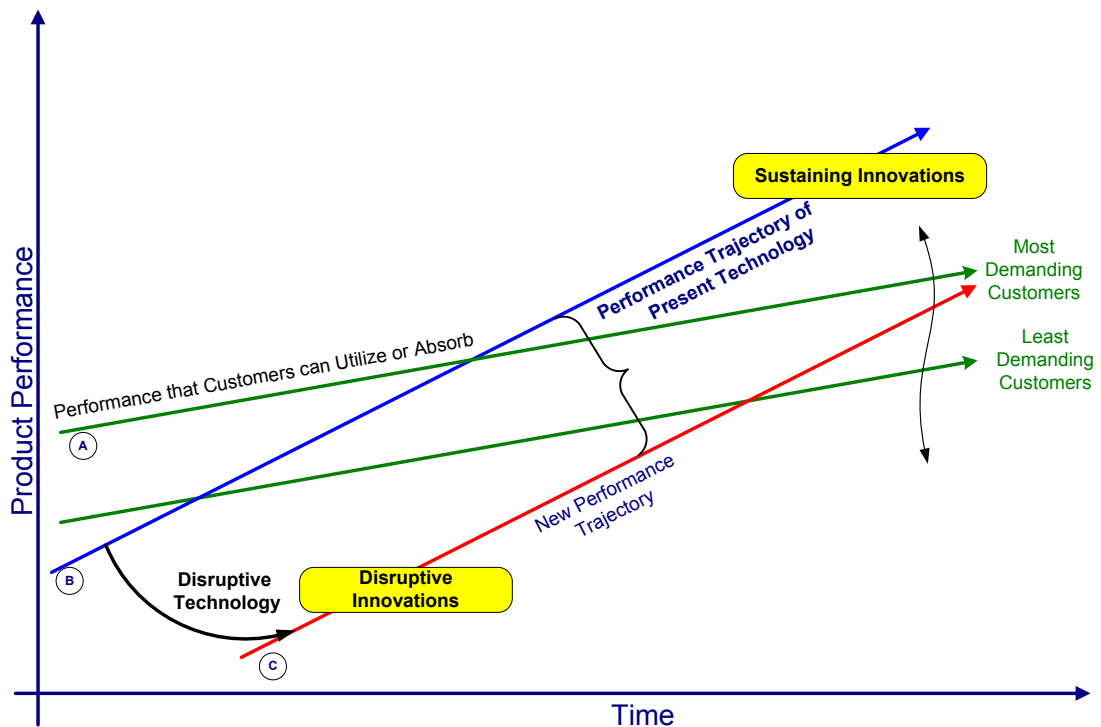


Figure 12 Disruptive Innovation Model (Christiansen, 2003)

That opens the way for innovative new entrants with a disruptive technology (Line C), with no legacy business model to protect, to address the lower end and less profitable segment of the market more effectively with lower cost products. It is then further possible that over time, improvement in the new disruptive innovation can efficiently address the entire market. This happens because the resource allocation processes of established companies are designed to maximize profits through sustaining innovations. When disruptive innovations (cheaper, simpler products) emerge, established companies are paralyzed, as they are always motivated to go upmarket rather than to defend the low-end markets. Companies have two basic options when they seek new

growth opportunities. They can tackle the existing market from an entrenched position with its sustaining innovations or they can take on competitors with disruptive innovations.

To test whether a technology is a disruptive technology, the offering must be compared with the definition by Christensen (2003). According to this definition a disruptive technology has the following elements:

1. A new, cheaper and lower quality product is introduced into the market.
2. The producer of the existing mainstream product is not interested in the niche market because revenue and margins are too small.
3. Existing customers for the mainstream product are not interested in the new product because quality is poor.
4. A new market is established as a new group of buyers buy the product since they cannot afford the existing mainstream product and they do not require the quality of the existing product.
5. The new product's sales increase and profits are invested in product development.
6. The quality of the new product and the existing product improves.
7. The new product becomes good enough to attract customers away from the existing product. The quality of the new product is comparable with the existing product, but the price is lower.
8. Eventually the new product replaces the existing product (Christensen, 1997).

Disruptive Innovation is not primarily about innovation, but rather about the ability of the organisation to successfully execute a new business model – to know exactly when and how to change from a perfectly successful business model, in the face of a seemingly less than imminent threat. It is critical to get the timing right on the industry trend line and to know where to position the company on the disruptive innovation timeline.

3.3 Corporate Social Responsibility (CSR)

Van Dijken (2007:145) defines CSR as being more than charity. *It is making sure that in the process of doing business, the environment is taken into account, employees are respected and motivated, and the highest standards of corporate governance are in place. Many of these initiatives go beyond formal legal requirements. More and more companies report not only their financial performance but also their social and environmental achievements.*

Van Dijken (2007) further suggests that there are three main points that emerge from an extraction of various definitions of CSR: (1) It addresses various stakeholders vs. only shareholders, (2) is voluntary and (3) can have a strategic dimension.

Carroll and Buchholtz (2000), developed a four-part conceptualisation of CSR, which according to them summarises the unified and simultaneous fulfilment of the organisation's social responsibility: its economic, legal, ethical and philanthropic responsibilities. This stakeholder view of CSR is shown in Figure 13.

The rapid changes on the competitive business landscape and global environmental issues like climate change should arguably force businesses to rethink the extent of their CSR activities. This responsibility cannot be left to Government as governmental capabilities for solving social problems are sometimes questionable and, in many cases, society is looking to the business sector for assistance in implementing remedies.



Figure 13 Pyramid of CSR (Carroll and Buchholtz, 2000)

Moreover, the business sectors are being targeted by active global environmentalists. Burke (1996), and Van Dijken (2007), raise the interesting fact that a decade ago an industry like banking was not featured on the environmentalists' hit list, but even that has changed. Powerful social and political forces encourage organisations to act more responsibly; consumer demand for responsibly made products, industry code of conduct; rankings of CSR performance; and pressures from socially responsible investors (Heslin and Ochoa, 2008). More than 100 countries are now members of the United Nations Global Compact (UNGC) and support the 10 UNGC principles covering several issues, including the environment (UNGC, 2008).

Heslin and Ochoa (2008) define five key drivers of business that could be positively affected by CSR initiatives, and then provides seven strategies (Table 2) with examples that illustrate the principles.

1. **Growth in market share** through positive responses from consumers (new markets can also open)

2. **Organisational learning** programmes providing opportunities for stakeholders to learn from projects they invest in
3. **Committed and engaged employees** being motivated through the organisations' socially conscious values
4. **External stakeholders** (which can powerfully effect the organisation) that often view CSR programmes as a measure of trustworthiness, forming positive opinions
5. **Financing and investor relations** being improved through coalitions like CERES¹

Table 2 Seven Strategic CSR Principles and Practises (Heslin, 2008:131)

STRATEGIC CSR PRINCIPLES	CORPORATION	EXEMPLARY STRATEGIC CSR PRACTICES
1. Cultivate needed talent	Marriott Microsoft Glaxo-Smith Kline	Provided extraordinary career opportunities Nurture required IT talent Expand access to mediations
2. Develop new markets	Philips Electronics Globe Telecom Whole Foods	Produce resource-efficient products Create first-time consumers Specialize in organic products
3. Protect labour welfare	Levi Strauss Ode guard & Rug mark Starbucks	Replace exploitation with education Certify ethical production Enhance farmers' productivity and welfare
4. Reduce your environmental footprint	DuPont Ethel M Norsk Hydro	Create more value and less "stuff" Produce abundant life from wastewater Renew raw materials

Table continued on the next page.....

¹ CERES is a coalition of over 80 investor, environmental and public interest organizations that periodically ranks 100 global corporations on their strategies for curbing greenhouse gases.

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STRATEGIC CSR PRINCIPLES	CORPORATION	EXEMPLARY STRATEGIC CSR PRACTICES
5. Profit from by-products	Fiji Xerox Shaw Industries Merrimac	Redesign products for learning and profits Adopt cradle-to-cradle manufacturing Convert grain and starch waste to fuels and food
6. Involve customers	Target Hewlett-Packard Patagonia	Enable customers to improve education Reduce the environmental cost of IT use Educate and engage customers
7. Green your supply chain	Nestle Wal-Mart S.C. Johnson	Optimize transportation Reduce packaging across the supply chain Identify, publicize and reward greener alternatives

3.3.1 Stakeholder Management

According to Carroll and Buchholtz (2000:65), a stakeholder is *“an individual or a group that has one or more of the various kinds of stakes in a business.”* This definition recognises therefore that stakeholders extend far beyond the shareholders and organisations need to management stakeholders in the broader context. The authors further elaborate that the business organisation of today is the institutional centrepiece of a complex society, conscious of an ever-improving lifestyle with more groups every day claiming their stake of “the good life”. Groups and individuals once viewed as powerless can today potentially exert great influence on the organisation.

The stakeholder concept has over the last decade evolved from the traditional shareholder capitalism to stakeholder capitalism, since Max Clarkson convened stakeholder theory conferences in the early 1990’s (Toronto Conference, 1994). This stakeholder concept can be graphically summarised as shown in Figure 14 and Figure 15.

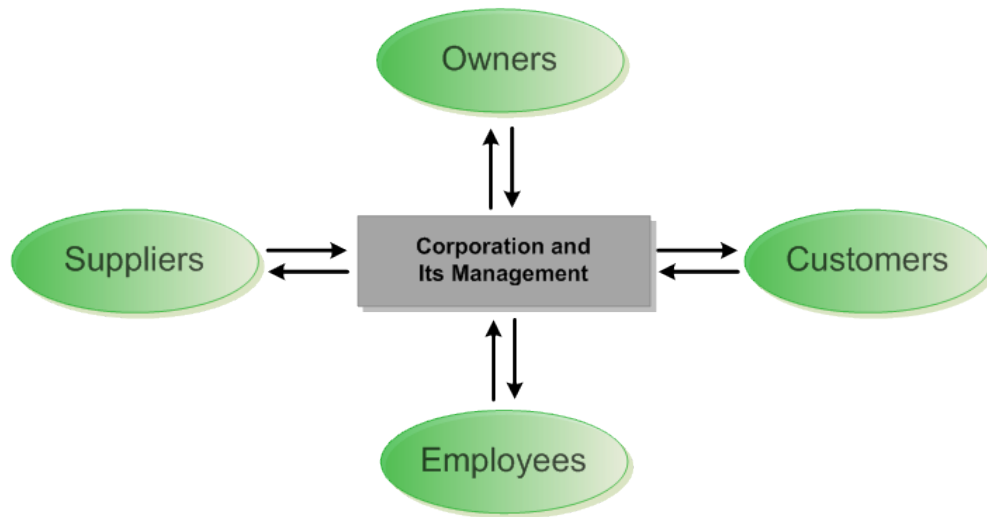


Figure 14 Managerial view of the organisation (Carroll and Buchholtz, 2000)

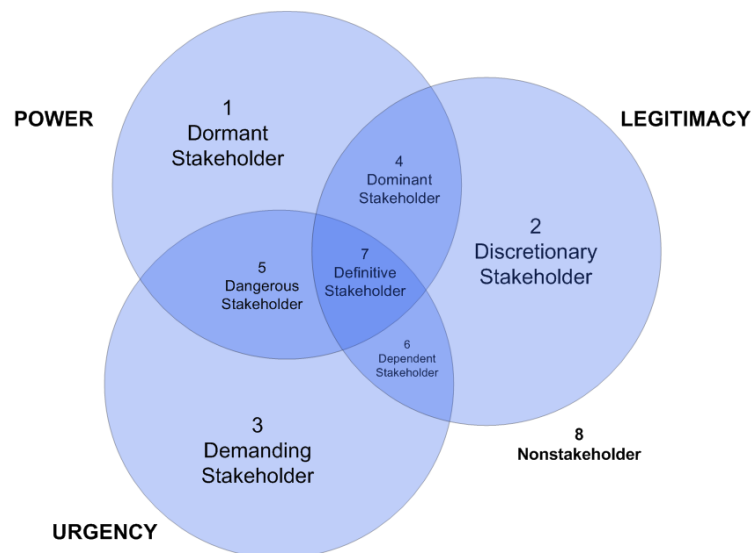


Figure 15 Stakeholder view of the organisation (Carroll and Buchholtz, 2000)

Another way of categorising stakeholders is to think of them as being:

1. Core: those who are key to the survival of the organisation
2. Strategic: those who are vital, and
3. Environmental: those who are neither “Core nor Strategic” (Carroll and Buchholtz, 2000)

Stakeholders can also be characterised according to certain important attributes (Carroll and Buchholtz, 2000:70) and this is graphically presented in Figure 16. Legitimacy refers to “the perceived validity of a stakeholders’ claim or stake”, power has to do with the ”ability or capacity to produce an effect” and urgency refers to the “degree with which the stakeholder claim calls for immediate attention or response”

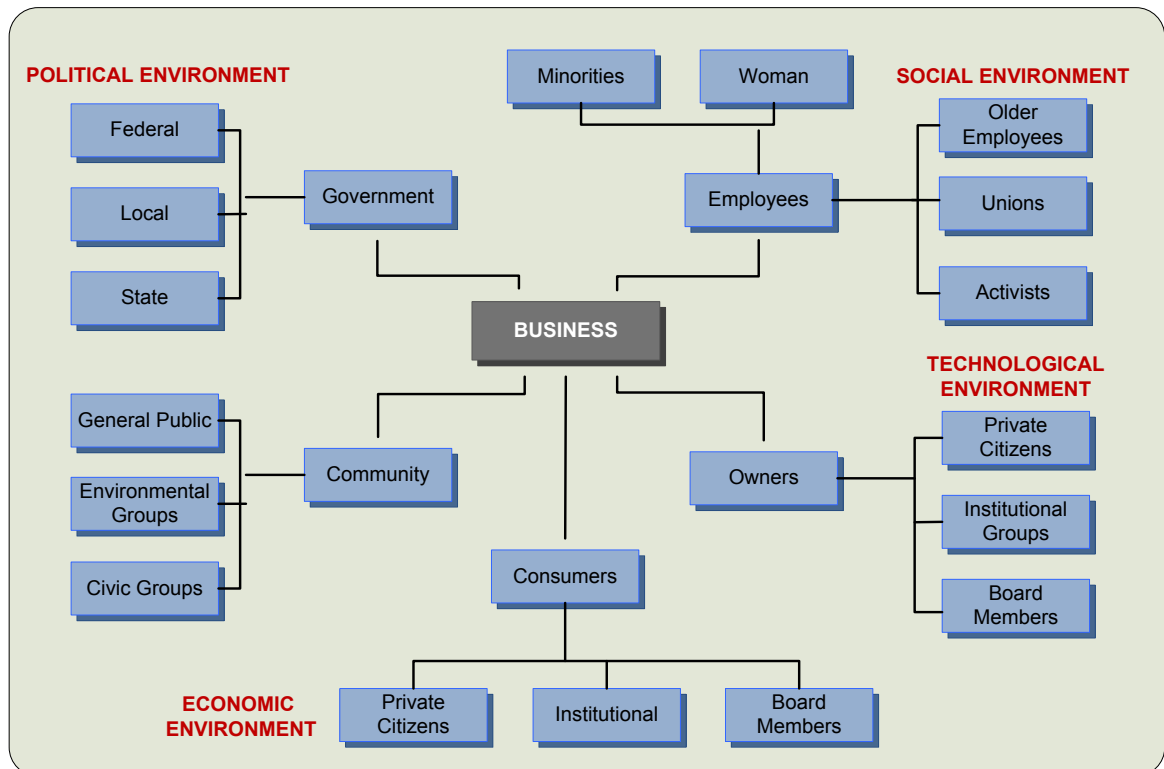


Figure 16 Stakeholder attributes typology (Carroll and Buchholtz, 2000)

3.3.2 Strategic CSR

The reason that the benefits of CSR activities are sometimes questioned is because these activities are not linked into the overall strategy of the organisation, but are developed in isolation (Székele and Knirsch, 2005). A company embarking on a path of sustainability incorporating the environmentalist views, needs to accept that the changes may require a radical rethink of past strategies and thus subsequently carefully evaluate its mission, vision and values and be aware of all the constraints placed upon it. This process should at the same time clearly identify corporate benefits as Burke (1996) maintains that without clear benefits of corporate social responsibility (CSR), it is doubtful if management will invest in its practices.

CSR becomes strategic when it is integrated with the overall business strategy and provides substantial economic value add and tangible business benefits to the organisation. It is also financially self-sustaining (Heslin and Ochoa, 2008).

Corporate strategy is an organisation's sense of purpose. It is about planning the future direction of the organisation against the available resources. Lynch (2000:8) defines corporate strategy as *"the pattern of major objectives, purposes and goals and essential policies for achieving those goals, stated in such a way as to define what business the company is in or is to be in, and the kind of company it is or is to be"*. Carroll and Buchholtz (2000:586), define strategic management as "the overall management process that focuses on positioning the firm relative to its environment". The organisation relates to its environment through the products and services it produces through complex business / stakeholder relationships. The definition of Carroll and Buchholtz, (positioning relative to its environment) clearly relates strategic management and environmental responsibility and poses a challenge for organisations to include environmental issues in the environmental scanning process.

Burke (1996) developed five dimensions of strategic CSR: centrality, specificity, proactivity, voluntarism and visibility.

Centrality is "a measure of the closeness of the fit between a CSR policy and the organisation's mission"

Specificity refers to "the organisation's ability to capture the benefits of CSR rather than simply creating collective goods which can be shared by others in the community"

Proactivity reflects "the degree to which behaviour is planned in anticipation of emerging economic, technological, social or political trends and in the absence of crisis conditions"

Voluntarism indicates "the scope of discretionary decision-making by the firm and the absence of externally imposed compliance requirements. Voluntarism is closely linked to proactivity, especially to the extent that it presumes the absence of regulatory or other mandates"

Visibility denotes both “the observability of a business activity and the firm's ability to gain recognition from internal and external stakeholders and can have both positive and negative consequences for firms”

Falck and Heblich (2007) found that strategic CSR often provides a company with an advantage. For example, when a company identifies a certain trend that could affect it, it could take advantage of the situation by positioning itself favourably with its stakeholders. It could even become a major player or leader providing advice on industry regulation. In a planning process model (Figure 17), Falck and Heblich (2007) explain the win-win multiple stage strategy process whereby a social trend is evaluated and responded to.

