

UNIVERSITY OF KWAZULU-NATAL

A CONTENT ANALYSIS OF GREEN INFORMATION ON THREE MAJOR ONLINE SEARCH ENGINES

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A CONTENT ANALYSIS OF GREEN INFORMATION ON THREE MAJOR ONLINE SEARCH ENGINES

ABSTRACT

In a world where information is critical to decision making, the search for information has been made easier by the ease of access to online platforms such as articles, reviews, statistics, videos, images and even social media. A growing trend and concern is green behaviour which has emerged from concerns about the sustainability and condition of the environment. A study of the content of available online information related to how consumers can be greener would be beneficial to marketers and businesses in the process of developing their strategies to address the needs of the green consumer. The objectives of this study were to determine the extent and content of the environmental information available online which is targeted at consumers and to identify who is providing the environmental information. The content of each website listed from the search engines was evaluated against criteria from a structured research questionnaire. The study was conducted in the form of a content analysis of three major search engines which were Google, Yahoo and Bing. The study found that recycling, reducing, green products and energy efficiency were the most prevalent solutions on the environmental information sites. Profit-orientated companies and educational institutions are the major providers of environmental information available online as they collectively contributed about 70% of the information available online. Businesses should align their products in such a way that they offer solutions to environmental challenges. This should further be translated and be visible in their product labels and websites. Green marketers should consider uploading environmental information which appeals to a child audience.

Keywords: Eco-friendly, Green consumer, Pro-environmental behaviour, Content Analysis, Sustainability.

DECLARATION

I, Mandy Gweneth Mabaso, (206503334) declare that:

- The research reported in this dissertation (except where otherwise indicated) is my original research.
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- This dissertation does not contain other persons' data, pictures, graphs or other information unless specifically acknowledged as being sourced from other persons.
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CHAPTER 1 : INTRODUCTION

1.1. Introduction

In a world where information is critical to decision making, the search for information has been made easier by the ease of access to online platforms such as articles, reviews, statistics, videos, images and even social media. A growing trend and concern is for consumers to exhibit green behaviour in an attempt to sustain the environment. A study of the content of available online information on how consumers' behaviour can become more green would be beneficial to marketers and businesses in the process of developing their strategies to address the needs of the green consumer. This chapter discusses the following areas, namely, background or research context, motivation for the study, problem statement, purpose of the study, research objectives, research question, and the significance of the study.

1.2. Background

Information is a critical block in the process of decision making. Government agencies, companies, organisations and even people invest a lot of money and time in the search for information. Maiywa (2013: 36) points out that for organisations to achieve objectives like profit enhancement, counterbalancing costs of operations, business sustainability and gaining a competitive advantage in the market, they need to focus on green marketing practices for the benefit of society. Kollmuss and Agyeman (2002: 332) further support this statement saying that solutions to environmental problems must be sought at both the structural or societal level of living conditions, as well at a personal or lifestyle level.

There is increasing pressure for companies to become greener in their business activities and product offerings. This is what has led to the creation of the term green marketing defined by the Business Dictionary as “promotional activities aimed at taking advantage of the changing consumer attitudes toward brands” (Dictionary, 2017: 133). These changes are increasingly being influenced by most firms' policies and practices that affect the quality of the environment, and reflect the level of its concern for the community. Knowledge is the critical point of most of the models for pro environmental behaviour (Kollmuss and Agyeman, 2002: 328). This leads to the question of what information is easily accessible to consumers about the benefits and cost of green behaviour.

The internet has become a vital source of information and the information available online has the ability to influence consumer knowledge, opinions and decision making (Darban and Li, 2012: 13). According to Internet World Stats, the growth rate of internet users is massive, as it was listed at 28.8 % of the world population in 2010 which increased to 46% by December of 2015 (Internet-World-Stats, 2017: 4). This research seeks to determine what environmental information is available online and who the providers of such information are.

One of the trending factors of marketing in today's society is business pursuit of the green consumer. This is the consumer targeted by green marketers. Connell (2010: 283) found that lack of information negatively affects green purchase behaviour.

1.2.1. What is Environmental Information?

Environmental information is any documented information, in any form on the state of elements of the environment and their interaction (air, water, soil, land and landscape, natural sites, flora and fauna), discharges, emissions, noise, radiation, waste, measures and activities affecting the environment, and effects of the environment on conditions of human life (Endinburgh, 2017: 1).

1.2.2. Environmental Challenges

Ozone depletion is one of the examples of human activities which affect the atmosphere. This is normally caused by chlorofluorocarbons, unregulated launches of rockets, global warming, and nitrogenous compounds which have effects on eyes, skin, human immunity, DNA damage and lung diseases (Anwar et al., 2015: 7). Along with ozone depletion are water pollution challenges. Environmental pollution is the most imperative topic of our time; water pollution, in particular, affects food safety which poses health hazards to humans (Lu et al., 2015: 6). There are a number of contributing factors to this rising water crisis in South Africa. Climate change has affected water supplies within the region and infrequent rain patterns have also contributed largely (Bucciero, 2017: 4). According to Joshi and Mishra (2011: 93), consumers' values and attitudes towards the environment change due to a major increase in environmental concern and awareness in the past few decades.

1.2.3. Behaviours Worsening the Environmental Problem

Many environmental challenges today are rooted in human behaviour. For example, carbon emissions and industries are contributing to air and water pollution, thus destroying biodiversity and marine life (King, Rosmarin, Friedmann and Reyers, 2005: 15). Incorrect disposal of hazardous waste by both individuals and businesses are behaviours that worsen environmental challenges (Blackman Jr, 2016: 41). Different patterns in energy consumption by households worsen the environmental crisis as each household contributes to energy

consumption by using different appliances, transportation by not carpooling, cooling and heating of buildings by not implementing insulation, and these are normally shared by household members (Swim, Clayton and Howard, 2011: 254).

1.2.4. Solutions to Address Environmental Issues

Carbon emissions and other air pollution can be addressed by government regulations, individuals using carpooling, and businesses can contribute by strategically sourcing materials from eco-friendly suppliers (Emissions, 2010: 214). Water pollution and depletion may be addressed by government regulations promoting waste water purification, promoting initiatives such as five-minutes-showers, smart showers and by businesses disposing of waste appropriately (Syed and Muniandy, 2014: 1408). In addressing waste management, government can provide an enabling environment by implementing policies, incentives and infrastructure (such as skip bins, landfill sites and waste transfer stations), and businesses can recycle waste (Young et al., 2015: 690). In addressing energy conservation, government can invest in renewable energy solutions and promote initiatives which reduce the use of fossil fuels (Sorrell, 2015: 80). These solutions are only effective when there are proper information communication processes in place which impart knowledge to consumers and ultimately influence their behaviour.