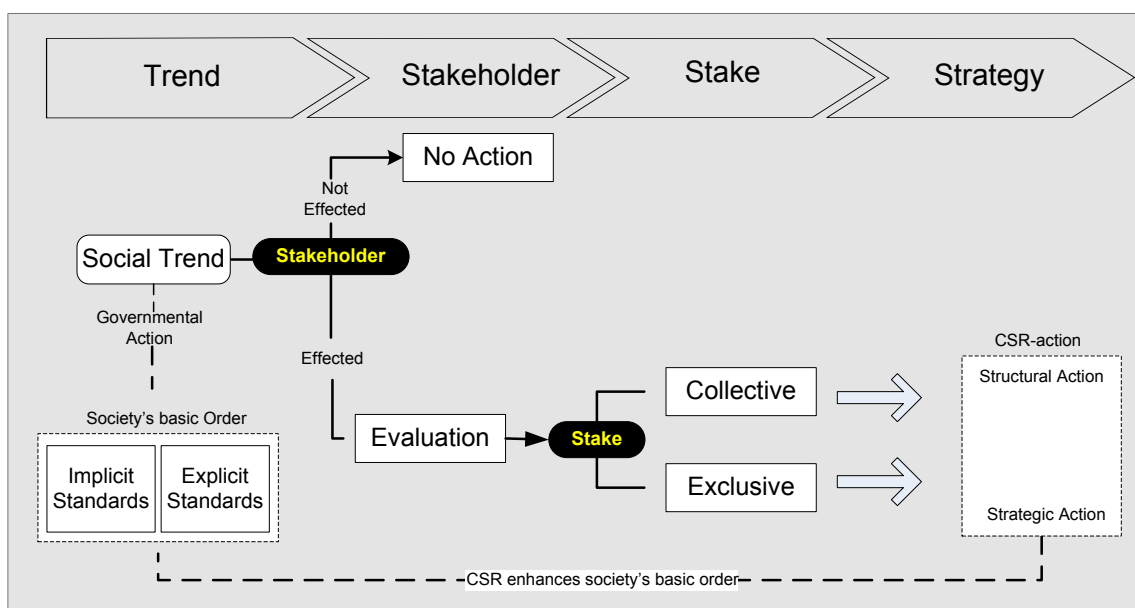


Figure 17 Planning process of strategic CSR (Falck and Heblich, 2007)

The ultimate decision management reach is based upon an evaluation of the opportunities and threats involved, including a cost-benefit analysis of future cash flow and net present value (Falck and Heblich, 2007). A crucial barrier to overcome in incorporating sustainability principles in the strategy development process is the trade-off between long-term and short-term objectives. Environmental sustainability or CSR considerations demand a much longer strategic view than the market's short-term evaluation of the company (Székele and Knirsch, 2005).

Globally companies are investing time and effort to address the demands and expectations that all society stakeholders place on the organisation. Many analysts argue that strategic CSR initiatives make the company more profitable, but some are still sceptical (Székele and Knirsch, 2005). Many would like to believe there could be a win-win situation of advancing environmentally as well as reducing costs – a typical eco-efficient scenario as previously discussed. However, Aragón-Correa, ,(2004) provide a more balanced perspective:

- First, polluting companies may not be able to restrain their adverse environmental impact without losing efficiency.
- Secondly, prices of goods may not always reflect the social cost thereof, as environmental costs are not priced in.
- Thirdly from a resource-based point of view, implementation of eco-efficient methodologies may not always be positively related to organisational performance. Many works have shown a null or negative relationship between corporate environmental progress and performance.
- Fourthly, several surveys indicate the growing interest in the natural environment, but this, according to Aragón-Correa and Senise-Barrio (2004), has created a myth about the corporate stakeholders' sensitivity to environmental progress statements of the organisation. An interest from the public does not always mean a willingness to act, as these types of surveys could reflect social bias.

3.3.3 Corporate Response to Climate Change

Boiral (2006) states that many managers are not knowledgeable regarding which strategy they should adopt to deal with climate change and the business implications of global warming, and thus relatively few organisations have actually implemented a climate change policy to meet the impending challenges (Packard and Reinhardt, 2000). These authors (2000:316), further state that this “asymmetry between the importance of this issue and the relative lack of corporate commitment may be explained in part by the widely-

shared perception that environmental action entails costs that impact productivity”.

Hoffman (2002) states that the economic and strategic impacts of climate change will depend mostly on the management of assets, the global competitiveness of countries, the possible implementation of regulatory policies stemming from the Kyoto Protocol and the ability of the market to take advantage of the emergence of new opportunities related to climate change policies. Boiral (2006) further expands that companies should make provision for environmental intelligence to anticipate the impacts of global warming, and assess how it should take advantage on the opportunities that could arise. This ”promotion” of obtaining sufficient environmental intelligence is illustrated in Figure 18 below. All the issues are interdependent on each other and require an interdisciplinary approach to properly integrate with each other.

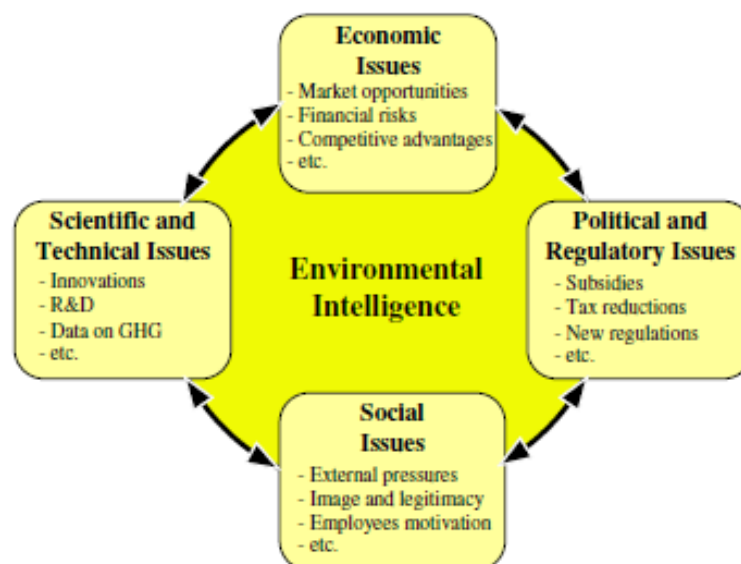


Figure 18 Promoting environmental intelligence (Boiral, 2006)

In order for the organisation to decide on a route to take in order to adopt a specific climate change strategy, it should begin with “preliminary” measures based upon three actions (Boiral, 2006): (1) Implement an environmental intelligence programme; (2) Draw up an inventory of their GHG emissions; and (3) Determine which options are most efficient in reducing GHG emissions, based on different objectives, regulations and environmental intelligence information (Refer to Figure 19).

The results from these preliminary measures however imply that managers are sometimes likely to take one of two routes – either to become proactive, or to delay and adopt a “wait and see” approach. This view also somewhat coincides with Kolk and Pinkse’s (2004) explanation of the three corporate responses to climate change they have postulated. This three-step classification of corporate responses to climate is summarised as follows:

1. A **defensive posture** taken by managers. This involves active opposition to any international climate treaties. The defence is an emphasis on the costs involved and the lack of scientific evidence for global warming.
2. In the **opportunistic / hesitant strategy**, companies prepare themselves for regulatory and market changes, but they take a “cautious approach in public”. They see no need to be a “first mover” or to take any risks.
3. Companies that follow an **offensive approach** take responsibility and their motivation is the need to take the first step themselves, not only for environmental reasons but also because it will offer them market opportunities or to improve their corporate image.

The potential consequences and risks of climate change are seen as so serious that a precautionary approach should be taken (Kolk, 2004).

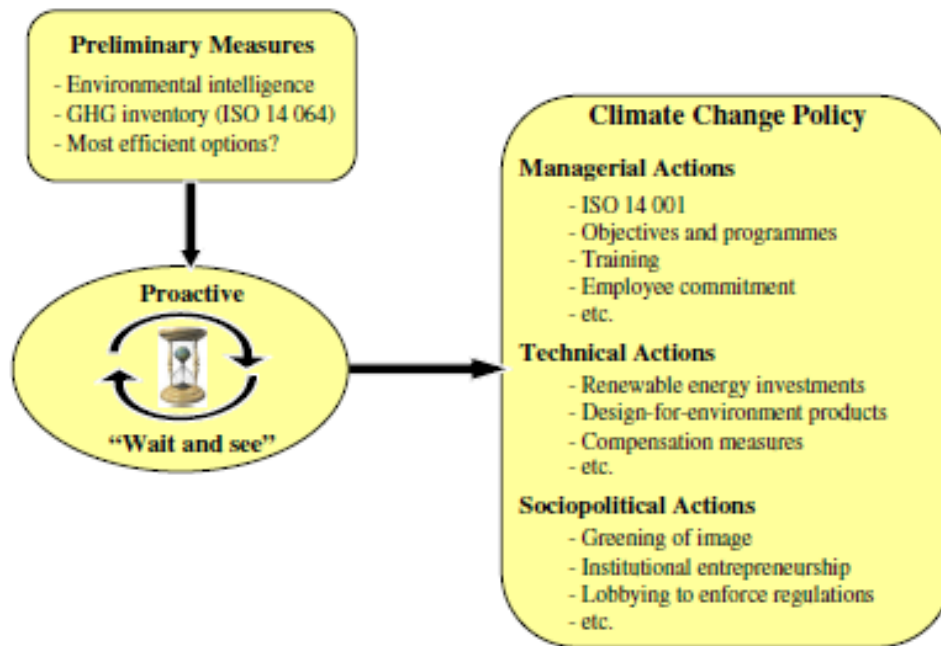


Figure 19 Developing a Climate Change Strategy (Boiral, 2006)

3.3.4 Global versus local CSR strategies

There are different views on whether multinational companies should have a global (centralized from the “home” organisation) or local (decentralised) CSR Strategy. There are benefits and drawbacks to both. Muller (2006) explains that the benefit of a global CSR strategy is that best practices could be more effectively transmitted throughout the organisation, while the drawback is a lack of ownership at the local level. A decentralised CSR strategy usually develops when the local organisation have autonomy, and can subsequently develop CSR strategies that are responsive and proactive towards local legislation and regulatory demands.

Increased globalisation however means that international organisations are faced with a much wider range of stakeholders, sometimes including different or opposite pressures from the Head Office and local companies. This increases the CSR complexities and the risks, especially for the locally responsive CSR approach. According to Muller (2006:190) the company’s CSR strategy “*may become fragmented and inconsistent leading to tensions*

within the organisation....and become a major obstacle to effective environmental management”.

3.3.5 CSR in procurement

Harwood and Humby (2008) state that addressing CSR in the procurement domain is currently an especially active area and is therefore introduced here. There are ranges of complex strategic supply decisions especially in large projects where there are many interrelated decision variables. The Global Reporting Initiative is also encouraging supplier reporting in order to increase supply chain transparency and sustainable practices (GRI, 2007). Ward and Smith (2006:4) as cited by Harwood and Humby (2008), explain that “the European Commission favours a concept whereby companies integrate social and environmental concerns in their business operations and in their interaction with their stakeholders on a voluntary basis.”

Cannon (2006:34) highlights the “growing public interest in where and how goods are produced”. According to Harwood and Humby (2008) organisations who do not seriously consider ethical and environmental conscious buying behaviours, face a supply risk whereby some of their customers could defect to their competition over time, driven potentially by the media and activists groups. Another procurement driver relates to increasingly stringent regulatory requirements, standards and/or political negotiations emanating from the recent ‘Bali treaty’ (Howden and Lean, 2007 as cited by Harwood and Humby, 2008).

Organisations are thus facing increasing pressure from a wider range of stakeholders to engage with social and environmental CR activities. Harwood and Humby (2008) have produced a force field analysis of CSR in procurement to help explain the current driving and restraining forces. This is shown in Figure 20. One of the restraining forces is the “*not my problem syndrome*.” Organisations that have one or more individuals taking responsibility for environmental matters often have a greater commitment towards the environment. Moreover significant results are most often produced where there is executive commitment (Aragón-Correa and Senise-Barrio, 2004).

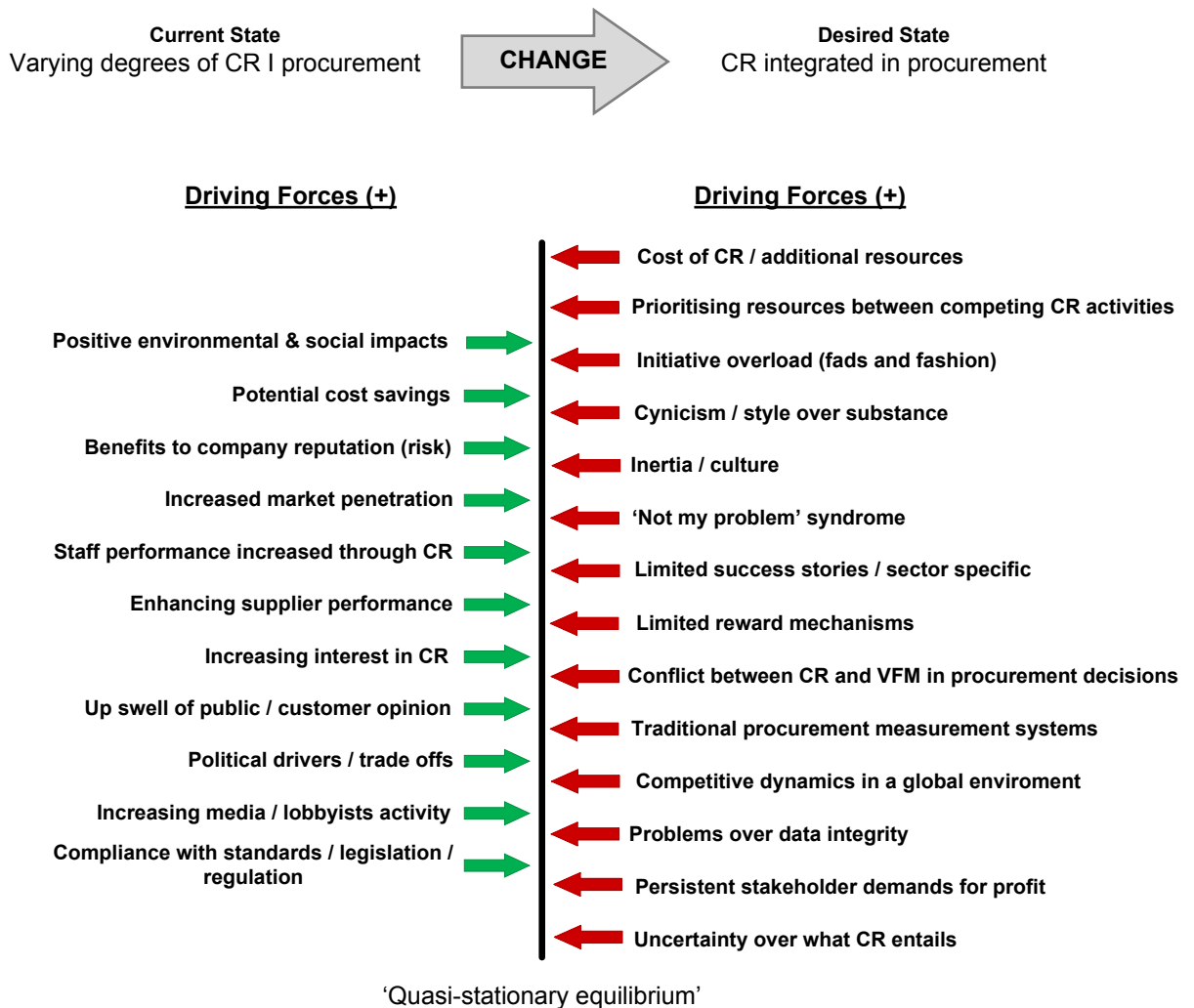


Figure 20 Force field analysis of CSR in procurement (Harwood and Humby, 2008)

3.4 Environmental reporting

Many different environmental reporting tools can be used to measure the business' impact on society and this, in turn, has led to the creation of a number of new organisations innovative enough to see these opportunities. Many of these organisations claim to have a "Best Practise" tool or guide to assist business.

3.4.1 CSR and reporting

According to Azzone, (1997), the initial goal of environmental reporting was only to demonstrate the company's environmental commitment. The reporting scenario has however widened and companies now need to show actual performance. The GRI (2006) states the purpose of a sustainability report as the practice of measuring, disclosing, and being accountable to internal and external stakeholders for organizational performance towards the goal of sustainable development. It defines it as a broad term descriptive reporting on economic, environmental, and social impacts (e.g., the triple bottom line of corporate social responsibility reporting)

Issues and risks regarding the environment present a number of challenges to companies in general, and for the mobile operator this is no exception. The company has to report to a variety of stakeholders and groups. Dixon et al. (2005) asserts that a number of studies have indicated that the environmental disclosure of companies is still low even though they are faced with increasing pressures from diverse stakeholder groups to address environmental concerns. Companies may, however, not be fully committed to environmental reporting as there are many obstacles to producing detailed accurate and valid reports. Székele and Knirsch (2005) add that many companies have started to include sustainability in their strategies, but that their reporting falls short in that there is an inability to compare results.

Dixon et al. (2005) go further to explain that where and when companies face legal challenges or pressures from the public, they inadvertently demonstrate their social responsibility towards the environment by publishing a corporate social and environmental report. Hooghiemstra (2000) supports the fact that companies use their CSR report as a corporate communication instrument to positively influence the public's perception towards their operations. Elkington (1997) confirms this view and further states that corporate social reporting is viewed as a public relations tool designed to offer reassurance and to help with "*feel-good*" image building. This is supported by Deegan et al. (2000, as they conclude that social disclosure in environmental reporting is a useful tool used by the company to reduce the effects of events that are perceived to be adverse to its corporate image. Székele and Knirsch (2005:631) state that

“Reporting on and communicating sustainability investments and achievements helps demonstrate transparency and seriousness of intent and rewards staff and partners for their input into the sustainability programs. The internal objective of reporting is to track and improve sustainability performance.”

On the other hand, where environmental issues are less obvious, it may be that the success of the implementation of an environmental management system and reporting is small and produce negligible benefits from the improved relationships with environmentally concerned stakeholders. (Brammer and Pavelin, 2004)

Azzone *et al.* (1997) has identified six target stakeholder groups to which the environmental report should be addressed.

1. **Academia** requires information to monitor trends, undertake comparative studies, establish and publicise **Best Practices** which could assist companies for benchmarking. Academics thus look for examples of innovative approaches of processes, equipment or services that could guide them into developing these best practise documents.
2. **Employees** are directly affected by everything that goes on in the company. Many employees may wish to participate in environmental initiatives and would like to see the statistics and regulatory compliance. The environmental report becomes a medium of communication between the company and the employee.
3. **Environmental NGO's** (nongovernmental organisations) focus on the principle of “the public's right to know”. The company has an opportunity to address any of the NGO's criticisms in the environmental report, and at the same time show accountability for any actions taken. It is critical for the company thus to be able to examine and know the limitations of its own activities in relation to the global CSR trends.
4. **The Financial Community** which includes banks, insurance companies and shareholders, is very much more interested in the future environmental risks to the company that might affect the company, than

the current environmental activities. The financial community realises that if the company does not improve on its environmental performance, future profits might be at risk. It is very important for the company to provide the financial costs and expenditure of environmental projects, including any cost savings.

5. **The local community** is mostly interested in the organisation's activities located in their geographical area that could affect the environment. Sometimes the employee and the community's interests might overlap as they share the same area of living.
6. **Trade and Industry** is made up of commercial customers and suppliers. As a customer, the basic concern is about the environmental practices of your suppliers. Industrial customers are increasingly concerned as to the ultimate disposal of their products, i.e. at the end of the product's life. Suppliers are increasingly tasked to "take back" the residue of their products and dispose of it in an environmentally friendly manner. The environmental report has become an opportunity (instead of a liability as in the past) to communicate to trade and industry the company's own best practices, reassurances and commitments to CSR.

There are a number of environmental reporting initiatives to assist companies in their environmental management and reporting. In the next section, some of these initiatives are discussed.

3.4.2 Key Environmental Reporting Best Practises

Companies are increasingly being asked by diverse stakeholders to provide information on exactly how they identify and manage social issues. Székele and Knirsch (2005) state further that a comparative analysis of sustainability is a complex task, as there are several reporting practices for environmental corporate governance and it is difficult to verify the accuracy of the information provided by companies. Economic performance can be easier measured by internationally accepted standards than environmental performance, as the latter is intangible. Székele and Knirsch (2005:632) provide a comprehensive list of various approaches to measure, monitor and assess a company's progress on sustainability. These include:

-
- a. Surveys
 - b. Award schemes
 - c. Investors' criteria
 - d. Benchmarking
 - e. Sustainability indexes
 - f. External communication tools
 - g. Accreditation processes
 - h. Standards and codes
 - i. Sustainability indicators
 - j. Metrics for sustainability performance
 - k. Non-quantifiable sustainability initiatives

From the literature research, a few key accreditation processes and sustainability indicators were discovered that could potentially assist the organisation in its environmental reporting and these are discussed here.

3.4.2.1 The British Standard (BS 7750)

The British Standards Institutions (BSI) issued the BS 7750 standard in 1991, which is a specification for an environmental management system to prevent environmental damage. BS 7750 was developed as a response to environmental risks and damage concerns, and focuses on the use of environmental auditing (Rezaee, et al. 1995).

Compliance to the standard is voluntary and the standards assist in developing a system to describe the company's environmental management, evaluate its performance, and define its policies and targets (ISO14000, 2004).

3.4.2.2 The International Organisation for Standardization (ISO)

This is probably the most well-known standard. The International Institute for Sustainable Development (IISD, 2008) asserts that consumers, governments, and companies are all seeking ways to reduce their environmental impact and increase their long run sustainability. For companies the key goals are to

become more efficient while earning profits and maintaining the trust of their stakeholders.

The International Organisation for Standardisation (ISO) formed a Technical Committee to develop the international environmental standard namely the ISO 14000 that stands as a standard for an environmental management system (EMS) (Sayre, 1996). The ISO 14000 series addresses various aspects of environmental management: ISO 14001:2004 and ISO 14004:2004 deal with environmental management systems, while the ISO 14001:2004 provides the requirements for an EMS and ISO 14004:2004 gives general EMS guidelines.

Fredericks (1997) states that: “the most important concept underlying the ISO 1400 environmental standards and the EMS audit guidelines is the verification process that audits provide. The environmental auditor’s primary role is to determine compliance or conformance—not performance.”

The International Institute for Sustainable Development (IISD, 2008) acknowledges that the implications of the ISO 14000 series are important in both the developed and developing world, but that “special steps” may have to be taken to ensure that for environmental management and sustainability do not reduce the opportunities of the developing world to trade with industrialized countries.

ISO has recently decided to launch the development of a new International Standard providing guidelines for social responsibility (SR). The guidance standard, ISO 26000, will be published in 2010 and will be voluntary to use. It will not include requirements and will thus not be a certification standard (IISD, 2008).

3.4.2.3 The ECO Management and Audit Scheme (EMAS)

EMAS was promulgated in June 1993 and has since been adopted by many European countries. The demands came from legal insistence in many countries for public reporting of corporate environmental performance based on regular environmental audits (Dixon, 2005). EMAS is a voluntary registration scheme and contains 21 Articles and 5 Annexes that cover a range

of issues, such as objectives, the environmental statement, accreditation and supervision of accredited environmental verifiers, the list of accredited environmental verifiers and registration of sites.

According to Carty (1993), EMAS enables companies to demonstrate a commitment to improve on their environmental performance by establishing an environmental management system and publicly report on their performance.

3.4.2.4 Institute of Social and Ethical Accountability

The Institute of Social and Ethical Accountability developed the Accountability 1000 (AA1000) standard ISEA for release in 1999. It provides a framework that organisations can use to understand and improve their ethical accountability and the ability to judge the validity of any ethical claims. The AA1000 focuses on securing the quality of social and ethical accounting, auditing and reporting.

3.4.2.5 The Global Reporting Initiative (GRI 2000)

The Global Reporting Initiative goes beyond the accreditation approaches previously discussed and generates a sustainability indicator (Székele and Knirsch, 2005). The GRI Reporting Framework was developed by a consensus and dialogue process consisting of all stakeholders from business, the investor community, labour, civil society, accounting, academia, and others (GRI, 2006). It is a structured guide aimed at producing standardised disclosure of economic, environmental and social information in annual reports.

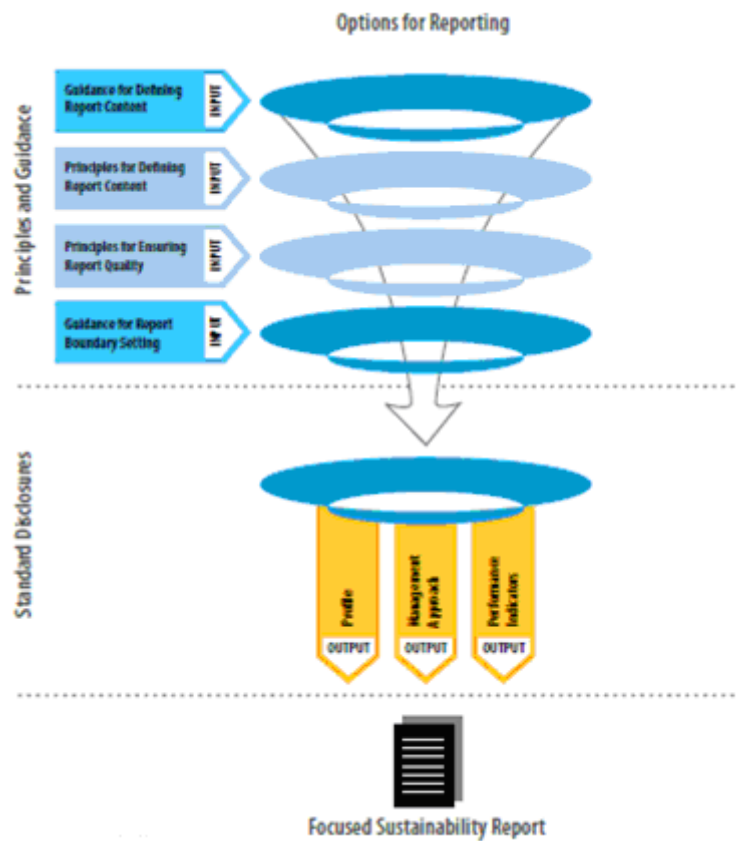


Figure 21 Overview of the GRI Guidelines (GRI, 2000)

The GRI released the guidelines as a draft for public comment during 2000. The Guidelines have the following objectives (GRI, 2000):

1. To present a clear picture of the human and ecological impact of business
2. Facilitate informed decisions about investments
3. Provide stakeholders with reliable information that is relevant to their needs
4. Provide a management tool to help the reporting organisation evaluate its performance and progress improvement
5. Establish widely accepted external reporting principles
6. Promote transparency and credibility

The GRI (2000) has developed a set of Sustainability Reporting Guidelines on economic, environmental and social performance. This process is summarised

in Figure 21. The GRI encourages organisations to obtain independent and external verification for its reports to ensure credibility of the data

3.4.2.6 CERES

CERES is a coalition of interest groups from investors, environmental groups to other public interest organizations working with companies to address sustainability and global climate change. CERES oversees the “Investor Network on Climate Risk”, a group of more than 50 institutional investors from the U.S. and Europe managing nearly \$7 trillion in assets (Cogan, 2006). It provides research data of high quality and impartial information on corporate governance and social responsibility issues.

The CERES report (2008) provided in Table 3 employs a “climate change governance checklist” to evaluate how companies are preparing and positioning themselves to address climate change. It focuses on board oversight, management performance, public disclosure, emissions accounting and strategic planning. The checklist consists of 14 governance steps and five governance categories companies could take to proactively address climate change, and rank the company on a 100-point scale. The CERES report however does not yet report on telecommunications companies.

3.4.2.7 The Greenhouse Gas Protocol (GHG)

In respect of emissions accounting, the Greenhouse Gas (GHG) Protocol (see Table 3) has grown to become the world’s most familiar and widely used tool by governments and companies (CDP, 2008d).

Climate Change Governance Checklist: 100 Point System		<i>Points</i>
BOARD OVERSIGHT		
1	Board committee has explicit oversight responsibility for environmental affairs.	Up to 12
2	Board conducts periodic review of climate change and monitors progress in implementing strategies.	
MANAGEMENT EXECUTION		
3	Chairman/CEO clearly articulates company's views on climate change and GHG control measures.	Up to 18
4	Executive officers are in key positions to monitor climate change and coordinate response strategies.	
5	Executive officers' compensation is linked to attainment of environmental goals and GHG targets.	
PUBLIC DISCLOSURE		
6	Securities filings identify material risks, opportunities posed by climate change.	Up to 14
7	Sustainability report offers comprehensive, transparent presentation of company response measures.	
EMISSIONS ACCOUNTING		
8	Company calculates and registers GHG emissions savings and offsets from projects.	Up to 24
9	Company conducts annual inventory of GHG emissions from operations and publicly reports results.	
10	Company has set an emissions baseline by which to gauge future GHG emissions trends.	
11	Company has third party verification process for GHG emissions data.	
EMISSIONS MANAGEMENT AND STRATEGIC OPPORTUNITIES		
12	Company sets absolute GHG emission reduction targets for facilities and products.	Up to 32
13	Company participates in GHG trading programs to gain experience and maximize credits.	
14	Company pursues business strategies to reduce GHG emissions, minimize exposure to regulatory and physical risks, and maximize opportunities from changing market forces and emerging controls.	

Table 3 CERES Governance Checklist (Cogan, 2006:3)

3.4.3 The Carbon Disclosure Project

The Carbon Disclosure Project (CDP) is an independent not-for-profit organisation which represents shareholders and corporations on climate change. The CDP provides a clear "CDP Questionnaire" framework within which companies have to report, and for this reason, has encouraged thousands of companies to report on climate change issues for the first time. The CDP collects this primary climate change data on an annual basis from as wide an audience as possible, while focussing on the world's largest corporations (CDP, 2008d).

The latest 2008 CDP Information Request was signed by over 385 international institutional investors with \$57 trillion in assets under management, and the Information Requests were sent to more than 7,000 companies worldwide.

The CDP (2008d) sees its role as to *“facilitate and promote an ongoing dialogue between institutional investors, purchasing organisations and senior corporate management regarding the business implications of climate change”*. It has gained global authority in this role. Its further role is to help organisations to measure, manage and reduce emissions and climate change impacts. The data collected by the CDP provides all company stakeholders with valuable insight into the strategies deployed by many of the largest companies in the world in relation to climate change, and facilitates a better understanding of the risks and opportunities involved. The CDP creates a neutral base for companies to show their commitment to reporting on carbon and emissions management.

Since its formation in 2000, the CDP has become the *“gold standard”* for carbon disclosure methodology and process, creating the largest database of corporate climate change information in the world (CDP, 2008d). All companies are further encouraged to report their emissions data using the Greenhouse Gas (GHG) Protocol standard methodology.

Cogan (2006) reported that more and more companies are responding to the CDP’s annual surveys each year, but that the participation rates among U.S. companies were still relatively low compared to other foreign companies.

The CDP produced what is termed a *“Climate Disclosure Leadership Index”*, based upon the weighted scoring of companies’ responses to the individual questions. The scoring system however focuses on disclosure, not climate change performance, and is based on quantitative and qualitative assessment of responses. It takes into account whether a question has been answered at all and an analysis of the extent and quality of the response (CDP, 2008e). Companies in non-carbon-intensive sectors, like telecommunications, are invited to answer only a subset of the questions as apposed to companies in carbon-intensive sectors like utility companies.

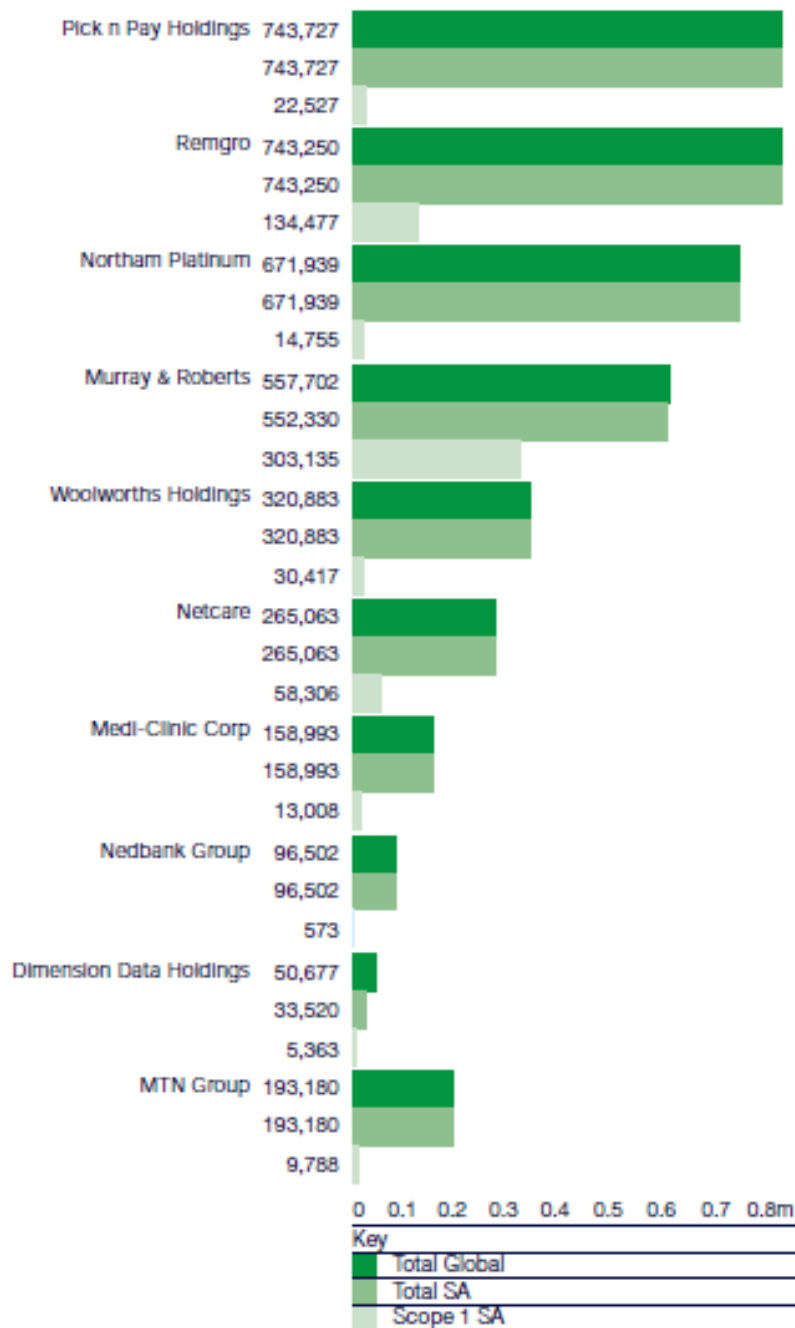


Fig4 SA Company emissions by scope and location (tonnes CO₂e) (CDP, 2008e)

An example of the 2008 submissions of the “*low emissions*” category of South African companies is provided in Fig4. Several companies included in this group of low emitters – such as MTN and Pick ‘n Pay does not, however, identify any emissions for operations outside South Africa. According to CDP (2008e) this may be slightly misleading, but the CDP (2008e) acknowledges that these companies are working on their systems and methodologies to report on global operations in the future.