1.3. Research Problem

Solomon (2014: 56) asserts that knowledge is a critical part of the consumer's decision-making process. Consumers first search their memory as a point of reference when remembering someone's comments, things they have seen and so forth (Kotler and Armstrong, 2013: 82). The human memory is exposed to several factors which make up their internal search; these may include social influences, morals, past experience and exposure (Fiske and Taylor, 2013: 89).

The internet forms part of the external search of many users. This has been primarily promoted by a number of available mobile devices that are internet enabled. For example, research indicates that as of January 2015, the average time spent online by an individual is 4.5 hours per day and further shows that North America has 88% internet user rate, West Europe 81%, Central East Asia 51%, and Africa 26% (Lohse, Bellman and Johnson, 2000: 29). These users start to actively look for information by asking friends and looking at adverts on the internet (Kotler & Armstrong, 2015: 73).

According to Zsóka, Szerényi, Széchy and Kocsis (2013: 136) there is a strong correlation between the intensity of environmental education and environmental knowledge, which in turn increases awareness and consumption related behavioural change. In this process the consumer

uses all kinds of information to decide which products to buy. The whole process of decision making is controlled by the availability of information (Saaty, 1990: 9). The question is what environmental information is available online which consumers have exposure to? Is there valuable information about green products and services to influence the consumer behaviour, and who are the providers of online environmental information? There is a gap in research in terms of these questions.

1.4. Research Objectives

The following are the objectives of the study:

1. To determine the extent and content of environmental information available online, targeted at consumers.
2. To find out who the providers of the online environmental information are.
3. To better understand the audience targeted by the online green information providers.
4. To find out whether the information providers benefit directly from the information they provide.

1.5. The Significance of the Study

Businesses that develop new and improved products and services which cater for the environment position themselves well to gain access to new markets, increase their profit sustainably and gain a competitive advantage over businesses which are not producing eco-friendly products. Green products contribute to greater opportunities, corporate social responsibility (CSR) ratings, government pressure or tax relief, and revenue enhancement (Miles and Covin, 2000: 308).

This study will identify what environmental information is available online and assist green and social marketers to improve the information available to consumers on green products and behaviours. It will further assist them to better adapt their overall green marketing strategies.

1.6. Literature

The environmental crisis, main consequences of the environmental crisis, responses to the environmental crisis by stakeholders such as government, business and consumers will be discussed. The Pro-Environmental Behaviour Theories covering the Theory of Reasoned Action, Theory of Planned Behaviour Model and Knowledge-Attitude-Behaviour Model will be discussed in relation to the literature. Further, the concept of green consumer behaviour, factors influencing green consumer behaviour, and the role green knowledge plays in consumer

behaviour which incorporates consumer knowledge, will be discussed. Lastly, the sources of green information, search engines and their role will be examined within the existing literature.

1.7. Research Methodology

This section discusses the research approach related to the study. It covers the research design, research methods, study location, sampling procedure, research instruments, data collection techniques, data analysis and ethical issues relating to the study. The nature of the study is in a form of deductive content analysis. This study was conducted on three online search engines which were Google, Bing and Yahoo.

The content of each website listed from the search engines was evaluated against criteria from the structured research questionnaire. The researcher conducted the content analysis using data mining and content analysis tools.

1.8. Structure of the Dissertation

Chapter 2 aims to address the questions underpinning the study and it also covers the literature of other researchers on the topic and its relevance to the study. It is an indication of what is in the current body of knowledge in environmental information.

Chapter 3 encompasses the research design followed by the research paradigm, the sampling process, reliability and validity, and ethical issues.

Chapter 4 offers an analysis of the data collected. The data is analysed according to the research objectives and themes.

Chapter 5 entails the main recommendations of the study, which are aimed at addressing the research problem, recommendations for further research and the research conclusion.

1.9. Conclusion

In a world of increasing technological influence, where knowledge is at the tip of our fingers, it has become critical to measure the extent of the information available online. This chapter offered an overview of the literature review, the motivation for the study, problem statement, the aim and study objectives, research questions, significance of the study, assumptions, study area, research methodology and the chapters' overview summary. This study contributes to the body of knowledge by offering a deeper understating of the information available online on environmental information that can influence green consumers' behaviour.

CHAPTER 2 : LITERATURE REVIEW

2.1. Introduction

This chapter discusses the following areas: the environmental crisis, the responses to the environmental crisis, the concept of green marketing, the environmental information provided online about environmental behaviour and its sustainability, the amount of information available on green consumer behaviour and its context, and the providers of green marketing information.

2.2. Environmental Crisis

What stands out amongst the most convincing argument for concentrating on environmental science, is the fact that in the perspective of many specialists, we are currently encountering an environmental crisis; in reality, many authors have indicated that the present environmental crisis is catastrophic in its nature, pace and gravity (Park, 2013: 43). There has been a major growth in the awareness of the environmental crisis due to major disasters since the 1970s. These include an explosion at a chemical plant near Seveso in Italy, Bošnjaković (2013: 1) the Sahelian droughts of the 1970s and 1980s, the nuclear accident at Chernobyl in 1986, and recently the tsunami in Japan of 2015 and most recently in early 2017 the tropical cyclone Dineo in Mozambique.

The global environment encounters problems such as the negative impact of climate change, harm to the earth's biodiversity, over-utilisation of natural resources and environmental and health issues that are critically aligned to issues of poverty and the sustainability of our ecosystem (Pradesh, 2015: 103). This increases the pressure and uncertainty within the competition for natural resources, which deepens as a result of augmented demands and reduced stability of supplies (Cordell, Drangert and White, 2009: 303). Cordell et al. (2009: 303) further emphasised this by pointing out that these challenges intensify pressure on ecosystems globally and their capability to guarantee continual food, energy and water security.

The more organisations continue to chase improved bottom lines, the more ecological systems suffer (see Figure 2.1).