3.4.4 Issues Concerning Environmental Reporting and Certification

Environmental reporting

Dixon (2005) states that the literature available on environmental reporting initiatives indicates that, unlike the case with financial reporting, there are no general industry acceptance of the format, standard or principles of environmental reports and their contents. Deegan (1999), confirms the general absence of regulation on environmental public disclosure, and states that an important consideration in the company's decision to disclose information is the cost of gathering the necessary data and comparing the benefits obtained (Deegan, 2000). The absence of standardised guidance on the reporting of environmental issues is considered a huge barrier limiting some companies to disclose environmental information (Dixon, 2005).

Businesses wishing to engage in environmental disclosure face a lack of reliable and credible methodology to communicate environmental information (Dixon, 2005) and this often provides an excuse not to report on environmental issues. Gray *et al.*, (1998, as cited by Dixon, 2005), confirm that "the increasing concern with stakeholders and anxiety about business ethics and corporate social responsibilities have raised the need for new accounting methods". According to Solomon and Lewis (2002) the most important reason companies do not disclose environmental information is because of a reluctance to disclose sensitive information.

Azzone *et al.*, (1997) state that any environmental report must be relevant, reliable, comprehensible and comparable. These measures are the four essential pillars on which any credible environmental report must be based and the absence of any one will result in a flawed report. A recurring problem is the failure of business to identify the intended audience and to address their requirements for an environmental report that is relevant and clearly understood. Some stakeholders, such as banks, insurance companies and firms operating in the supply chain, view the company's environmental report as highly incomplete and Clarkson (1995, as cited by Azzone *et al.*, 1997), states that this can only be resolved by clearly identifying the key stakeholders to whom the environmental reports are addressed.

Environmental Management Certification

As discussed earlier, organisations use environmental certification, developed by government and nongovernmental organisations, to develop environmental policies to be proactive in environmental management with the “additional” hope to gain differentiation from the competition. More recently evidence has emerged that indicate problems regarding certification (Aragón-Correa and Rubio-López, 2007).

While ISO14000 certification demands serious commitment to meeting legal requirements, it is not enforced. Secondly, organisations may be certified while still not conforming to local environmental laws. Moreover, ISO14000 does not demand the company to publish environmental performance which raises a transparency issue. Lastly, because ISO 1400 and even EMAS certification is voluntary, not all industries are equally familiar with the certifications, which leads to people unfamiliar with it treating these certifications as unimportant (Aragón-Correa *et .al.*, 2007).

3.4.5 Environmental Indicators

There are difficulties in gathering data and suitable information. Uncertainties are inherent in how to estimate and measure the impact of environmental issues in some areas (CICA, 1994). Because indicators are sometimes based on estimates, results may change. The assumptions and calculations underlying the estimates can also be very complex and obscure to public and private decision-makers according to Székele and Knirsch (2005).

Environmental indicators are important for credibility in environmental reporting. An indicator makes the information easier to interpret and understand for different users while allowing for meaningful comparisons between companies (CICA, 1994; GRI, 2000). According to Székele and Knirsch (2005:641) “*Indicators help translate scientific information into policy-shaping tools, and help translate public expectations into measurable components, such as targets or benchmarks*”.

While the WBCSD (2008b) has developed its own eco-efficient measures, Székele and Knirsch (2005) list the three types of the GRI indicators as indicated here:

-
1. Productivity or efficiency ratios
 2. Intensity ratios (for example emission intensity e.g. CO₂ emissions per unit;
 3. Percentages

Every living being possesses a natural footprint. Székele and Knirsch (2005) interestingly explain the “Ecological Footprint” as a tool for measuring human natural resource consumption and waste output, taking into consideration the earth’s natural capacity to replace the used up materials. The human ecological footprint becomes sustainable when its annual consumption is equal or less than nature’s regenerative capacity to replace what has been consumed.

3.5 Sustainable Development and Environmental Management

3.5.1 Sustainable Development

In section 3.3.2 the importance of strategic CSR and addressing environmental concerns was discussed.

Sustainable development involves the simultaneous improvement of the economy, the environment, and the wellbeing of people (IISD, 1996). It is about building a society where a proper balance exists between economic, social and ecological aims (Székele and Knirsch, 2005). Heslin and Ochoa (2008:126) further state that *“environmental sustainability involves using scientific insights to reduce the environmental footprint of an organization’s operations and products. Doing so can help to address issues including the earth’s diminishing supply of non-renewable resources and capacity to absorb the waste from our production and consumption.”*

The most commonly used formal definition however (IISD, 1996:7 and (Málovics et al., 2008) is by the World Commission on Environment and Development (the Brundtland Commission):

“Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs”. It contains within it two key concepts:

-
1. The concept of “needs”; in particular the essential needs of the world’s poor, to which overriding priority should be given; and
 2. The idea of limitations imposed by the state of technology and social organization on the environment’s ability to meet present and future needs.

The International Institute for Sustainable Development (IISD, 1996) comments further that sustainable development cannot be achieved by a single company in isolation from the rest of society. It describes sustainable development as a “pervasive philosophy” to which participants in the global economy including consumers and governments must adhere to if humankind hope to meet today’s needs without taking away the ability of future generations to meet their own. Achieving sustainable development is not simply about manipulating the environment, while people pursue business as usual. *“It is a social and economic project as much as an environmental project, and one with the very positive objective of optimising human well-being”*

The WBCSD (2000) developed the concept of eco-efficiency, which is a concept for helping companies to become more sustainable. It states that sustainability can only be achieved by businesses working together with governments, suppliers, customers, and NGOs. Governments would typically formulate economic and industrial policies to encourage eco-efficiency for business to comply with. This will typically include policies to reduce energy and resource use throughout the economy (WBCSD, 2000).

The diagram in Figure 22 helps to illustrate four areas where eco-efficient opportunities inside and outside of the company exist.

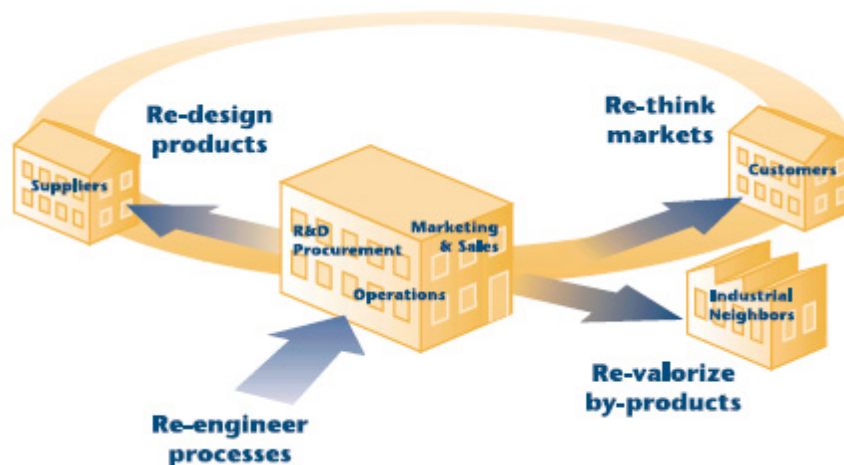


Figure 22 Navigating eco-efficient opportunities (WBCSD, 2000)

Székele and Knirsch (2005) asserts that there is a business case for sustainability, as it assist the organisation to reduce risks, avoid waste, increase energy efficiency and being driven to create new innovative products and services. By adopting sustainability principles, the company can become more profitable. The key factor however, according to their studies, is strong leadership – commitment from executive management and distributed to all levels of the organisation. Székele and Knirsch (2005) state further that risks and uncertainties have strong links to environmental concerns. Cost analysis of direct and indirect energy measurements can lead to an exposure of risks the company faces and lead to a new strategy of applying renewable energy.

A second key factor mentioned by Székele and Knirsch (2005) to achieve sustainability is flexibility to change. Management must adopt an approach of continuous improvement and adaptation, whereby business activities are constantly aligned with the overall business strategy. Lastly, an openness to engage with all stakeholders in industry to benchmark activities and initiatives is required.

When discussing sustainable development, most economists use the “*capital theory*” approach (Harte, 1995). “Capital” consists of natural and manufactured (economic and social) capital. This approach assumes that the current level of living can be maintained, and still provide similar levels of living standards for future generations by providing them with at least the same amount of capital the present generation owns.

Málovics et al. (2008) divide sustainable development in two: weak and strong. Weak sustainability means “*even if the quantity of natural capital is decreasing by creating man-made capital, total capital can be maintained, which would be enough to fulfil the criteria of sustainability.*” Strong sustainability on the other hand is less permissive, saying that “natural capital cannot (or only to a limited extent) be substituted by man-made capital and may suffer irreversible harm, so that it is necessary to maintain not only the aggregate but also the amount of available natural capital.” (Málovics et al., 2008:908).

Málovics et al., (2008) go further and suggest that the requirement for strong sustainability for the organisation is to:

1. Use non-renewable resources
2. Use of sustainable energy
3. Keep a balance between “use” and “production of renewable resources”
4. Cultivate a real sustainable ecocycle economy, whereby wind and solar energy are the only energy sources for sustainability

The force field of Harwood and Humby (2008) (see section 3.2.2) suggests that one of the restraining forces for implementing good CSR practise is the “*not my problem syndrome.*” One of five key drivers of business affected by CSR initiatives as identified by Heslin and Ochoa (2008) in section 3.3 is organisational learning programs.

Boiral (2002) confirms these studies in his research and provides evidence that taking the tacit knowledge of employees into account in the organisation can be very useful in key areas of environmental management: the identification of pollution sources, the management of emergencies and the development of preventive solutions. The author highlights four main characteristics of tacit knowledge: It is personal in nature; the development of tacit knowledge is assimilated through informal learning; is difficult to codify and explain in an explicit manner and, lastly, tacit knowledge is orientated towards the execution of specific tasks.

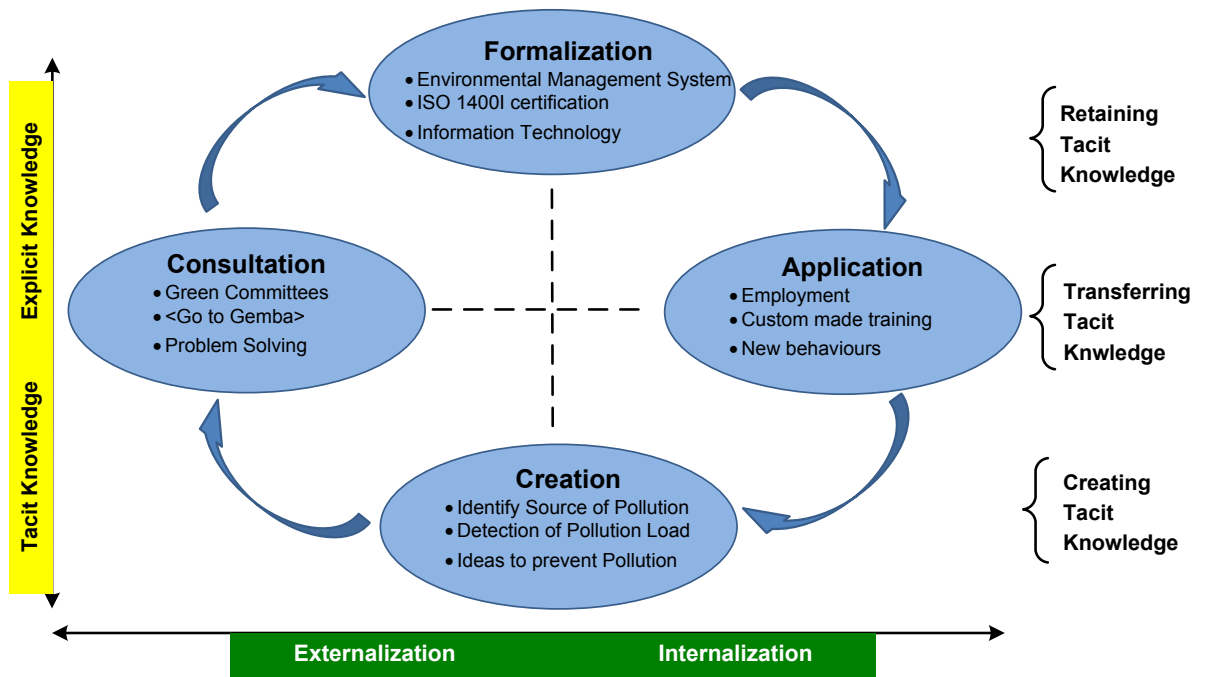


Figure 23 Creating, transferring and retaining tacit knowledge (Boiral, 2002)

The environmental initiatives of the organisation require learning new practices, knowledge, and introducing clean technologies (Azzone and Bertéle, 1994 as cited by Boiral, 2002). The development of preventive maintenance to reduce spill and pollution often leads to substantial savings in costs and organisation resources. This, however, calls for the involvement of all employees in utilising their expertise as well as the learning of new work methods (Boiral, 2002). The introduction and use of environmental management systems such as ISO 14001, which requires rigorous documentation, would contribute to the preservation of tacit environmental knowledge within companies (see section 3.4.2). Boiral (2002) summarises the process of the creation and retaining of tacit knowledge in the organisation for the benefit of environmental management as shown in Figure 23.

3.5.2 Environmental Risks

According to KPMG, a project sponsor of the CDP (CDP, 2008e:76), the nature and extent of climate change risk to business remain unclear: *“Little is known about which parts of economies are exposed to risk and therefore there is a need for further analysis at sector level.”* The risk to the environment has

nevertheless grown in importance over the last few years. Dixon (2005:703) summarizes some general risks as follows:

1. Fines for pollution of land, water or air
2. Penalties may be imposed on a company
3. Cleanup costs for land sites
4. Liability for disposal of hazardous wastes
5. System breaks down allowing environmental problems to occur
6. Loss of employee time and / or employee law suits due to safety hazards
7. Product liability suits or recall costs
8. Loss of the public confidence (damaged reputation or corporate image)
9. Loss of market share when environmental incidents occur
10. A company may lose its license or be shut down

Companies have to be able to respond to any environmental risks in an effective manner. According to Cogan (2006) climate risk has become embedded in every business activity and subsequently companies with significant GHG emissions or energy-intensive operations, face risks from new regulations. In addition, climate change poses many direct physical risks from the physical impacts of climate change, including the increased intensity of weather events, droughts, floods, storms and sea level rise. These risks are likely to increase in the future. The level of importance attached to each type of risk differs considerably both across sectors and regions (see Figure 24).

There are several general risks identified:

- Changes in consumer habits that accompany changing weather patterns could affect the profitability of the company
- Long-term capital investments

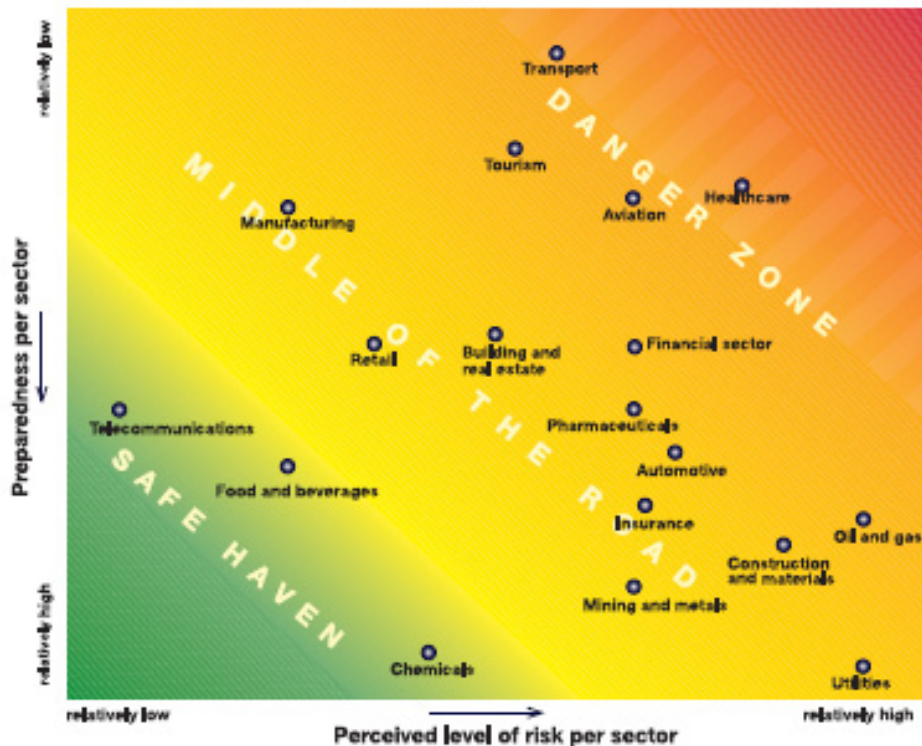


Figure 24 KPMG's risk preparedness framework (CDP, 2008e)

- Trillions of dollars of property near low lying coastlines is at risk
- Drought and more frequent heat waves could lead to the collapse of local food systems
- Many state, national and international regulations are putting increasing pressure on companies with emissions from operations to invest in emissions controls. In most leading economies in the world, regulatory activity is picking up at the state and regional level (Cogan, 2006). Companies with poor climate governance will be significantly affected.
- Cogan (2006) believes climate risk preparedness in the global and domestic marketplaces will be a key driver in a company's ability to compete effectively.
- As regulation calls for accelerated demand for cost-effective energy of "clean" power such as wind and solar, this cost to the company from the CO₂ it produces, see losses in the company's EBITDA.
- Companies may have an opportunity to increase profitability by implementing energy efficiency technologies and emission-reducing

strategies that meet changing consumer demands. This will bring about technological and competitive risks and opportunities to a company.

Current reality is that all of these risks are materialising regardless of the actual rate of climate change.

3.5.3 Industry regulation

The public concern for international issues such as climate change has grown tremendously in the last decade, while the development of national and international regulatory and policies to address these problems continues to lag (Muller, 2006). This gap between society's demand for regulation on these issues and the ability of government to provide regulation has led to pressure from society for increased self-regulation on the part of the organisation.

3.6 Summary

CSR can mean many different programmes and measures, but all of this has a common goal: to minimise the negative effects an organisation may have on the environment and implicitly, CSR thus contributes to a firm's reputation and profitability (van Dijken, 2007). However, implementing a valid, reliable and transparent environmental programme is currently a minefield. The application of environmentally appropriate actions in the rapidly developing Africa mobile operator environment remains therefore a major challenge.

CHAPTER 4

RESEARCH DESIGN AND METHODOLOGY

4.1 Introduction

For this carbon footprint and corporate environmental responsibility research, the primary method of data collecting was through a qualitative survey and analysis. A measuring instrument was specifically tailored and developed for this purpose and is based on the literature review, discussions with decision makers and an assessment of important factors from personal experience in the industry.

The focus of this research is identifying issues relating to the carbon footprint of Africa's mobile operators. It has been stated throughout that reporting of such information is evolving, and still sensitive. As such a qualitative or interpretative analysis of data is essential given the sensitive nature of the data required, it is conceivable that much of the data collected will need careful analysis and interpretation in order to identify possible areas of misinformation or inadequate information. Research design principles will hopefully consider this.

4.2 Research Objectives

This qualitative study has the following four objectives:

1. To identify strategic risks and opportunities and their implications for the mobile operator in Africa and the Middle East.
2. To determine actual absolute Greenhouse Gas emissions
3. To review if the mobile operator in Africa and the Middle East report on its GHG Emissions have appropriate data available? (If yes, then the Carbon Footprint calculations and the performance against targets and plans to reduce GHG emissions can be done.)
4. To determine mobile operator responsibility and management approach to climate change

4.3 Research Design

Research design provides the blueprint for the collection, measurement and analysis of data (Cooper and Schindler, 2006). Two main general research approaches exist, i.e. Qualitative and Quantitative (Leedy and Ormrod, 2005). Quantitative data is numeric data that invariably require statistical methods that can either be descriptive or inferential (Collis and Hussey, 2003). Qualitative methods, on the other hand, can yield both qualitative and quantitative data. An example of qualitative data collection methods is interviews and open-ended questionnaires (Leedy and Ormrod, 2005).

An attempt will be made to respond to the research objectives through the collection and analysis of limited data due in part to a ‘relative’ poor response rate (refer to the section on delimitations below). The researcher seeks to gain an understanding of human interactions, perceptions and behaviour. Hence, the research problem is more on the social platform than the physical (Collis and Hussey, 2003).

The research variables at play in the qualitative research design approach followed in this study, are of such a nature that identification and control of any one variable is complex. An in-depth understanding of the issues will thus be attempted rather than a statistical or quantitative analysis of such complex interacting variables (Collis and Hussey, 2003). In this research, qualitative data was thus collected via a questionnaire containing open and closed questions.

A measuring instrument was specifically tailored and developed for this part of the research and was in the form of a survey. This instrument contained about 40 statements representing the constructs and was based on a choice selected from literature reviews, discussions with decision-makers and an assessment of important factors from personal experience in the industry.

This research instrument is based upon the survey used by the Carbon Disclosure Project, which seeks to improve the signatories’ investors understanding of possible impacts on the value of their investments driven by the factors connected with climate change. In this research the original CDP

research questionnaire is referred to as the "formal-CDP", and the questionnaire that was adapted is referred to as the "modified-CDP".

The formal-CDP questionnaire asks the question "How?" and expects the respondent to reply in a long and comprehensive manner. It takes a whole team of researchers with large funding to accumulate and interpret such responses. This type of in-depth research is outside the scope for this research project, and it was decided to use the basis of the formal-CDP, but rather ask the questions in a manner of fact, i.e. "*Is your company on risk – yes or no?*", and then provide a set of answers for the respondent to choose from. The modified-CDP thus created is a tool to make it easier for the mobile operator to complete.

The set of guiding response answers were developed from guidelines in the CDP5 and CDP6 information available about the Carbon Disclosure Project (CDP, 2008d), as well as from the CDP5 responses of ABN Amro Holdings (CDP, 2008a) and Rio Tinto (CDP, 2008b). The Carbon Disclosure Project for South Africa's 2007 Report regarding the JSE Top 40 companies were also consulted extensively (CDP, 2008d).

4.4 Population and Sample Size

A target population can be any collection of individuals, organisations or groupings of interest in a research study (Collis and Hussey, 2003; Leedy and Ormrod, 2005). A research sample drawn from the target population must be representative of the population from which it is drawn.

A researcher can apply various sampling techniques in order to achieve the required representation and to avoid sampling bias.

There are two categories of sampling, viz. probability and non-probability sampling. Probability sampling implies that the sample can be determined upfront based on representation whereas the same cannot be done with non-probability sampling. There are different probability sampling techniques, the most common of which include random sampling, systematic sampling and stratified sampling (Cooper and Schindler, 2006; Leedy and Ormrod, 2005).

Initially an attempt was made to be all inclusive in the sampling process and to include all the major mobile operators in Africa and the Middle East like Zain, MTN, Vodacom, Orascom, Millicom, Telecel, Econet and Orange. Due to the potential perceived 'sensitivity' of the research, however, a number of companies declined to participate. One mobile operator based in South Africa stated that they are busy with their own internal project. According to Solomon and Lewis (2002) the most important reason companies do not disclose environmental information is because of a reluctance to disclose any sensitive information.

The researcher was thus forced to employ a non-probability sampling in this research and more specifically a purposeful selection of candidates.

The population comprises all senior mobile operator managers in the Finance, Regulatory and Network disciplines. The population also includes CEO's of these companies.

The sample size was originally the entire population which includes all mobile operators in Africa and the Middle East. There are currently 176 registered telecommunications companies in Africa and the Middle East. From this list provided for reference in the Telecommunications Companies List on page 116, significant percentages are companies that are either pure fixed line or also still either not operational or very small. The overall count of mobile operators in the geographical area is thus much less than the 176 listed in Table 26 Africa and Middle East Telecommunications Companies (MNO, 2007). As already stated, the purposeful selection of candidates was from two major mobile operators operating in a geographical area of Africa and the Middle East.

4.5 Data Collection

A questionnaire with open and closed questions was used in this research (Refer to Appendix B). The questionnaire was emailed to approximately 150 participants from about 70 mobile operators in Africa and the Middle East (Refer to section 4.4 Population and Sample Size). An introductory letter (refer to Appendix A) accompanied the questionnaire.

Follow-up phone calls were made where possible, and several follow-up emails were sent.

The researcher had personal contact with the senior management of three large mobile operators in Africa and the Middle East. Their commitment for the distribution of the modified-CDP6 questionnaire internal to the organization in Africa was requested. From one of the three mobile operators there was a concern about the confidentiality aspect of the data requested, and they declined to participate. This is under general terms understandable, however it also demonstrates that the CDP and the role of environmental reporting is still seen as a “hands-off” confidential issue and a problem only to be dealt with by the organization’s Corporate Communication departments.

For many of these major Africa and Middle East mobile operators the CDP was completely unknown to several senior management employees. The senior management of the mobile operators also complained that they could not easily provide the data the CDP required. A week or even two weeks was not enough time to populate the data.

Eventually, when after several weeks of follow-up, zero responses were received from the email of questionnaire that were sent out, the further data collection focussed only on the two major mobile operators where the researcher has a relationship with senior executives. The researcher was therefore for practical reasons forced to limit the scope of this research to two companies only.

4.6 Bias

“Bias attacks the integrity of the facts. It is particularly vicious when it enters surreptitiously into the research system and goes undetected” (Leedy and Ormrod, 2005: 209). Bias is inherent in both quantitative and qualitative research. More specifically, the potential bias in this research might result from leading questions, pre-selection of ‘biased’ candidates for interviewing and personal bias in the interpretation of the results.

Given the perceived sensitivity of the business issues, some of which have already been identified, one can expect some biased view from participants.

Potential sampling bias has been discussed in the sampling procedures. Where applicable, reference to other forms of potential bias will be made.

4.7 Data analysis

A qualitative data analysis approach was followed in this research.

The main challenge to the analysis of qualitative data is that there is no clear and accepted set of conventions for analysis (Collis and Hussey, 2003).

The data analysis approach is discussed more fully in the results of section 5.2.

4.7 Limitations and delimitations

Research limitations (weaknesses) indicate areas that could have been explored to add value to the research but have not been included due to various constraints, e.g. time constraints (Collis and Hussey, 2003). The limitations in this research mainly revolve around the lack of participation by most of the mobile operators has already been discussed elsewhere (refer to section 4.4).

Delimitations indicate the scope of the research study (Collis and Hussey, 2003). The scope of the study will be limited to two mobile operators in Africa and the Middle East. The mobile operator in South Africa is not included in this study. One of the reasons for this delimitation is that in most of the African countries diesel generators are the norm and not the exception.

Secondly the rest of Africa seemingly lacks the CDP initiative, and since these perceived gaps exist, this study wishes to focus more on these developing countries.

This research will not attempt to uncover the carbon footprint of the mobile operator's organization. The focus will be only on the "Radio Network" side. The Network is the portion of the physical arrangement of base transceiver systems sites.

The researcher will also not attempt to research or to enter into the debate and market economics of the global carbon market and CO₂ trading mechanisms.

Discussions, initiatives and applications in the mobile operator's organization concerning CSR are wide. This study only focuses on the CSR aspects of the environment and those aspects applicable to the mobile operator's network infrastructure only. Current CSR consumer-related issues like the re-cycling of mobile phones and the health-related questions about the radiation of mobile phones thus falls outside the scope of this research.

Quality standards within the organisation are important. This is also the case about the environment. This study however does not provide extensive research and discussions about the mobile operator's use of quality standards in operations or reporting about the environment or sustainability.

4.8 Ethical Issues and Confidentiality

Collis and Hussey (2003) firstly suggest that no clearly defined ethical protocols exist in business research. The authors do however provide a checklist of some issues that need the researcher's attention in this regard. They are confidentiality / anonymity; informed consent; dignity and publications.

This survey investigates a number of business issues within an evolving and innovative environment. The nature of some of the information requested can be considered very sensitive. For this reason the issues raised by Collis and Hussey (2003) were given careful consideration. All participants were informed that their contributions would be completely confidential and their consent was requested prior to completion of the survey questionnaire. All communication with participants was professional and courteous, thus preserving their dignity at all times. Any publications ensuing from this research will preserve the anonymity of the participants.

4.9 Validity, Reliability and Generalisability

While it is accepted that definitions may differ depending on the research design (Easterby-Smith, Thorpe & Lowe), the definitions used here for reliability, validity and generalisability are considered sufficiently generic for these studies.

Reliability reports on the repeatability of research findings within the confines of the stated research design. If research findings can be repeated with subsequent research by the original researcher or any other researcher then the findings are termed reliable (Collis and Hussey, 2003).

Reliability is addressed here on a number of levels. Firstly, with an established questionnaire (CDP) that has already been proved in previous surveys. Secondly, cognizance was taken of the environment in which the questionnaire would be released. It has previously been shown that the elaborate structure of the original CDP questionnaire resulted in a lack of completed return information. The questionnaire here was subsequently re-engineered to improve user interface and thus facilitate response. The pilot study also assisted in this regard (see below).

Validity is defined as measure of the ability of a research protocol to gather data that truly represents what is being measured. If research findings reflect what is actually happening, i.e. the measures used accurately reflect the phenomena under study, then the findings are said to be valid (Collis and Hussey, 2003).

In this research, validity is supported by the fact that the questionnaire has been shown to yield valid data (CDP, 2008c). Furthermore a pilot study revealed that the questionnaire was easily understood and led to improved compliance in questionnaire completion.

Generalisability refers to the ability and appropriateness of extending research findings from an area under study to other areas not covered in the study (Collis and Hussey, 2003). Generalisability of results should at least be possible to the original population from which the sample is drawn. This requires meeting research design criteria such as representativeness of the sample and other sampling considerations. Generalisability is, however, often not possible beyond the target population and in the case of qualitative studies this is often due to cultural and social differences between groups (Collis and Hussey, 2003). Cognizance need to be taken of the limited sample possible from the total active mobile operators in Africa and the Middle East. Generalisability to all mobile operators in this area is thus limited.

4.10 Pilot Study

Piloting an interview helps in identifying problems of ambiguity, lack of clarity and errors with regard to the questions themselves. Piloting is done before the actual interviews are conducted or the questionnaire submitted, and allows the researcher time to take corrective actions (Collis and Hussey, 2003). Correctly designed pilot studies can improve reliability and validity of results (Collis and Hussey, 2003)

In this study a short pilot study was carried out by sending the questionnaire to two key participants and asking for their feedback. An in-depth discussion with the researcher's supervisor and statistician followed to improve on the quality of the instrument.

4.11 Summary

This chapter has outlined the general research protocol for this research. It has imposed some restrictions and constraints on the data that need to be considered in the data collection and data analysis process.

CHAPTER 5

RESULTS AND DISCUSSION OF FINDINGS

5.1 Introduction

Both the historical and the literature review have strongly supported the view that a radical rethink of corporate social responsibility and environmental issues is a priority issue globally. The results here will yield further light on this matter by providing a view of the status of carbon footprint sensitivity and commitment of African and Middle Eastern (ME) mobile operators. The results will be discussed per objective.

The data analysis of this research follows the four objectives as stated:

1. To identify strategic risks and opportunities and their implications for the mobile operator in Africa and the Middle East.
2. To determine actual absolute Greenhouse Gas emissions
3. To review if the mobile operator in Africa and the Middle East report on its GHG Emissions have appropriate data available
4. To determine mobile operator responsibility and management approach to climate change

5.2 Demographics and Responses

It was accepted from the start of this research that environmental issues might be a sensitive matter to the mobile operator. Another factor that could influence the response rate which was anticipated, is that the 'cold' communication of an email might be problematic (Cooper and Schindler, 2006). The extent of this "sensitivity" and the "human factor" of willingness to be involved in a questionnaire was, however, surprising in that a number of operators declined to participate in the survey. This survey and results discussion involves therefore only two of the "big five" operators in Africa and the ME.

The two operators included in this survey operate in 21 different African and Middle Eastern countries, and 20 responses to the survey were received from 16 of those countries, giving an overall response rate of 48%.

The total count of countries in Africa is 60 and for the Middle East, 19. Thirteen countries in Africa responded to the questionnaire and three from the Middle East. Thus from the total number of actual countries in Africa and the Middle East ratio, the response is 17%. This is summarised in Figure 25 below.

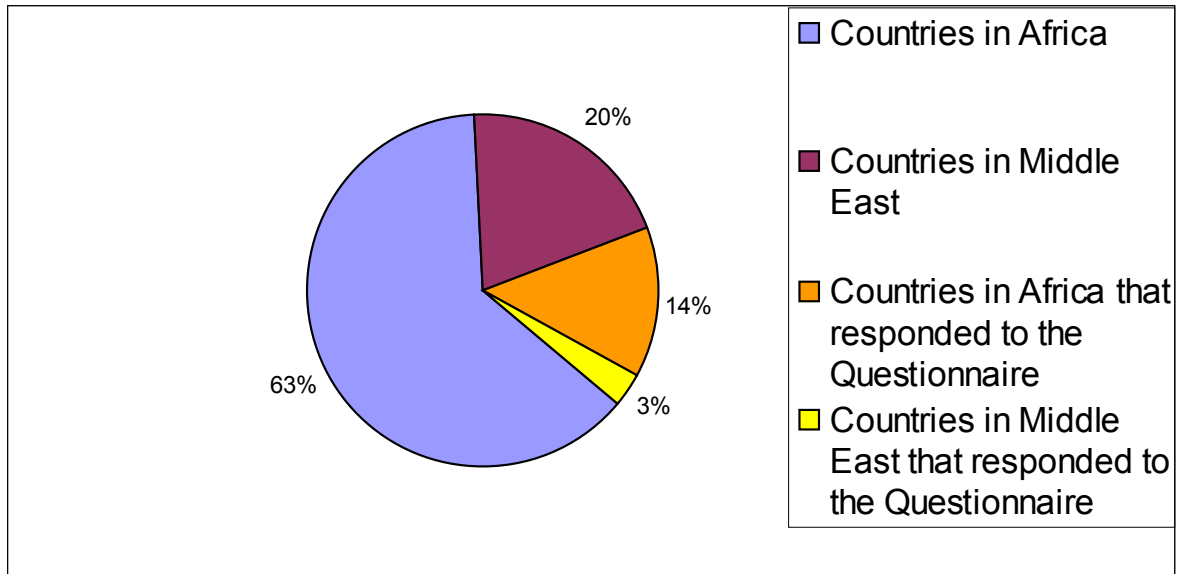


Figure 25 Response Rates

A discussion of the data analysis is reviewed here in order to facilitate an understanding of the actual results. Each table presented in the following sections is a summary of the responses and precedes a short discussion of the findings of qualitative data that was obtained.

Each table heading is a summary-reference only of the modified-CDP questionnaire (refer to Appendix B), followed by the sample response options. The best way to read and interpret the data in the tables is thus to have a separate view of the full modified-CDP questionnaire.

In general, there were two kinds of questions: One in which the respondent had to choose only one answer, and, for the second type of question, a multiple response was possible. For the first type of question, table percentages will add to 100%. For the latter responses however, the reader

will note that the percentages in the table will not sum to 100%, as the percentages given columns in the table (for these multiple-answer questions), refers to the percentage of respondents that answered that specific question. In general a percentage higher than 100% is therefore possible. To minimise possible confusion, the percentage column total have been removed, as this percentage total is not critical to the interpretation of the data.