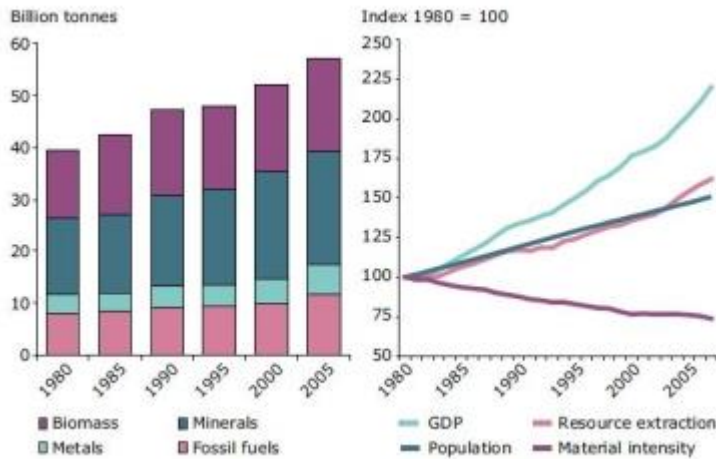


Figure 2.1: Global Extraction of Natural Resources from Ecosystems and Mines, 1980 to 2005/2007

Adapted from Stephan Lutter et al. (2014: 3)

The environmental crisis in some countries like South Africa is primarily looked at as an act of God instead of it being looked at as a government policy issue that may be avoided or minimised by humans (Redclift, 2010: 44). The environmental crisis is difficult to manage as it requires a collective effort.

Straughan and Roberts (1999, cited by Ali and Ahmad, 2016: 85) argued that environmental issues have had a series of stages, beginning during the 1960s with the green concept focusing more on energy saving and pollution. Subsequently, due to increased social and political pressure, businesses progressed to implementing environmentally friendly behaviours such as recycling, alternative packaging, product redesign and alternatives to some products and materials.

2.3. Main Consequences of the Environmental Crisis

Climate change is a change in global or regional climate patterns; the change has been apparent from the middle to late 20th century forward, and is largely as a result of the high levels of carbon dioxide in the atmosphere produced mainly by the use of fossil fuels (Allaby and Park, 2013: 93). The major consequences of the environmental crisis are stratospheric ozone depletion, air and water quality degradation, land contamination and filling of dumping sites, land usage change and habitat loss, and the loss of biodiversity (Alexander, 2016: 9).

Stratospheric ozone depletion is the thinning of the stratospheric ozone which forms a protective barrier around the earth to protect it from harmful solar ultraviolet (UV-B) radiation (Downie, 2013: 374). After much scientific debate, a consensus was reached that

Chlorofluorocarbons (CFCs) are primarily responsible for the damage to the ozone layer (Downie, 2013: 374).

Decrease in air quality is a result of high levels of air pollution which includes a tropospheric ozone, oxides of nitrogen, oxides of sulphur, lead and various aromatic compounds (such as benzene) which may lead to or exacerbate respiratory and cardiovascular illnesses (Hamilton, Gemenne and Bonneuil, 2015: 67).

Water quality degradation is the pollution of water bodies like lakes, rivers, oceans, aquifers and ground water by contaminants resulting in human health hazards and destruction to the lives of animals and plants in a particular environment (Allaby and Park, 2013: 48).

Land contamination and filling of dumping sites: A study revealed how dump sites have led to contamination of the land which they fill and how they affect the potential hydrogen (pH) of the land, and how they have negatively impacted the plant population within the area (Ali, Pervaiz, Afzal, Hamid and Yasmin, 2014: 62).

Soil erosion and degradation are prevalent problems caused by deforestation and climate change (Ochoa, et al., 2016: 31). The replacement of forest trees and plants with commercial crops which do not hold the soil has also largely contributed to soil erosion (Shiva, 2016: 138).

Land use change and habitat loss: The implications associated with land use and habitat loss primarily emanate from preparation of land for urban growth, the improvement and advancement of the existing infrastructure (like the construction of a new road and rail networks), the drainage of wetlands, and the destruction of coastal mangrove forests (Downie, 2013: 454). The increasing demand for agricultural land and urban development has resulted in massive deforestation which in turn results in habitat loss (Jantz et al., 2015: 1129).

Loss of biodiversity. Contaminated water results in existing plants and animal species at risk of becoming extinct. Spread of diseases and the destruction and degradation of habitats has been experienced in many areas which have been converted to urban areas (Downie, 2013: 481).

The environment is the supporter of life and this section has broken down the impact of the environmental crisis into simple elements. Some elements of the environmental crisis such as air and water pollution directly impact humans and other species in the ecosystem (Hallström, 2005: 27). These environmental consequences may affect future generations if left unmanaged. As part of the solution, it is important to devise interventions that will improve human beings' understanding and behaviour. This section provided an overview of the consequences which

impact on human beings and other species relating to environmental issues. A response to them is essential from government, consumers and business in creating a sustainable environment.

2.4. Responses to the Environmental Crisis

In spite of the wide variety of interventions implemented to address the environmental and health crisis, the toll that humans have had on environmental sustainability has remained a concern, hence, governments and other non-profit organisations such as Friends of the Earth, Greenpeace, Global Environment Facility and World Wide Fund for Nature took the initiative to devise several plans for saving the planet (Goudie, 2013: 67). This section discusses the responses that may be explored to mitigate the impact of the environmental crisis.

2.4.1. Government Responses

This section discusses some government interventions that may be used to respond to the environmental crisis, namely, the promulgation of environmental laws, introduction of tax credits or tax relief for coping with those laws, community education initiatives and punitive measures to address non-compliance.

In response to global environmental challenges, governments have introduced laws with the objective of discouraging the indiscriminate promotion, sale, and consumption of non-eco-friendly products (Rajasekar and Devi, 2014: 2585). For example in South Africa, the government introduced the regulatory framework relating to air quality, water and waste management in 2004 and the minimum emission standards published in November 2013 in an endeavour to reduce the environmental crisis (National Environmental Africa, 2014). The government policy of abolishing free plastic bags offered to customers by supermarkets and the use of recyclable paper bags instead, is one of the responses that government has introduced to minimise the negative ecological effects (Ohtomo and Ohnuma, 2014: 7). Carbon emissions tax introduced by the South African government is supported by Convery, McDonnell, and Ferreira (2007: 2) citing that product taxes, in addition to influencing consumer behaviour, can lead to efficiency and environmental improvements at a minor cost.