Key:

N = the number of respondents.

Some results from the questions that were asked, delivered non-substantial results and were omitted from the discussions that follow.

5.3 Strategic Risks and Opportunities and their Implications

The first objective was to identify strategic risks and opportunities and their implications for the mobile operator. Azzone et al. (1997) support this approach in that the financial community, including banks, insurance companies and shareholders, is very much interested in future environmental analysis that allows risk management assessments beyond the current environmental issues.

5.3.1 RISKS

Table 5 Exposure to regulatory risks: If any

Possible Responses	Operator 1		Operator 2		Total	
	N	%	N	%	N	%
Yes, possible future Regulator Intervention by International Bodies	6	46.15	1	14.29	7	35
Yes, possible future Regulator Intervention from Local Government	3	23.08	6	85.71	9	45
No, none anticipated for at least next 5 years	1	7.69	0	0	1	5
No, none anticipated for at least next 10 years	1	7.69	0	0	1	5
None anticipated ever by Government to Africa or ME Mobile Operators	1	7.69	0	0	1	5
Do not know	1	7.69	0	0	1	5
Total:	13		7		20	100%

The results depicted in Table 5 immediately raise speculation as to the depth of insight of the respective operators. Both operators clearly see the future as

one of greater regulation (69% and 100% of operator 1 and 2 respectively from the total of the “yes” response). However, operator 1 views international regulation as the more possible reality (46%), whereas local regulation is viewed as a strong reality (85%) by operator 2. One can therefore speculate that at this stage two of the major participants in the mobile operator game are aware of impending controls and conceivably are strategically aligning themselves accordingly. The views of the two operators concur with the comments from Cogan (2006) that many state, national, and international regulations are putting increasing pressure on companies with emissions from operations to invest in emissions controls and that in most leading economies in the world, regulatory activity is picking up at the state and regional level.

Table 6 Exposure to regulatory risks: How

Possible Responses	Operator 1		Operator 2		Total	
	N	%	N	%	N	%
1. No exposure to physical risks from climate change	3	23.08	1	14.29	4	20
2. Limited exposure to physical risks from climate change	3	23.08	4	57.14	7	35
3. Medium exposure to physical risks from climate change	4	30.77	1	14.29	5	25
4. High exposure to physical risks from climate change	2	15.38	1	14.29	3	15
5. Very high exposure to physical risks from climate change	0	0	0	0	0	0
6. Do not know	1	7.69	0	0	1	5
Total:	13		7		20	100%

The results of Table 6, when considered in the light of what has been highlighted in Table 5, offer “food for thought”. While both operators categorically state that regulations will be imposed (Table 5), they are both very conservative as to the underlying cause for such regulations. Both operators err on the side of conservative estimates, i.e. their predictions are that climatic risks are minimal. The question then begs itself as to what is considered high risk enough as to precipitate a regulatory response? This pertinent question needs a response and may be answered in follow-up research.

Table 7 Physical Risks: Perception of Exposure

Possible Responses	Operator 1		Operator 2		Total	
	N	%	N	%	N	%
Extreme weather events - Rain and/or Flooding	9	69.23	3	42.86	12	60
Extreme weather events - Wind, Storm and/or Hurricane activity	5	38.46	2	28.57	7	35
Rising sea levels	4	30.77	1	14.29	5	25
Increased health risks to employees (For example increase of Malaria)	5	38.46	4	57.14	9	45
Changes in temperature and precipitation	6	46.15	3	42.86	9	45
Drought	6	46.15	0	0	6	30
Other natural disasters	3	23.08	1	14.29	4	20
Do not know (All above selections are nullified)	0	0	1	14.29	1	5
Total:	38		15		53	100%

The results in Table 7 do not easily yield to analysis, in that a number of choices and combination of choices were available to participants. Results are therefore not mutually exclusive. A large number of responses have been received stating that there is an expectation for extreme weather events to impact the mobile operator. A general observation can thus be made that both operators perceive the possibility of a number of climatic changes. This alone is cause for concern in that each disaster in itself holds potential catastrophic results.

Table 8 Which General Risks

Possible Responses	Operator 1		Operator 2		Total	
	N	%	N	%	N	%
Increase insurance premiums	5	38.46	3	42.86	8	40
Site outages from unavailability of power	10	76.92	4	57.14	14	70
Loss of revenue	8	61.54	4	57.14	12	60
Loss of infrastructure	6	46.15	2	28.57	8	40
Price changes prompted by resources scarcity	5	38.46	1	14.29	6	30
Possible changes in consumer attitudes (i.e. expectation from consumers that the GSM Operator utilizes Energy from Renewable Power Sources)	4	30.77	5	71.43	9	45
Production and supply chain or supply process disruption	4	30.77	0	0	4	20
Other general risks - please specify	1	7.69	0	0	1	20
Do not know	0	0	1	14.29	1	5
Total:	43		20		63	100%

Table 8 provides another view of the issues reflected in Table 7. In the same manner as no one single catastrophic event is expected, so too is no one single general risk expected. There is a definite perception of risk to “loose” sites (i.e. being off-air) as a result of power losses. This is where the mobile operator could possibly be hurt the most, as this will directly impact on revenues, also indicated by the responses. The response furthermore indicates a concern from changes in subscriber consumption patterns. This is in line with comments from Heslin and Ochoa (2008), in that a positive response from consumers is one of five key drivers of business, i.e. the opening up of new markets when positively affected by CSR initiatives. Companies will therefore need to be prepared on a wide front as bottom line considerations play out on all the issues raised in Table 8.

Table 9 Actions Taken

Possible Responses	Operator 1		Operator 2		Total	
	N	%	N	%	N	%
No, we do not have any formal planned action	4	30.77	4	57.14	8	40
No, I am not aware of any planned actions to manage the identified risks	0	0	1	14.29	1	5
No, but we are in internal discussion about creating plans	1	7.69	1	14.29	2	10
Yes, we have plans but have not taken any real action	2	15.38	0	0	2	10
Yes, we have plans and have taken specific actions	5	38.46	1	14.29	6	30
Do not know	1	7.69	0	0	1	5
Total:	13		7		20	100%

The results expressed in Table 9 raise considerable cause for concern while supporting the results given in Table 6. Both Table 6 and Table 9 suggest a “wait and see” attitude by the operators to both the advent of the dramatic climatic disasters (Table 6) and the planning around the management of the same potential disasters (Table 9). This concurs with Boiral’s (2006) explanation of companies adopting a “wait and see” approach, sometimes from a lack of market intelligence. The interpretation of the data in Table 9 is that both operators have not fully sprung into gear in strategic planning for potential climatic disasters, and this is most obvious in the approach of Operator 2.

Table 10 Reasons no Action Taken

Possible Responses	Operator 1		Operator 2		Total	
	N	%	N	%	N	%
Perceived risks are immaterial (low risk) for immediate action	1	7.69	4	57.14	5	25
Unimportant to address with existing operational demands	1	7.69	0	0	1	5
Other - please specify	2	15.38	1	14.29	3	15
Do not know	3	23.08	0	0	3	15
Total:	7		5		12	100%

The reasons the mobile operator states for not having taken any action are given in Table 10. It is clear the low perceived risk to the organisation from climate change is the major reason. This agrees with KPMG's risk preparedness framework (CDP, 2008e), and the level of importance attached to each type of risk, which differs considerably across sectors and regions (refer to Figure 24).

Table 11 Current Financial Risks

Possible Responses	Operator 1		Operator 2		Total	
	N	%	N	%	N	%
0% - No financial effects on the company at present	2	15.38	2	28.57	4	20
0.5% - Limited or insignificant financial effects at present	4	30.77	2	28.57	6	30
<1% - Small financial effects at present	3	23.08	0	0	3	15
<5% - Medium financial effects at present	2	15.38	1	15.29	3	15
>5% - High financial effects at present	2	15.38	0	0	2	10
Do not know	0	0	2	28.57	2	10
Total:	13		7		20	100%

The significance of Table 11 is that it firstly once more highlights the difference between the preparedness of operator 1 and 2. Operator 1 has already experienced the financial impact of climatic changes (impending or real), from implementation measures. This suggests that the company is to some extent proactive in its climate change strategy. Operator 2 on the other hand seems to have little or no current financial commitments to address climate change. The suggestion here is that Operator 2 lags in financial preparedness for any untoward climatic event, and most likely has not really considered the potential seriousness of the outcomes.

Table 12 Future Financial Risks

Possible Responses	Operator 1		Operator 2		Total	
	N	%	N	%	N	%
0% - No financial effects on the company foreseen in the future	0	0	1	14.29	1	5
0.5% - Insignificant or limited financial effects foreseen in the future	3	23.08	1	14.29	4	20
<1% - Small financial effects foreseen in the future	2	15.38	3	42.86	5	25
<5% - Medium financial effects foreseen in the future	4	30.77	0	0	4	20
>5% - High financial effects foreseen in the future	2	15.38	0	0	2	10
Do not know	2	15.38	2	28.57	4	20
Total:	13		7		20	100%

The results in Table 12 again support the preliminary conclusion that operator 1 is currently more committed or aware of the issues and it will be interesting to consider if this awareness has been directed to effective actions in reducing its Carbon Footprint and other related corporate social responsible actions. Operator 1 seems to anticipate future CAPEX expenditure in its preparation to climate change. Azzone (1994) stated that the financial community realises that if the company does not improve on its environmental performance, future profits might be at risk. It is therefore important for the mobile operator to provide for the financial costs and expenditure of environmental projects.

5.3.2 OPPORTUNITIES

Table 13 Anticipated regulatory opportunity

Possible Responses	Operator 1		Operator 2		Total	
	N	%	N	%	N	%
No	5	38.46	4	57.14	9	45
Yes - please specify	5	38.46	2	28.57	7	35
Do not know	3	23.08	1	14.29	4	20
Total:	13		7		20	100%

In Table 5 it was clear both operators anticipated regulatory intervention in their industry. The results of Table 13 can be interpreted to mean that although regulatory intervention is expected, no great opportunities for the mobile operator lie in this. Further exploration of the opportunities offered by the regulatory changes that have occurred in developed countries could be made.

Companies could then consider if the possibilities exist that similar changes could be promulgated in Africa and thus also similar opportunities. Understanding such changes will provide a strategic advantage to any company in gear to exploit such opportunities. In most leading economies in the world, regulatory activity is however increasing at the state and regional level (Cogan, 2006). Companies with poor climate governance will be significantly affected.

Table 14 Physical changes present opportunity

Possible Responses	Operator 1		Operator 2		Total	
	N	%	N	%	N	%
No	8	61.54	4	57.14	12	60
Yes - please specify	2	15.38	2	28.57	4	20
Do not know	3	23.08	1	14.29	4	20
Total:	13		7		20	100%

When asked if physical changes resulting from climate change present opportunities, operator 2 appears to be more confident of exploiting the physical changes that might result under climatic change conditions. Table 7 did in fact list some physical risks, but further information is required before the implication of the answers to this question can be fully interpreted. The important fact remains: both operators do feel that there are opportunities, confirming what Falck and Heblich (2007) found: that when a company identifies a certain emerging trend, it could take advantage of the situation by positioning itself favourably.

Table 15 Anticipated climate change opportunities

Possible Responses	Operator 1		Operator 2		Total	
	N	%	N	%	N	%
None - No general opportunities exist.	5	38.46	2	28.57	7	35
"Mandatory" sharing of site infrastructure	6	46.15	4	57.14	10	50
Teleconferencing service as people travel less and work from home	5	38.46	2	28.57	7	35
New or modified products and services - for which consumers pay more	2	15.38	2	28.57	4	20
Other - please specify	1	7.69	0	0	1	5
Do not know	1	7.69	3	42.86	4	20
Total:	20		13		33	100%

Both mobile operators anticipate opportunities from climate change from the results in Table 15. A high number of respondents answered the questions and the "mandatory" sharing of site infrastructure is seen as the one major opportunity to be exploited further. Forum for the Future (2008) defined other indirect opportunistic contributions ICT could make to the world, for example telework, using mobiles to remotely manage energy-using appliances, electronic commerce and video-conferencing could reduce the burden on transport infrastructures and help to reduce CO₂ significantly.

Table 16 Future products to adapt to climate change

Possible Responses	Operator 1		Operator 2		Total	
	N	%	N	%	N	%
No	4	30.77	3	42.86	7	35
Yes	6	46.15	3	42.86	9	45
Do not know	3	23.08	1	14.29	4	20
Total:	13		7		20	100%

The results recorded in Table 16 offer interesting speculation for the future consequences of corporate action with respect to investing in products and services that are designed to adapt to the effects of climate change. Personally the researcher is not aware of any existing initiatives or corporate spending to cope with the effects of climate change. For example:

- No specific strengthening of towers because of extreme wind speeds.
- No research and development funding is being spent.
- No raising of sites specifically to anticipate higher sea levels, etc.

The only explanation is that, although the question is very clear, the respondents misinterpreted it. This was evident from the additional explanations provided by the respondents when they responded "yes". (Table 16)

Table 17 Financial impact of opportunities

Possible Responses	Operator 1		Operator 2		Total	
	N	%	N	%	N	%
0% - No financial effects on the company foreseen in the future	2	15.38	2	28.57	4	20
0.5% - Limited or insignificant financial effects foreseen in the future	4	30.77	0	0	4	20
<1% - Small financial effects foreseen in the future	0	0	0	0	0	0
<5% - Medium financial effects foreseen in the future	3	23.08	2	28.57	5	25
>5% - High financial effects foreseen in the future	2	15.38	1	14.29	3	15
Do not know	2	15.38	2	28.57	4	20
Total:	13		7		20	100%

In this question, the respondents were asked to rate the impact of financial spending (relative to their existing CAPEX Budgets) on the opportunities they have identified as per Table 15. The answers are summarised in Table 17. It is clear that some spending is anticipated.

5.4 Actual absolute Greenhouse Gas emissions

The second objective for this part of the modified-CDP was to determine the actual absolute Greenhouse Gas (CO₂) emissions of the mobile operator.

- To determine CO₂ emissions under Scopes 1 & 2 of the GHG Protocol.
- To determine the percentage of energy costs from renewable sources.
- To determine if the information has been externally verified or audited.

Only one respondent (Gabon) out of 20 provided information. The information accumulated is thus not enough to draw conclusions or comparisons. It is however clear that; in general, these mobile operators do not have this data available.

The questionnaire also requested information that would allow the calculation of its carbon footprint. The questions were designed to be easy to answer, and the researcher was quite confident that the information is easy to obtain and available, i.e. quantity of generators in the network and average monthly fuel bill. With this “simple” information it would have been possible to calculate the

mobile operator’s carbon footprint for its Network. As mentioned earlier, this assumption was underestimated, and the responses received yielded inconclusive data.

This second objective of the modified-CDP, to determine the actual absolute Greenhouse Gas (CO₂) emissions of the mobile operator, is inconclusive and could not be achieved.

Boiral (2006) stated clearly that as one of the three actions an organisation should take to adopt a specific climate change strategy, it should draw up an inventory of their GHG emissions. The CERES report (2008) provided in Table 3 employs a “climate change governance checklist” to evaluate how companies are preparing and positioning themselves to address climate change. It focuses on board oversight, management performance, public disclosure, emissions accounting and strategic planning. “Check point” number 8 requests the organisation to calculate and register its GHG emissions.

It is very clear that the two mobile operators have not considered these above tasks and actions yet, and are in addition ill-prepared to provide the most basic information. For this reason the follow-up questions on (1) external verification and the (2) Standard or Protocol against the information, were removed from the results and discussion.

Table 18 GHG Emissions Inventory Accuracy Plan

Possible Responses	Operator 1		Operator 2		Total	
	N	%	N	%	N	%
No	8	61.54	6	85.71	14	70
Yes - please specify	0	0	0	0	0	0
Do not know	5	38.46	1	14.29	6	30
Total:	13		7		20	100%

According to a large percentage of respondents, no GHG Emissions inventory accuracy plan exists (Refer to Table 18). This is expected as no Greenhouse Gas (CO₂) emissions data is available.

Table 19 International Emissions Trading Strategy

Possible Responses	Operator 1		Operator 2		Total	
	N	%	N	%	N	%
No	5	38.46	5	71.43	10	50
Yes - please specify	1	7.69	0	0	1	5
Do not know	7	53.85	2	28.57	9	45
Total:	13		7		20	100%

According to the interpretation of the results from Table 19, neither mobile operator has or had knowledge of any international emissions trading strategy or initiatives.

5.5 Performance and Plans to reduce GHG emissions

The third objective is to determine performance against targets and plans to reduce GHG emissions.

Table 20 GHG Emissions reduction plan

Possible Responses	Operator 1		Operator 2		Total	
	N	%	N	%	N	%
No	5	38.46	4	57.14	9	45
Yes - then refer to the next question	1	7.69	2	28.57	3	15
Do not know	7	53.85	1	14.29	8	40
Total:	13		7		20	100%

One interpretation of the results from Table 20 is that neither mobile operator has or had substantive knowledge of any GHG Emissions reduction plan or, for that matter, – any targets. i.e., no targets are defined.

The results depicted in Table 20 would appear to be very significant in that it again demonstrate a commitment, and again operator 1 is clearly the more committed, in that only 38% commented that there was no reduction plan in place whereas for operator 2 there was a 57% surety that no reduction plans were in place. However, operator 2 participants were more informed as to what the plans were, thus there would appear to be more transparency in operator 2 environments. In fact a large percentage (54%) of operator 1 participants did not know what the targets were. Interestingly one participant from operator 1 suggested a figure of 70% reduction in emission rates targets.