Promulgation of laws that promote eco-friendly behaviour has been a buzz word in other countries as well. For example, in Australia, the government passed laws such as the Natural Resources Management Act of 2004, and the Greening of Government Operations Framework and the National Action Plan for Salinity and Water Quality (South - Australia, 2003: 1)

What is not clear in these government interventions, is how they educate (or force businesses to educate) communities on environmental issues. The next question would be what initiatives has the South African Basic Department of Education implemented to educate learners in

schools about environmental issues? Wals, Brody, Dillon and Stevenson (2014: 1) point out that the issues of climate change, and loss of biodiversity are highly complex and contested in both science and society, thus making education around these issues extremely difficult.

Another thorny issue is related to punitive measures that governments may implement to address non-compliance with environmental laws and regulations of each country. Konisky and Teodoro (2015: 572) found that governments infringe on environmental laws significantly more often than private firms but there is a lower chance of them being penalised for their violations. On the opposite end, if companies are complying with environmental laws government may provide incentives to those companies in order to harness compliance (Haas, 2015: 264).

Research by Chen and Chai (2010: 33) found that a relationship exists between consumers' attitude on government's role and their attitude on green products, and this was further echoed by Tsen, Phang, Hasan and Buncha (2006: 50) with findings showing that there many people with genuine environmental concerns but who have a strong belief that care of the environment is the primary responsibility of government. Chen and Chai (2010: 33) further found that customers who are for the environment could sacrifice the country's economic growth and let government spend on environmental protection initiatives.

In closing, Haywood, Brent, Trotter and Wise (2010: 342) pointed out that it is imperative for policy-makers and others stakeholders interested in upholding a consumer attitude of green consumption, to promote a positive attitude towards it. Governments are crucial stakeholders because of their power to enact laws and regulations which promote, monitor and enforce implementation of pro-environmental behaviour to businesses and consumers.

2.4.2. Business Responses

Deshpande (2011: 3) described green marketing as all those actions designed to create and facilitate any exchange intended to fulfil human wants or needs in a way that has little negative impact on the global environment. Polonsky (2014: 124) further defined green marketing as those actions designed to generate and facilitate any exchange with the intention of satisfying human needs while caring for the planet.

There is a widely held public view that poor economic development initiatives or conditions are not only harmful to the environment, but they are also unfavourable to societal welfare as addressed by the famous phrase in business 'corporate social responsibility' (CSR) (Schubert, Kandampully, Solnet and Kralj, 2010: 286). Gule and Maduku (2017: 2) argued that it is crucial for businesses to initiate strategies which stimulate the consumption of green products among

consumers. The study conducted by Chan, Hon, Chan and Okumus (2014: 25) revealed that providing regular training on environmental issues to employees is likely to provide solutions to improve environmental performance and the image of an organisation. This implies that businesses may respond to environmental challenges by engaging their staff members.

Businesses are about enhancing bottom lines and most often than not, investors face the dilemma of choosing to be either environmentalists or economists (Zokaei, Lovins, Wood, and Hines 2013: 53). Welford (2013: 17) states that the environment may be considered after profits. This implies that green initiatives may not be pursued if an organisation is unable to make a profit from it. Social and political pressures have influenced companies to change from only addressing pollution and waste disposal to adding another dimension of developing different package designs and devising promotional strategies to keep up with the green evolution (Straughan & Roberts, 1999: 558). The role played by businesses in consumer education may assist them in gaining market share and competitive advantage. In support of this assertion, Chen (2005: 25) points out that green purchasing according to International Standards (ISO14000), can encourage the implementation of pollution prevention by firms from the inception stage. Education of a society may promote green consumption, which leads to the attainment of both environmental and financial performance.

Businesses contribute largely in the environmental crisis in that they manage waste from cradle to grave, manage greenhouse gases, carbon emissions and so forth. They can further play a role in the environmental crisis by acquiring goods from suppliers that produce eco-friendly products and incorporating 'green concepts' into their marketing strategies. Bhaskaran, Polonsky, Cary and Fernandez (2006: 684) affirmed that the adoption of environmental standards is often determined by the market power of value-chain intermediaries and not necessarily by the market power of consumers.

Prusynski (2008: 2) recommends that businesses should procure hybrid vehicles as part of the organisational fleet, utilise green web hosting, conduct an energy audit, print less by using less paper, use digital software to store documents, conserve electricity, institute a company recycling program for electronics, build green offices from the floor up and conduct staff training on environmental issues. This implies that businesses should develop strategies which incorporate green initiatives.

The consensus drawn from the literature as the key phrase in the description of environmental sustainability is 'caring for the planet'. Profitability of green products accompanied by consumer demands, may motivate businesses to invest more in green initiatives. According to Prakash (2002: 292) consumers make purchasing decisions based on available information,

provided that the information is useful in assisting consumers make informed decisions. Businesses' response is essential in solving the environmental crisis. The initiatives implemented by businesses are easily transferred to consumers as the more green products are made available, the more interest will grow from consumers to buy them.

2.4.3. Consumers Responses

The green consumer's role in the midst of the environmental crisis is to buy eco-friendly products, behave in an environmentally friendly way, and reject non-environmentally friendly products. This action has the power to influence businesses to produce more green products. Research in the last decade has indicated that consumers are aware and are willing to pay more to 'go green' (Rahbar and Abdul 2011; Lee, 2008). On the other side, Joshi and Rahman (2015: 136) argued that products' functional attributes and consumers environmental concerns are the two major causes of green purchasing behaviour. Organisations and consumers should share a responsibility towards environmental issues and, by the purchasing of green products, consumers participate in this process (Delafrooz, Taleghani, and Nouri, 2014: 34).

Joshi and Rahman (2015: 129) stated that consumers can indirectly mitigate environmental harm by purchasing green products as this may help consumers derive good health from the process. Consumers' attitudes to green product consumption is a pertinent element in encouraging purchasing of green products (Sheth, Sethia and Srinivas, 2011: 21).

2.5. Pro-Environmental Behaviour Theories

This section explains models or theories applicable in predicting human behaviour, namely, the Theory of Reasoned Action, the Theory of Planned Action and the Knowledge-Attitude-Behaviour Model.

2.5.1 Theory of Reasoned Action

The Theory of Reasoned Action is a theory applied by researchers to investigate human behaviour in the disciplines of social psychology in the prediction of various social behaviours in literature (Mishra, Akman and Mishra, 2014: 26). This theory is about two variables which are attitudes towards behaviour and subjective norms; these variables influence behavioural intention which ultimately determines behaviour. The theory posits that intentions to participate in a behaviour are most influenced by individuals' attitude toward participating in the behaviour and their perceptions of the norms associated with it (Sable, Schwartz, Eleanor and Lisbon, 2006: 21).

2.5.2 Theory of Planned Behaviour

The Theory of Planned Behaviour is an adaptation of the Theory of Reasoned Action which additionally includes perceived behavioural control to improve the predictive power of the Theory of Reasoned Action (Madden, Ellen and Ajzen, 1992: 3). This model is applied to assess the psychological variables which are elements of green consumer behaviour.

2.5.3 Knowledge-Attitude-Behaviour

This model uses three variables: **knowledge** which affects **attitude** leading to a change in **behaviour** (Pui, Nicol, Brauer, Palad and Carlsten, 2017: 17). Putting this into context, the Knowledge-Attitude-Behaviour intends to explain the relationship that environmental awareness (knowledge) has in predicting an environmental concern (attitude) which leads to pro-environmental behaviour. Most research studies utilising this model are health related studies (Qu et al., 2009; Bettinghaus, 1986; Kistler et al., 2017).

The above theories explain the variables of human behaviour and can be used to further clarify the concept of consumer knowledge, attitudes, intentions and behaviours. The study is concerned about how green information (knowledge) is available online which can influence consumer attitude and behaviour to be greener.

2.6. The Concept of Consumer Behaviour

The theoretical foundation for this study is the theory of consumer behaviour and the factors that influence this. According to Babu, Vani and Panchanatham (2009: 60) consumer behaviour is defined as study of individuals, groups, or organisations and the processes they choose to implement, acquire, utilise, experience services, dispose of products, and the impact that these processes have on the consumer and society.

Behaviour is normally referred to as a process which occurs primarily at an individual, group level (for example friends sway each other on what type of clothing brands one wears) or an organisational level (for example management at work decides on which products the organisation uses). Consumer behaviour encompasses the consumption and disposal of products, together with the study of how they are procured. Consumer behaviour incorporates products, services and ideas (Schiffman, O'Cass, Paladino and Carlson, 2013: 4). Consumer behaviour research assists in the enhancement of understanding and estimating of not only the theme of product acquisition but also the rationale behind purchasing, how often purchasing occurs and so forth (Stávková, Stejskal and Toufarová, 2008: 283).

The process of assessing and analysing consumer behaviour assists marketers to improve their marketing strategies. Learning that new products are usually initially adopted by a few

consumers (referred to as early adopters) and only adopted by masses later in the product life cycle, marketers pick up that businesses that introduce new products should have adequate cash flows to survive until their products are well known in the market (Stávková et al., 2008: 283).

2.7. Factors Influencing the Consumer Behaviour

The primary factors influencing consumer behaviour are cultural, social, personal and psychological (Armstrong et al., 2014: 43).

2.7.1 Cultural Factors

Glocalization, has become a term that popularly refers to business operation strategies being aligned to both the global and local community needs (Drori, Höllerer and Walgenbach, 2014: 86). One of the reasons for implementing this approach is to address cultural factors. When it comes to understanding the needs and behaviours of individuals, culture is crucial (Horner and Swarbrooke, 2016: 57). Culture is part of the external influences that impact consumers. Humans are not born understanding their culture; however, it is introduced to them as they grow. Individuals are influenced by their families, friends and society within their cultural environment and, in the process, individuals learn their values, preferences, knowledge, beliefs, morals and their culture (Rani, 2014: 54). It is therefore crucial to understand the cultural dynamics of the market and tailor products and marketing strategies to the target market.

2.7.2 Personal Factors

Personal factors may affect consumer behaviour. These factors are unique in nature for each consumer in the market. Under these factors, demographics such as place of residence, age, gender, occupation, economic situation, personality and self-concept may be located (Horska and Sparke, 2007: 352). Gifford and Nilsson (2014: 11) concluded that individuals with a personal and social profile who has specific attributes such as having spent time in nature as a child, an accurate knowledge of the environment, its problems and potential solutions is likely to care about the environment.

2.7.3 Psychological Factors

The psychological factors include motivation, skills, knowledge, lifestyle, positions, and personality. Perception is about how an individual or group views a specific reality; it is the process of selection, processing and the interpretation of input data from the environment to make them purposeful. Personality is what renders a person unique and is created by inner characteristics and affects consumer behaviour. Consumers' skills and knowledge are linked to understanding changes of consumer behaviour (Stávková et al., 2008: 277).

A meta-analysis of eighteen papers revealed that the majority of researchers concurred that environmental knowledge had a positive effect on consumers' purchase intentions and on their actual buying of green products (Joshi and Rahman, 2015: 140). Similarly, a study conducted by Aman, Harun and Hussein (2012: 162) also found a positive correlation between environmental concern, environmental knowledge and green purchasing behaviour. On the contrary, a study conducted by Rahman (2016: 5361) revealed that knowledge about the environment was not a direct contributor to environmental behaviour but it influenced attitude, which ultimately affected behaviour, even though information resources, environmental facilities and social factors did contribute to environmental behaviour. Environmental attitudes have a considerable influence on environmental behaviour and the commitment to address environmental sustainability in the long term (Dutta, 2014: 95).

The environmental attitudes have a strong influence on environmental behaviour and that the level of environmental knowledge controls this relationship (Fraj-Andrés and Martínez-Salinas, 2007: 97). Further, subjective knowledge showed indirect effects on pro-environmental behaviour through environmental risk perception and willingness to pay for products which are environmentally friendly (Onel and Mukherjee, 2016: 328). Therefore, the relationship between attitudes and behaviour is formed by the existence of other moderating variables such as environmental knowledge and a sense of responsibility as predictors of environmental behaviour (Tang, Fryxell and Chow, 2004: 98).

2.7.4 Social Factors

Situational factors may influence consumers' purchasing decisions; this may be guided by the social environment, actual environment of the purchasing place and time (Rani, 2014: 60). Similar values, behaviours, lifestyles and interests are normally found in individuals within the same social class, where, three generic categories are assigned which are lower class, middle class and upper class (Spaargaren and Van Vliet, 2000: 70). Rani (2014: 60) further asserted that consumers from different social classes have different needs and consumption patterns. These disparities are as a result of different levels of purchasing power and is essential to understand what social class is targeted as the buying patterns and behaviour of a particular social class is normally pretty similar (Burnett, 2011: 84).