The regulatory environment is shifting with increasingly demands from NGO's and governments for environmental legislation and for organisations to implement energy reduction measures, set targets and then report on these from a corporate governance perspective. ETNO (2006b) further suggests as a guiding best practise principle (to create greener energy consumption to reduce the effects of global warming), that companies:

- Monitor and measure all types of energy consumption effectively and set quantitative improvement targets.
- Identify, monitor and measure all major GHG emissions from direct and indirect activities related to running a telecommunications business.

Table 21 Operational activities to reduce emissions

Possible Responses	Operator 1		Operator 2		Total	
	N	%	N	%	N	%
No coordinated activities to reduce emissions	5	38.46	1	14.29	6	30
Activities on limited scale to reduce emissions	2	15.38	1	14.29	3	15
Process modifications	2	15.38	1	14.29	3	15
We are pilot testing (limited scale) renewable energy sources for sites	2	15.38	1	14.29	3	15
Renewable energy - wide implementation of solar where feasible	4	30.77	2	28.57	6	30
Renewable energy - wide implementation of wind where feasible	0	0	0	0	0	0
Renewable energy - wide implementation of hydrogen fuel cells where feasible	1	7.69	0	0	1	5
Renewable energy - wide implementation of geothermal energy where feasible	0	0	0	0	0	0
Renewable energy - implementation of bio-fuel	0	0	0	0	0	0
Hybrid power	5	38.46	4	57.14	9	45
Energy efficiency measures	3	23.08	1	14.29	4	20
Acquisition of energy efficient equipment	3	23.08	2	28.57	5	25
Report on water, electricity and fuel usage	4	30.77	4	57.14	8	40
Contribute to creating public awareness of climate change	1	7.69	1	14.29	2	10
Limit travel by central site monitoring equipment for remote fault management	1	7.69	0	0	1	5
Projects to add sites to the electricity grid	5	38.46	4	57.14	9	45
Offsets	0	0	0	0	0	0
Sequestration	0	0	0	0	0	0
Other - Please specify	1	7.69	0	0	1	5
Total:	39		22		61	100%

From Table 21 it would appear that there is quite a selection of operational initiatives to reduce emissions. While operator 1 appears to be spreading a strategic approach over most of these approaches, operator 2 is specialising in a few of the approaches, i.e. hybrid power, reporting on water, electricity and fuel usage as well as projects to add sites to the national electricity grid. It would therefore appear that operationally both mobile operators have options to implement and claim corporate social responsibility to reduce GHG emissions.

5.6 Responsibility and Management approach to Climate Change

The fourth objective is to determine responsibility and management approach to climate change.

Table 22 Does an overall body taking responsibility for climate change make sense

Possible Responses	Operator 1		Operator 2		Total	
	N	%	N	%	N	%
No	7	53.85	3	42.86	10	50
Yes - then refer to the next question	3	23.08	3	42.86	6	30
Do not know	3	23.08	0	0	3	15
Total:	13		6		19	100%

Studying the results of Table 22, it can be concluded that neither mobile operator is 100% convinced that there is Board or Executive level oversight over the company's climate change policies. It is a concern that there is this uncertainty. It implies that the mobile operator has not transferred and communicated its climate change strategies and policies in the organisation. It might be a challenge, as both mobile operators are multinational companies. There are different views on whether multinational companies should have a global or local CSR Strategy. There are benefits and drawbacks to both. Increased globalisation however means that international organisations are faced with a much wider range of stakeholders, sometimes including different or opposite pressures from the Head Quarter and local companies. Sustainability reporting is nevertheless a required action where an organization

publicly communicates its environmental performance to all stakeholders – including employees.

Table 23 Which Board or Executive Body takes responsibility

Possible Responses	Operator 1		Operator 2		Total	
	N	%	N	%	N	%
None - No specified in previous question	7	53.85	1	14.29	8	40
CSR function (Corporate Social Responsibility)	0	0	0	0	0	0
HR function	0	0	0	0	0	0
Regulatory function	0	0	4	57.14	4	20
Finance function	0	0	0	0	0	0
Risk Management function	2	15.38	0	0	2	10
Quality function	0	0	0	0	0	0
Operations function	1	7.69	1	14.29	2	10
Engineering function	1	7.69	1	14.29	2	10
Specially appointed committee	0	0	0	0	0	0
Other - Please specify	0	0	0	0	0	0
Total:	11		7		18	100%

Reading Table 22 and Table 23 together provide a slightly different view of the commitment of the two operators. From Table 22 it appears that operator 2 has specific bodies in place responsible for carbon foot printing management. However, Table 23 suggests that this management function resident in operator 2 is merely a regulatory one, whereas for operator 2 some, albeit minor management control, exists in the risk management section.

Table 24 Information published on GHG emissions

Possible Responses	Operator 1		Operator 2		Total	
	N	%	N	%	N	%
Nothing is published about Greenhouse Gas emissions	11	84.62	6	85.71	17	85
The company's Annual Report or other statutory filings	0	0	0	0	0	0
Formal communications with shareholders or external parties	0	0	0	0	0	0
Voluntary communications such as Corporate Social Responsibility reporting	0	0	0	0	0	0
Do not know	1	7.69	1	14.28	2	10
Total:	12		7		19	100%

One interpretation of the results from Table 24 is that neither mobile operator publishes any GHG emissions data. From the body of knowledge, some of the

reasons were established. Firstly, businesses wishing to engage in environmental disclosure face a lack of reliable and credible methodology to communicate environmental information (Dixon, 2005), and this often provides an excuse not to report on environmental issues. Azzone *et al.* (1997) states that any environmental report must be relevant, reliable, comprehensible and comparable. These measures are the four essential pillars on which any credible environmental report must be based and the absence of any one will result in a flawed report.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

The problem statement for this research is:

A positive commitment to Corporate Social Responsibility of African and Middle Eastern mobile operators can have a corresponding positive effect on its Carbon Footprint.

In responding to this statement a quick overview of the results may be advantageous. The overview picture emanating from the results is that the two mobile operators to a greater or lesser extent appear ill-prepared for the advent of dramatic climatic changes and the resultant impact this may have. Moreover they appear uncertain, or possibly reluctant, to reveal any preparation or proactive strategic intent in this regard.

Generally, the data supports the possibility that operator 2 is more proactive and committed to the issues than operator 1. However, the results do not always support this supposition.

Given this overview a general conclusion concerning the problem statement is that very little involvement in corporate social responsibility has been suggested in the results. Moreover this lack of involvement conceivably leads to a lack of awareness of potential issues and to a lack of awareness of potential opportunities.

Strategic intent and proactive strategic planning is a precursor to creating a competitive advantage. The conclusion here is that the two mobile operators are not exploiting these opportunities to gain a competitive edge. It would seem therefore that the lack of strategic intent by both mobile operators leave the path open for another of Africa's mobile operators to seize this opportunity.

The reality that carbon emissions have a long-term negative effect on the planet, and that a strategic advantage can be gained by exploiting the drive of end-users to support only "carbon footprint-friendly" organisations. Collectively therefore conclusion here is that *"The Corporate Social Responsibility of African and Middle Eastern mobile operators has a positive effect on its Carbon Footprint."*

Although some commentators might argue that telecommunications is a relatively low emitter of CO₂, and thus also in a low risk industry, the reality of climate change and the potential powerful impact that future consumer trends can have on the industry, makes it vital for the mobile operator to take cognisance of its current environment. The researcher believes the mobile operators in Africa and the Middle East indeed has a challenge ahead of them, and would suggest the following recommendations for future strategy development:

- Engage a “champion” in each operation that could spearhead initiatives in the local operation. This individual can be the communication “hub” for any initiatives, communication and reporting, and should not necessarily be in HR, Legal, Finance or any specific department. The only qualification is a passion for climate change as a subject.
- Make an effort to extract the data required to calculate the entire global operation’s footprint from the central database. Do a CO₂ footprint calculation and include this information in the next CDP submission.
- Plan far in advance to include each country operation in the activities of the CDP. It is not good enough for an “overworked”, non-interested appointed individual to report on climate change initiatives from the OPCO’s.
- As the mobile operator’s main source of emissions is on the Network, it should endeavour to build a database of all the operational options it has available in the Network to address its carbon footprint. This will form part of an overall strategy to, in addition, address the office environment, where most of the environmental discussions normally start.

The research on the topic of corporate social responsibility of African and Middle Eastern mobile operators and its carbon footprint might be the first of its kind. It is quite a challenge to collect all the data. The number of companies responding was a disappointment.

For various valid reasons, this research could not complete the calculation for the carbon footprint of the African and Middle Eastern mobile operators. This research is still crucial and should be investigated:

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- A good initiative would be to formally engage with the CDP and use their channels, name and infrastructure to carry out future research. It might be a good idea to use the modified-CDP, and try to “sell” this as a tool to be used especially for the mobile operator in Africa and the Middle East, before expecting them to complete the formal-CDP. In this way better results should be guaranteed.
 - According to CDP (2008e), further research is currently being done on how companies use the CDP data. It would be a good idea to use Africa as a geographical area and engage the largest operators with this research.

The mobile operator faces serious power supply challenges in Africa and the Middle East. The second problem (and the other side of the coin), mentioned in section 1, is how to address the climate change problem with technical measures to lower its carbon footprint. For various reasons, most mobile operators seem to be slow to adopt technical solutions at its disposal to execute a carbon footprint reduction. Further research on this is therefore recommended.

CHAPTER 7

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CHAPTER 8 RESOURCE LIST

Non-Governmental Organizations, Regulatory Bodies and Industry Associations		
www.nrdc.org	Natural Resources Defense Council	NRDC
www.climateresource.com	The Climate Resource	---
www.edf.org	Environmental Defence Fund	EDF
www.climateactionprogramme.org	Climate Action Programme	CAP
www.pewclimate.org	PEW Centre	PEW
www.wwf.org	WWF Global Conservation Organization	WWF
www.wri.org	World Resources Institute	WRI
www.greenpeace.org	Greenpeace	Greenpeace
www.climate.network.org	Climate Action Network	CAN
www.carbontrust.co.uk	Carbon Trust	Carbon Trust
www.sam-group.com	Sustainable Asset Management	SAM
www.incr.com	Investor Network on Climate Risk	INCR
www.ceres.org	Coalition for Environmentally Responsible Economies	CERES
www.incr.com	Investor Network on Climate Risk	INCR
www.wbcsd.org	World Business Council for Sustainable development	WBCSD
www.cdproject.net	Carbon Disclosure Project	CDP
www.nbi.org.za	National Business Initiative (The regional partner of the WBCSD in South Africa)	NBI
www.iea.org	International Energy Agency	IEA

Non-Governmental Organizations, Regulatory Bodies and Industry Associations		
www.wimm.nl	Foundation for Environmental management. Amsterdam Business School, University of Amsterdam.	WIMM
www.unglobalcompact.org	United Nations Global Compact	UNGC
www.businessethicscanada.ca	Canadian Business Ethics Research Network	CBERN
www.wbcasd.org	The World Business Council for Sustainable Development	WBCSD
www.gesi.org	The Global e-Sustainability Initiative	GeSI
www.atu-uat.org	African Telecommunications Union	ATU
www.itu.org	International Telecommunications Union	ITU
www.gsmworld.com	Global System for Mobile Communications Association	GSMA
www.etno.be	European Telecommunications Operators Association	ETNO
www.gemi.org	Global Environmental Management Initiative	GEMI
www.un.org	UN department of Economic and Social Affairs	---
www.nrdc.org	Natural Resources Defense Council	NRDC
www.climateresource.com	The Climate Resource	---
www.un.org	UN department of Economic and Social Affairs	---
www.atu-uat.org	African Telecommunications Union	ATU
www.climateactionnetwork.org	Climate Action Network	CAN
www.climateactionprogramme.org	Climate Action Programme	CAP

Non-Governmental Organizations, Regulatory Bodies and Industry Associations		
www.carbontrust.co.uk	Carbon Trust	Carbon Trust
www.businessethicscanada.ca	Canadian Business Ethics Research Network	CBERN
www.cdproject.net	Carbon Disclosure Project	CDP
www.ceres.org	Coalition for Environmentally Responsible Economies	CERES
www.edf.org	Environmental Defence Fund	EDF
www.etno.be	European Telecommunications Operators Association	ETNO
www.gemi.org	Global Environmental Management Initiative	GEMI
www.gesi.org	The Global e-Sustainability Initiative	GeSI
www.greenpeace.org	Greenpeace	Greenpeace
www.gsmworld.com	Global System for Mobile Communications Association	GSMA
www.iea.org	International Energy Agency	IEA
www.incr.com	Investor Network on Climate Risk	INCR
www.incr.com	Investor Network on Climate Risk	INCR
www.itu.org	International Telecommunications Union	ITU
www.nbi.org.za	National Business Initiative	NBI
www.pewclimate.org	PEW Centre	PEW
www.sam-group.com	Sustainable Asset Management	SAM
www.unglobalcompact.org	United Nations Global Compact	UNGC
www.wbcsd.org	World Business Council for Sustainable development	WBCSD
www.wbcsd.org	The World Business Council for Sustainable Development	WBCSD
www.wimm.nl	Foundation for Environmental management. Amsterdam	WIMM

Non-Governmental Organizations, Regulatory Bodies and Industry Associations		
	Business School, University of Amsterdam.	
www.wri.org	World Resources Institute	WRI
www.wwf.org	WWF Global Conservation Organization	WWF
	(The regional partner of the WBCSD in South Africa)	

APPENDICES

Appendix A Research Introduction Letter

Africa and Middle East Mobile Operators: Carbon Disclosure Research Project

15 September 2008

The Netherlands

Email: Reiner@CarbonResearch.eu

Name

Company Name

Address

Country

Greenhouse Gas (GHG) Emissions and Climate Change

Dear Sir,

Considerations of the effects of Climate Change are no longer limited to the scientific community. It is affecting us all.

According to a Sir Richard Stern "*Climate Change is global in its causes and consequences and the response to it must be international. It presents a unique challenge for economics: It is the greatest and widest-ranging market failure ever seen.*"

As part of a **research project** in Africa and the Middle East, we are assessing the potential risks and opportunities relating to climate change for the Mobile Operator. We wish to improve our understanding of the possible impacts on the Mobile Operator from regulation, technological innovations and shifts in consumer attitude - all driven by climate change.

Your participation in this survey would provide valuable input that would assist the Mobile Operator in future decision-making and strategy development. (For example: from the data received, we will do the calculations of your Operation's CO₂ Footprint and emissions intensity factor.)

The survey is based upon the CDP6, an initiative of the **Carbon Disclosure Project**², an independent not-for-profit organisation and coordinating secretariat for institutional investors with combined assets of over US\$57 trillion under management.

The **questionnaire** was developed in such a manner as to take the absolute minimum of your time (Less than 15 minutes).

² www.cdproject.net

Your individual **survey response** will be treated in utmost confidence. Your contact e-mail address would only be used to receive a copy of a report on the aggregated research results.

It is important for us to determine what the overall organization's level of understanding is about the Climate Change and the opportunities and risks, and we therefore ask that all of the following **functions in the organization** provide inputs and respond:

1. Director Operations or HOD
2. Director Regulatory or HOD ("Head of Division")
3. Director Finance or HOD
4. Director CSR (or EHS – Environmental Health and Safety)

We would like to take this opportunity to thank you in advance for your response, and look forward to receiving your information by latest **Monday 22 September 2008**.

Your co-operation would be greatly appreciated.

Yours sincerely,

Reiner Biewenga

Reiner@CarbonResearch.eu

Appendix B Research Questionnaire

A Climate Change Risks to GSM Operator

Objective: To identify strategic **risks** and **opportunities** and their implications.

1 Is your company exposed to **regulatory risks** related to climate change?

(Choose one)

Note: Regulatory risks generally arise from current and/or expected national and/or global government policy.

1. Yes, possible future regulator intervention by international bodies
2. Yes, possible future regulator intervention from local government
3. No, none anticipated for at least next 5 years
4. No, none anticipated for at least next 10 years
5. None anticipated ever by Government to Africa or ME Mobile Operators
6. Do not know

2 If answer to (1) is "yes" then please answer: How is your company exposed to **regulatory risks** related to climate change?

(Select all applicable answers)

1. Not applicable - None anticipated as per answer above
2. International regulation of emissions
3. National carbon taxation
4. National regulation of emissions limits
5. Mandatory trading programmes
6. Process or product standards set by Local Government
7. Mandatory energy efficiency standards
8. Other - please specify
9. Do not know (All above selections are nullified)

If "8. Other" was chosen, please specify:

3 How is your company exposed to **physical risks** from climate change? (**Note:** Question 4 give examples of physical risks)

(Choose one)

1. No exposure to physical risks from climate change
2. Limited exposure to physical risks from climate change
3. Medium exposure to physical risks from climate change
4. High exposure to physical risks from climate change
5. Very high exposure to physical risks from climate change
6. Do not know

4 What do you perceive are the most important **physical risks** to your company?

(Select all applicable answers)

1. Extreme weather events - rain and/or flooding
2. Extreme weather events - wind, storm and/or hurricane activity
3. Rising sea levels

-
4. Increased health risks to employees (For example, increase of Malaria)
 5. Changes in temperature and precipitation
 6. Drought
 7. Other natural disasters
 8. Do not know (All above selections are nullified)

5 How is your company exposed to **general risks** (as per list) as a result of climate change?

(Select all applicable answers)

1. Increase insurance premiums
2. Site outages from unavailability of power
3. Loss of revenue
4. Loss of infrastructure
5. Price changes prompted by resources scarcity
6. Possible changes in consumer attitudes (I.e., expectation from consumers that the GSM operator utilizes energy from renewable power sources)
7. Production and supply chain or supply process disruption
8. Other general risks - please specify
9. Do not know (All above selections are nullified)

If "8. Other general risks" was chosen, please specify:

6 Has your company taken any **action** to manage the physical **risks** you have identified?

(Choose one)

1. No, we do not have any formal planned action
2. No, I am not aware of any planned actions to manage the identified risks
3. No, but we are in internal discussion about creating plans
4. Yes, we have plans but have not taken any real action
5. Yes, we have plans and have taken specific actions
6. Do not know

7 If answer to (6) is "no" then please answer: Why has your company not taken any action?

(Choose one)

1. Perceived risks are immaterial (low risk) for immediate action
2. Unimportant to address with existing operational demands
3. Other - please specify
4. Do not know

If "3. Other" was chosen, please specify:

8 How do you assess the current financial effects of the risks you have identified and how those risks might affect your business?