Social factors are further sub-divided into variables which are the 'reference groups', 'roles in society', and their 'social status'. Reference groups are made up of people that individuals compare themselves with. The reference group may be relatives, co-workers, neighbours, family members or friends (Armstrong et al., 2014: 44). 'Roles in society' imply that individuals play a number of roles in a society depending on the group they belong to. For

example, an individual who is an Executive Director is a manager to his subordinates in a particular organisation can be a husband to his wife at home. Hence, purchasing patterns of individuals may be influenced by their various roles in a community. Social status implies that an individual from an upper middle class would spend money on trendy objects whilst an individual from middle to lower income class may spend their money on basic items needed for survival (Armstrong et al., 2014: 44).

This section discussed factors influencing consumer behaviour, which are cultural factors, personal factors, psychological factors and social factors. In a nutshell, the availability of environmental information from different platforms, including online information about green products influences individuals' behaviour. The more information available online, the higher the potential influence they have on consumers' behaviour (Fraj-Andrés and Martínez-Salinas, 2007: 100). This research therefore investigates online environmental information.

2.8. The Concept of Green Consumer Behaviour

Green purchasing refers to the buying of environmentally friendly goods and avoiding goods that are harmful to the environment (Chan, 2001: 390). Green purchasing is often measured as a combination of green purchase behaviour and intention. Green purchase intention refers to consumers' willingness to purchase green products (Joshi and Rahman, 2015: 131). Many studies have reported a discrepancy between actual purchasing practices and consumers who expressed favourable attitudes while exploring green purchase behaviour (Vermeir and Verbeke, 2006: 2008). One of the trending marketing factors in today's society is businesses' pursuit of the green consumer. This is the consumer targeted by green marketers. Connell (2010: 284) found that lack of information negatively affects green purchase behaviour.

2.9. Factors Influencing Green Consumer Behaviour

Pro-environmental consumers largely behave similarly to normal consumers as their behaviour is informed by the same factors, which are (1) Situational factors - factors representing situational forces that impact the consumers decisions about green purchasing (2) Product price; (3) Product availability; (4) Social and reference groups; (5) Product attributes and quality; (6) Brand image and (7) Eco labelling and certification (Joshi and Rahman, 2015: 133).

In relation to *price*, they found that extremely higher prices of green products negatively influence green product purchase intentions and behaviour (Joshi and Rahman, 2015: 134). Ekpe, Adubasim and Adim (2016: 54) concluded that price was a critical factor which influenced online consumer purchase behaviour. Consumer purchase intention is directly and positively influenced by a low price level (Somervuori and Ravaja, 2013: 485).

In relation to *product availability*, the research showed that unavailability and inconvenience associated with acquiring a product tends to discourage green consumers from buying a product. Nguyen, Phan, Cao and Nguyen (2017: 5) mentioned that high price, product unavailability, lack of credibility of eco-labels, and limited product information are primary barriers to purchasing green products. The indirect effect of product availability on purchase intentions forces consumers to rely on different product aspects when making their purchase decision (Steinhart, Mazursky and Kamins, 2013: 225).

Reference groups were found to have a positive relationship with consumer green purchase behaviour. Cours, Walker and Kiesler (2007: 471) argued that reference groups such as siblings play an important roles in influencing brand preferences. Kaushal (2011: 79) also concurred that reference groups play influential roles in consumer buying behaviour. Consumers adjust their views about a brand to be in line with their self-brand connection and the influence of reference groups (Hammerl, Dorner, Foscht, Brandstaetter and Maloles, 2013: 431).

In relation to *product attributes* and *quality* the study by Joshi and Rahman (2015: 134) gathered that functional and sustainable features of products, together with superior product quality, have positive influences on consumers' green buying behaviour whilst inferior product features may lead to a disjuncture between a consumer's sense of responsibility toward the environment and their personal needs. Cerjak, Mesić, Kopic, Kovačić and Markovina (2010: 292) supported this assertion, pointing out that features such as taste and healthiness of products are vital elements for consumers who buy green products.

With regards to *store-related attributes*, Joshi and Rahman (2015: 135) found that store related features positively affect consumer green purchase behaviour. Store attributes are one of the motivating factors that consumers consider in purchasing a product or service (Van Kenhove, De Wulf and Van Waterschoot, 1999: 125). The study conducted by Ghosh, Tripathi and Kumar (2010: 84) added that customers are more attracted by store attributes such as efficient billing systems, visual merchandising, informative signage within the store and prompt staff.

In relation to *brand image*, there was no conclusive evidence to support the argument that brand image influences consumers' green purchase behaviour. Zhang (2015: 60) stated that even though there is lack of evidence linking consumers' green behaviour and brand image, consumers essentially make their purchase choices based on the brand image rather than the product itself.

Lastly, on *eco-labelling*, D'Souza, Taghian and Lamb (2006: 8) found that there are consumers who would buy green products regardless of the price (either lower or higher than the next best

alternative) as long as the eco-label is visible. Pedersen and Neergaard (2006: 25) conclude that society sees a benefit in eco-labelling as it reflects compliance with environmental standards.

Straughan and Roberts (1999: 559) found that a number of demographic variables (age, gender, income, education, place of residence) are correlated with green consumer behaviour. More recently, studies have also focused on the influence of sociodemographic factors (such as age, gender and education) on the pro-environmental lifestyle adoption decision (e.g. Jansson, 2011: 193; Ziegler, 2012: 1392). With regards to **age**, Tobler, Visschers and Siegrist (2011: 679) state that older individuals concentrate more on health motives whilst younger individuals are more likely to be motivated to purchase environmentally friendly products for environmental reasons. The environmental knowledge varies among different demographic groups, with the better educated, younger, well-off individuals and those residing in urban areas had a better understanding of environmental issues (Stoimenova, 2016: 502). This supports the assertion that age is one of the factors contributing to consumer behaviour and preferences.

With regards to **gender**, Mostafa (2007: 225) concluded that men are generally more concerned about environmental problems than their female counterparts and have a more positive outlook towards green purchasing than women. On the contrary, Lee (2009: 93) had females scoring significantly higher on environmental attitude, environmental concern (among other variables) and green purchase behaviour than their males counterparts. In short, this means that gender as a variable has a role to play in green consumer behaviour.

In a study by Zhao, Gao, Wu, Wang and Zhu (2014: 149), it was pointed out that **income** is commonly believed to be positively related to environmental sensitivity. These authors explain that individuals can, at higher income groups, tolerate the marginal increase in costs related to supporting green movements and preferring eco-friendly product offerings. Regarding **education**, the research finding by Shahnaei (2012: 138) relating to the relationship between educational levels and green purchase behaviour, showed that the higher the education level, the more positive the impact on green purchasing among consumers. With regards to **place of residence**, the research pointed out that people dwelling in urban areas were more likely to care for environmental issues (Straughan and Roberts, 1999: 559).

According to Vicente-Molina, Fernández-Sáinz and Izagirre-Olaizola (2013: 132), objective and subjective knowledge influences pro-environmental behaviour. The effects of psychosocial variables on pro-environmental behaviour are facilitated by pro-environmental behavioural intention and social norms which are created within individuals through education and the media. Information and knowledge seem to influence pro-environmental behaviour through

attitudes and behavioural intentions (Bamberg and Möser, 2007: 25), hence, environmental education may be essential for individuals to acquire environmentally friendly behaviour (Ballantyne, Connell and Fien, 1998: 296). A shortage of knowledge or the holding of contradictory information might limit pro-environmental behaviour (Vicente-Molina et al., 2013: 132). This implies that knowledge plays a pivotal role in shaping the way individuals perceive the environment and in the long-run can contribute to saving the planet.

2.10. The Role Green Knowledge Plays in Consumer Behaviour

There have been numerous attempts at understanding green consumer behaviour. Kollmuss and Agyeman (2002: 241) stated that the question of what makes people act in an environmentally friendly way is complex and cannot be simplified into one model. They found that environmental knowledge forms part of most models that attempt to explain pro-environmental behaviour but that knowledge does not necessarily equal pro-environmental behaviour. There may be a need to evaluate the level of knowledge, as there is an understanding that people do not know enough about the environment to act in an environmental friendly way (Kollmuss & Agyeman, 2002: 241). Similarly, the variables of perceived behaviour control and green purchasing intentions were found by Chen and Deng (2016: 950) to be significantly influenced by product knowledge.

According to Hirsh (2014: 238), there is a positive correlation between environmental knowledge, environmental concerns and behaviour. Knowledge plays an influential role within all the variables affecting consumer behaviour; the amount of information a consumer has determines how they view every aspect of a product and how much effort they put to searching for alternative greener products (Lee, 2010: 42). Fraj-Andrés and Martínez-Salinas (2007: 97) established that environmental behaviour is considerably impacted by environmental attitudes and the level of environmental knowledge.

2.10.1 Consumer Knowledge

Consumer knowledge can be labelled as the amount of information a consumer has about the benefits, dangers, features, functions, support and risks of using a product (Maniatis, 2016: 12). Consumers are more inclined to develop a positive attitude towards purchasing a particular product or service if they are exposed to more information and their intention to purchase is also enhanced through knowledge (Pagiaslis and Krontalis, 2014: 346). This suggests that, in order to influence consumer behaviour towards green consumption, sufficient consumer knowledge plays a vital role. It can be concluded that availing sufficient information to consumers about a product can have an influence on consumer behaviour leading to green product consumption (Gule and Maduku, 2017: 2).

2.10.2 Environmental Knowledge

Existing literature suggests that consumer knowledge is one of the greatest factors affecting green purchase behaviour (Ariswibowo and Ghazali, 2017; Lee, 2010; Mostafa, 2007; Kolbe, 2015). The extent of environmental awareness by consumers facilitates the relationship between consumer intentions and attitudes to their behaviour. Joshi and Rahman (2015: 137) asserted that ample information available about green products may result in strengthening consumer confidence in green products, which further supports attitudes towards green consumer behaviour. On the contrary, limited consumer knowledge about the green products prevents consumers from channelling their attitudes towards green purchases (Joshi and Rahman, 2015: 137).

Wolsink (2007: 1201) argued that there is a limited relationship or association between consumers' knowledge levels and a pro-environmental attitude as well as decisions leading to purchasing green products. This may support the point that some people require by-laws to be in place and be visible before they comply with environmental regulations. Another example relating to limited information about required green behaviour could be green consumers purchasing compact fluorescent light bulbs but then failing to dispose of them in the dedicated disposal location due to the lack of knowledge of their effects on the environment. The first intention of purchasing a light bulb that saves energy shows that the consumer is conscious of environmental issues, however due to limited information about the appropriate place of disposal the action somewhat counteracts the initiative. Mondelaers, Verbeke and Van Huylenbroeck (2009: 1130) concluded that consumers appreciate simplified and user-friendly information about products. This point may take the argument back to the marketing strategy on green product branding which suggests that appealing green branding (including eco-labels) and information may help in simplifying consumer concerns. Eco-labels attached on green products without prior consumer awareness campaigns and education may reduce eco-labels' effectiveness as consumers may not trust the labels (Joshi and Rahman, 2015: 138).

2.10.3 Types of Environmental Knowledge

Limited knowledge of environmental issues by consumers precludes the appreciation of a broader view and behaviour required for sustainable development (Mostafa, 2007: 225). A more knowledgeable consumer is able to analyse and conceptualise product related information more effectively and efficiently and consumer knowledge that is efficiently conceptualised meaningfully influences one's information processing (Zhou and Brown, 2016: 393). It is crucial to provide meaningful green information online to consumers which may include environmental challenges, possible causes of the crisis, possible solutions and so forth. When consumers encounter conflicting information, knowledgeable consumers undergo the

analytical and cognitive processing, while consumers who lack knowledge instead evaluate the product based on its details and attributes (Zhou and Brown, 2016: 392). This means that the type of information provided by businesses and marketers to consumers should be in sync to avoid conflicting views, ideas and conclusions.

Zsóka et al. (2013: 135) define environmental knowledge as knowledge and awareness of environmental problems and solutions. Ramekar, Muneshwar, Kute and Choube (2017: 220) added that environmental knowledge can be divided into objective knowledge and perceived or subjective knowledge about environmentally friendly actions. Pagiaslis and Krontalis (2014: 340) state that objective knowledge can be further sub-divided into environmental knowledge, which relates to the reasons for environmental problems (abstract or factual or declarative knowledge) and concrete knowledge, which relates to the likely actions that consumers can take to address the environmental crisis (also procedural or action-related knowledge). Knowledge of the green crisis is knowledge about the problems facing the environment such as pollution of air, water and soil, global warming, overpopulation, natural resource depletion, waste disposal, climate change, loss of biodiversity, deforestation, ocean acidification, ozone layer depletion or any other factors degrading the environment (Rinkesh, 2009).