(With reference to the % of impact to your **current** CAPEX budgets)

(Choose one)

1. 0% - No financial effects on the company at present
2. 0.5% - Limited or insignificant financial effects at present
3. <1% - Small financial effects at present
4. <5% - Medium financial effects at present
5. >5% - High financial effects at present

6. Do not know

9 How do you assess the future financial effects of the risks you have identified and how those risks might affect your business?

(With reference to the % of impact to your **future** CAPEX budget)

(Choose one)

1. 0% - No financial effects on the company foreseen in the future
2. 0.5% - Insignificant or limited financial effects foreseen in the future
3. <1% - Small financial effects foreseen in the future
4. <5% - Medium financial effects foreseen in the future
5. >5% - High financial effects foreseen in the future
6. Do not know

B Climate Change Opportunities to GSM Operator

10 Does the current or anticipated regulatory requirements on climate change offer opportunities for your company?

(Choose one)

1. No
2. Yes - please specify
3. Do not know

If "2. Yes" was chosen, please specify:

11 Do the physical changes resulting from climate change present opportunities for your company?

(Choose one)

1. No
2. Yes - please specify
3. Do not know

If "2. Yes" was chosen, please specify:

12 How does climate change present opportunities for your company? (Options examples are provided below)

(Select all applicable answers)

1. None - No general opportunities exist.
2. "Mandatory" sharing of site infrastructure
3. Teleconferencing service as people travel less and work from home
4. New or modified products and services - for which consumers pay more
5. Other - please specify
6. Do not know

If "4. Other" was chosen, please specify:

13 Do you have plans to invest in products and services that are designed to **adapt** to the effects of climate change?

For example:

- Research and development funding
- New patents

(Choose one)

1. No
2. Yes - please specify

3. Do not know

If "2. Yes" was chosen, please specify:

14 How do you assess the future **financial impact** of the opportunities you have identified to affect your business?

(With reference to the % of impact to your **future CAPEX** budget)

(Choose one)

1. 0% - No financial effects on the company foreseen in the future
2. 0.5% - Limited or insignificant financial effects foreseen in the future
3. <1% - Small financial effects foreseen in the future
4. <5% - Medium financial effects foreseen in the future
5. >5% - High financial effects foreseen in the future
6. Do not know

C CO2 (Carbon) Emissions Accounting

Objective: To determine actual absolute Greenhouse Gas (CO2) emissions.

15 Are you able to provide figures of your CO2 emissions under Scopes 1 and 2 of the Greenhouse Gas Protocol?

- If so, please provide the following information - Question 16 to 19.
- If not, please proceed to Question 20, and leave Question 16 to 19 blank.

(Note: The GHG Emissions explanations can be found at: www.ghgprotocol.org)

(Choose one)

1. No
2. Yes - please specify

Scope 1 Direct GHG Emissions

16 Total Scope 1 activity in metric tonnes CO2-e emitted:

Scope 2 Indirect GHG Emissions

17 Total Scope 2 activity in metric tonnes CO2-e emitted:

Electricity consumption

18 Total MWh of purchased electricity:

19 Total MWh of purchased electricity from renewable sources:

In order for us to calculate your CO2 emissions footprint please specify the following for your entire in-country operations:

Information on question 20 to 26 to be supplied by the Finance with help from Operations

20 Provide the total average monthly electricity usage for BTS, TX and MSC sites
(Consumption in kWh):

21 Please provide the total costs of the country operation in US\$ of your energy consumption from electric power

22 Provide the total amount of company vehicles running on petrol:

23 Total average monthly **vehicle** fuel amount for petrol vehicles (litres):

24 Provide the total amount of company vehicles running on diesel:

25 Total average monthly **vehicle** fuel amount for diesel vehicles (litres):

26 What percentage of energy costs are incurred on energy from renewable sources?

Information on question 24 to 31 to be supplied by the **Operations with help from the **Finance****

- 27 Provide the total amount of (Base Stations + Transmission Sites) in Network:
28 Provide the total average monthly fuel amount for sites (diesel fuel delivery in liters):
29 On how many BTS and TX sites do you have a generator installed?
30 On how many BTS and TX sites do you have renewable power installed?
31 On how many BTS and TX sites do you have hybrid power installed?
32 Current country price of diesel converted from local currency to US\$:

33 Has the information reported in response to Questions 15 to 32 been externally verified or audited?

(Choose one)

1. No
2. Yes - please specify
3. Do not know

If "2. Yes" was chosen, please specify which organisation:

34 Can you specify the Standard or Protocol against which the information was audited?

(Choose one)

1. No
2. Yes - please specify
3. Do not know

If "2. Yes" was chosen, please specify the Protocol:

35 Does your company have a system in place to assess the accuracy of GHG emissions inventory calculation relating to GHG measurement?

(Choose one)

1. No
2. Yes - please specify
3. Do not know

If "2. Yes" was chosen, please specify:

36 Does your company have a strategy participating in regional or international emissions trading schemes?

(Choose one)

1. No
2. Yes - please specify
3. Do not know

If "2. Yes" was chosen, please specify which scheme or mechanism:

D Performance

Objective: To determine performance against targets and plans to reduce GHG emissions.

37 Does your company have a GHG emissions reduction plan relating to the GSM Network in place?

(Choose one)

1. No
2. Yes - then refer to question 38

3. Do not know

38 If answer to question 37 is "yes" then:

(Please answer)

What are the emissions reduction targets?

Over what period do these targets extend?

39 What operational activities relating to the GSM Network are you undertaking to reduce your emissions?

(Select all applicable answers)

1. None - No coordinated activities to reduce emissions
2. Activities on limited scale to reduce emissions
3. Process modifications
4. We are pilot testing (limited scale) renewable energy sources for sites
5. Renewable energy - wide implementation of solar where feasible
6. Renewable energy - wide implementation of wind where feasible
7. Renewable energy - wide implementation of hydrogen fuel cells where feasible
8. Renewable energy - wide implementation of geothermal energy where feasible
9. Renewable energy - wide implementation of bio-fuel energy
10. Hybrid power
11. Energy efficiency measures
12. Acquisition of energy efficient equipment
13. Report on water, electricity and fuel usage
14. Contribute to creating public awareness of climate change
15. Limit travel by central site monitoring equipment for remote fault management
16. Projects to add sites to the national electricity grid.
17. Offsets
18. Sequestration
19. Other - Please specify

If "19. Other was chosen, please specify:

:

40 What investment relating to the GSM Network will be required to achieve the targets over the next 3 years? (Best guess information)

(Please answer)

For example: US\$ xxx over 3 years

41 Has any emissions reductions **relating to the GSM Network** been achieved to date as a result of emission reduction plans?

(Choose one and answer)

1. None
2. Do not know
3. Small amounts relative to network total emissions
4. Medium amounts relative to network total emissions
5. Good savings amounts relative to network total emissions

Approximate CO2 Percentage (%) Saving to network total emissions:

42 We would like to calculate your company's CO2 emission intensity (the ratio of CO2-e produced per subscriber)

(Please answer)

Please state your country operation's EBITDA for the last financial year:

Please state your country operation's total number of active subscribers:

E Governance

Objective: To determine responsibility and management approach to climate change.

43 Does a Board Committee or other Executive Body have overall responsibility for climate change?

(Choose one)

1. No
2. Yes - then refer to question 44
3. Do not know

44 Which Board Committee or Executive Body has overall responsibility for climate change?

(Choose one)

1. None - No specified in question 43
2. CSR function (Corporate Social Responsibility)
3. HR function
4. Regulatory function
5. Finance function
6. Risk Management function
7. Quality function
8. Operations function
9. Engineering function
10. Specially appointed committee
11. Other - Please specify

If "11. Other was chosen, please specify:

45 Please indicate whether you publish information about details of your Greenhouse Gas emissions :

(Choose one)

1. Nothing is published about Greenhouse Gas emissions
2. The company's Annual Report or other statutory filings
3. Formal communications with shareholders or external parties
4. Voluntary communications such as Corporate Social Responsibility reporting
5. Do not know

46 Do you engage with policymakers on possible responses to climate change? (For example, taxation, regulation and carbon trading opportunities?)

(Choose one)

1. No
2. Yes - please specify
3. Do not know

If "2. Yes" was chosen, please specify which organisation:

Appendix C Ranking the worlds Telecoms Operators

Rank	Company	Country	2004 revenues (million EUR)
1	NTT	Japan	80,441
2	Deutsche Telekom	Germany	57,880
3	Verizon	USA	57,411
4	Vodafone	UK	50,357
5	France Télécom	France	47,157
6	SBC	USA	32,850
7	Telecom Italia	Italy	31,237
8	Telefónica	Spain	30,322
9	BT	UK	27,475
10	AT&T	USA	24,594
11	Sprint	USA	22,091
12	KDDI	Japan	21,737
13	China Mobile	China	18,720
14	MCI	USA	16,664
15	BellSouth	USA	16,350
16	China Telecom	Chin	15,687
17	Cingular Wireless	USA	15,654
18	Telstra	Australia	13,859
19	KPN	Netherlands	12,102
20	BCE	Canada	11,881
21	Qwest	USA	11,122
22	Nextel	USA	10,767
23	Vivendi Universal Telecom	France	9,944
24	Telmex	Mexico	9,905
25	O2	UK	9,860

Continued on next page....

Rank	Company	Country	2004 revenues (million EUR)
26	América Móvil	Mexico	9,616
27	TeliaSonera	Sweden	8,980
28	KT	South Korea	8,334
29	China Unicom	China	7,720
30	SK Telecom	South Korea	7,433
31	Telenor	Norway	7,324
32	Alltel	USA	6,641
33	STC	Saudi Arabia	6,559
34	Swisscom	Switzerland	6,514
35	China Netcom	China	6,317
36	Softbank	Japan	6,231
37	TDC	Denmark	6,055
38	Portugal Telecom	Portugal	6,023
39	SingTel	Singapore	6,012
40	Belgacom	Belgium	5,540
41	Telkom	South Africa	5,376
42	OTE	Greece	5,184
43	Cable & Wireless	UK	4,754
44	Tele2	Sweden	4,716
45	Wind	Italy	4,715
46	Telus	Canada	4,693
47	Telemar	Brazil	4,362
48	Chunghwa Telecom	Taiwan	4,330
49	Auna	Spain	4,290
50	Telekom Austria	Austria	4,056

Table 25 The World's Top 50 Mobile Operators (Cogan, 2006:3)

Appendix D List of Africa and Middle East Telecommunications Companies

1. Afghan Wireless Communication Company
2. Afghn Telecom Corporation
3. Africell Gambia Ltd
4. Africell PLC Company
5. Airtel Telecom – Seychelles
6. Al Madar Telecom Company
7. Algerian Mobile Network, ATM MOBILIS
8. Angola Telecom
9. Areeba Afghanistan
10. Areeba Syria (AJSC)
11. Asia Cell Telecommunications Company Ltd
12. Atlantic Wireless Liberia Inc
13. Avea Iletisim Hizmetleri A.S
14. Bahrain Telecommunications Company
15. Bashair Telecom Co.Ltd
16. Bell Bénin Communications (BBCOM)
17. Benson Informatics Ltd
18. Cable & Wireless Seychelles Ltd
19. Cabo Verde Telecom, S.A
20. Cell C (Pty) Ltd
21. Cellcom Israel Ltd
22. Cellcom Lonestar Communications Corporation
23. Mobily (Etihad Etisalat)
24. Cellcom Telecommunication INC
25. Cellplus Mobile Communications Ltd
26. Celtel (SL) Limited
27. Celtel Burkina Faso
28. Celtel Congo Brazzaville
29. CelTel Congo SPRL
30. Celtel Gabon SA
31. Celtel Kenya Limited
32. CelTel Limited
33. Celtel Madagascar
34. Celtel Niger S.A
35. Celtel Nigeria Ltd
36. Celtel Tanzania Limited
37. CelTel Tchad SA
38. Celtel Uganda
39. Celtel Zambia Limited
40. Comium Services BVI (Liberia)
41. Comium Sierra Leone INC
42. Comores Telecom
43. Companhia Santomense de Telecomunicações
44. Congo Chine Telecom .a.r.IOasis
45. Datatel GSM
46. Djibouti Telecom SA
47. ECMS-MobiNiL
48. Econet Ezi Cel Lesotho (Pty)
49. Econet Wireless (Private) Limited

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50. Econet Wireless Burundi Limited
 51. Emirates Integrated Telecommunications
 52. Emirates Telecommunications Corporation
 53. Emtel Ltd
 54. Eritel Communication Co (Eritel)
 55. Ethiopian Telecommunications Corporation
 56. Etisalat Misr
 57. Gambia Telecommunications Company Ltd
 58. GETESA
 59. Ghana Telecommunications Company Ltd
 60. Globacom Ltd
 61. Hormuud Telecommunications Inc
 62. Irancell Telecommunications Services Company
 63. Jordan Mobile Telephone Services Company Ltd
 64. Jordan Telecom Group
 65. Kasapa Telecom Limited
 66. Korek Telecom Ltd
 67. Libertis S.A
 68. Libyana Mobile Phone
 69. Lintel (Sierra Leone) Limited
 70. Mahanagar Telephone Mauritius Ltd (MTML)
 71. Maroc Telecom
 72. Mascom Wireless (Pty) Limited
 73. Mattel Mauritania Telecom
 74. Mauritel Mobiles
 75. Médi Telecom
 76. MIC 2
 77. MIC Tanzania (Mobitel)
 78. MIC1 S.A.L
 79. Millicom chad
 80. Millicom Sierra Leone Ltd
 81. Mirs Communications Ltd
 82. Mobile Telecommunications Company of Esfahan
 83. Mobitel
 84. Moçambique Celular, SARL - mcel
 85. Moov Côte d'Ivoire
 86. Moov Gabon
 87. MTC Atheer
 88. MTC Namibia
 89. MTC Vodafone (Bahrain) B.S.C
 90. MTC-Vodafone (Kuwait)
 91. MTN (Zambia) Ltd
 92. MTN Cameroon
 93. MTN Congo Brazzaville
 94. MTN Côte d'Ivoire
 95. MTN Nigeria Communications Limited
 96. MTN South Africa
 97. MTN Uganda Ltd
 98. National Mobile Telecommunications Co
 99. NationLink Telecom
 100. Net*One Cellular (Pvt) Ltd
 101. Nigerian Mobile Telecommunications Limited
 102. Office des Postes et Telecommunications du Bénin

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103. Oman Mobile Telecommunications Company LLC
 104. Omani Qatari Telecommunications Company
 105. Onatel Burkina Faso
 106. Orange (Botswana) Pty Limited
 107. Orange Cameroun S.A
 108. Orange Ivory Coast S.A
 109. Orange Madagascar S.A
 110. Orange Mali SA
 111. Orange Réunion
 112. Orascom Telecom Algérie S.P.A
 113. Orascom Telecom Iraq Corporation
 114. Orascom Telecom Tunisie
 115. Palestine Telecomm Co Ltd
 116. Partner Communications Company Ltd
 117. Pelephone Communications Ltd
 118. PowerCom (Pty) Limited
 119. Public Telecommunications Company Ltd (PTC)
 120. Qatar Telecom (Qtel) Q.S.C
 121. Rafsanjan Industrial Complex (Coop)
 122. Rwanda Terracom
 123. Rwandacell SARL
 124. Safaricom Limited
 125. SahelCom Siege
 126. SanaTel Mobile Communications Company
 127. Saudi Telecom Company (STC)
 128. Scancom Ltd
 129. Sentel GSM SA
 130. Société Nigérienne des Télécommunications
 131. Societe Reunionnaise de Radiotelephone
 132. Somafone Telecommunications Service Company
 133. Sonatel
 134. Sotelma Malitel
 135. Spacetel – Yemen
 136. Spacetel-Bénin
 137. Sudan Telecommunication Company Ltd (Sudatel)
 138. Sudanese Mobile Telephone Co. Ltd
 139. Swazi MTN Limited
 140. Syriatel Mobile Telecom SA
 141. Telecel Bénin Ltd
 142. Telecel Centrafrique
 143. Telecel Faso SA
 144. Telecel Niger SA
 145. Telecel Togo SA
 146. Telecel Zimbabwe (PVT) Ltd
 147. Telecel-Burundi Company
 148. Telecom Development Company Afghanistan Ltd
 149. Telecom Namibia Ltd
 150. Telecommunication Company of Iran (TCI)
 151. Telecommunication Kish Co
 152. Telekom Networks Malawi Ltd
 153. Telesom Company
 154. Telma Mobile SA
 155. Telsom Mobile Somalia

156.	Thuraya Satellite Telecommunications Co
157.	Togo Telecom
158.	Tunisie Télécom
159.	Turkcell Communication Services PLC
160.	Uganda Telecom Ltd
161.	Umniah Mobile Company
162.	UNITEL S.A.R.L
163.	VM, S.A.R.L
164.	Vodacom DR Congo
165.	Vodacom Group Pty Ltd
166.	Vodacom Lesotho (Pty) Ltd
167.	Vodacom Tanzania Limited
168.	Vodafone Egypt Telecommunications S.A.E
169.	Vodafone Telekomunikasyon A.S
170.	Wana
171.	Wataniya Telecom Algérie
172.	XPress Telecommunications
173.	Yemen Mobile Phone Company
174.	Zambia Telecommunications Company Ltd
175.	Zanzibar Telecom Ltd

Table 26 Africa and Middle East Telecommunications Companies (MNO, 2007)