Environmental challenges may be addressed by recycling, reusing, reducing, water conservation (including municipal water restrictions), conserving electricity, and conserving biodiversity. Pruitt (2017) further suggests the following solutions for waste management: compost at home, use insulation made from recycled paper, properly dispose of any non-recyclable items, purchase and use school supplies made from recycled products, recycle cans and bottles, engage and motivate co-workers to purchase green products, avoid printing of hard copies, purchase recycled paper, purchase energy efficient products and dispose old computers appropriately. For these solutions to be implemented, the information should be made available on different platforms.

2.11. The Sources of Green Information

Latest developments in information technology and new systems of communication have led to remarkable changes in consumer behaviour; this has further caused a swayed focus in most businesses' marketing strategies (Cantalops and Salvi, 2014: 41). Advanced technology has moved the business focus from manual systems to automated systems of advertising. The role of search engines has increased significantly in internet marketing commerce (Yadav and Pavlou, 2014: 25). A far cry from the times when search engines were side-lined by advertisers in favour of traditional portals like news, search is once again central to portal strategies (McGaughey and Mason, 1998: 5).

Research by Schindler and Bickart (2005: 27) found that 46% of the world population are internet users and recent research conducted by Miniwatts Marketing Group in March 2017 revealed that there are 3,7 billion internet users (which represents about 50% of the world population), hence, it cannot be doubted that it is a massive platform for consumer information. These statistics indicate that the internet will be a major platform where the perceptions and behaviours of consumers are influenced.

Government departments, non-governmental organisations, research companies, green businesses and individuals such as bloggers may all contribute by uploading green information that is valuable to green consumers.

2.11.1 Government Departments

Government may provide green information to communities and other stakeholders, through awareness campaigns, government websites, agreements, policies and regulations. For example, the South African government has a dedicated department with a primary purpose of achieving full realisation of the right to an environment that is not harmful to the health and well-being of South African citizens (Environment, 2017). The 7th millennium goal on environmental sustainability requires national governments to integrate systems, policies and regulations which promote environmental sustainability (Kenya, 2002: 29). Likewise, South Africa has responded to environmental challenges by signing international agreements, passing national laws and developing national policies, implementing environmental management strategies, monitoring and research, raising awareness and education (Environment, 2017).

2.11.2 Non-Governmental Organisations and Non-Profit Organisations

Government systems cannot cope with the task of environmental protection alone, hence non-governmental organisations (NGOs) are needed to play a supportive role. NGOs create awareness among the public on current environmental issues and solutions which comprises of protecting the natural resources and entrusting the equitable use of resources (Agarwal, 2008: 933). The means of green information sharing by NGOs may be by transferring information through newsletters, brochures, articles, audio visuals, organising seminars, lectures and discussion groups (Badrudin, 2015: 705).

2.11.3 Profit Orientated Businesses

The role played by businesses in sustainable development is indefinite; hence they are considered as an important stakeholder in providing environmental information (Spence, Agyemang and Rinaldi, 2012: 9). Businesses need to provide information about how they are complying with local environmental laws, how they decrease waste and the use of fossil fuels, and how they have conducted awareness about environmental issues to staff and to the

community (Rivera and Delmas, 2004: 231). Business involvement is important because businesses with formalised environmental information management tend to be more knowledgeable about environmental issues and ultimately, tend to exercise more meaningful environmental behaviour (Mir and Feitelson, 2007: 410).

2.11.4 Individual Bloggers

Bloggers provide information through posting of blogs, sharing their likes and dislikes on certain issues, expressing their views and opinions, offering suggestions, reporting about the latest news, and forming groups in blogosphere (Agarwal et al., 2008: 207). Bloggers are certain that they hold a crucial role in creating change through environmental citizenship practice by creating an opportunity to broadcast environmental knowledge and attitudes which may exist between pro-environmental bloggers and other bloggers (Luck and Ginanti, 2013: 15). Nisbet and Kotcher (2009: 341) stated that bloggers hold solid opinion-leader-like traits and should therefore be involved and be used as useful platforms in environmental campaigns. According to Rowse (2004: 34), one of the most common systems bloggers use to generate revenue is through placing of paid adverts on their sites. This is one reason that motivates individual bloggers to upload as much information as possible.

It is anticipated that search engines and selected websites for government institutions, non-profit organisations, profit orientated businesses and individual bloggers provide a wide range of environmental information that is likely to improve consumer behaviour and protect the planet.

2.12. Target Audiences for Environmental Information

Adams and Frost (2006: 281) found that multiple industries (surveyed in three different countries) ranked their most important online target audiences as Non-Governmental Organisations (NGOs), government, customers, shareholders/investors, academia, employees, suppliers and competitors. Aerts, Cormier, Gordon and Magnan (2006: 188) found that business owners perceive their target audience as the general public rather than being specific to NGOs, government and so forth. In contrast, Cooper (2003: 240) found that online environmental information in the electricity industry was mostly targeted to shareholders and prospective employees. According to the study conducted by Rowbottom and Lymer (2009: 12), most (37%) environmental information requests were from computers registered to the company hosting the website classified as 'employees'; about 32% from computers registered to private individuals; about 9% were consultants; about 7% were educational institutions and the balance was recorded to be from customers, suppliers and competitors. In a nutshell,

depending on the type of online environmental information, different stakeholders may be targeted. This study aims to determine the target audience of online green information.

2.13. Internet as an Information Resource

The existence of the internet has led to large volumes of information resources that were previously only available to libraries and bookstores to be accessible to a much wider community (Waithaka, 2013: 21). This has bridged the gap emanating from the distance, availability and access to information. The internet is also considered a primary source of information to consumers which provides green information either freely or at a fee (Theodosiou and Green, 2003: 388). There is no doubt that information is available on the Internet and that the Internet is cheaper than conventional information sources such as mass media advertising, marketer-controlled information and face-to-face marketing communications (Jepsen, 2007: 22). Search engines make information searches easier to internet users.

2.13.1 Search Engines

According to Berman and Katona (2013: 646) a search engine is a website that services its visitors with the search results based on their inputs: the visitors type in search phrases into a search bar; the site then returns a number of search results and displays them in an ordered list. This list is often referred to as an Organic list and has various links to other websites organised from the most relevant content for the search phrase provided (Berman and Katona, 2013: 646).

A survey conducted on the top ten search engines and recorded by Ratcliff (2017) revealed the Google is leading with estimated unique monthly visitors of 1.6 billion, handing them 72.48% of the world's market share of search engines. The second biggest search engine is Bing with 400 million monthly visitors with 10.39% market share. The third biggest is Yahoo with 300 million and 7.78%. The graphical presentation in Figure 2.2 below indicated the top search engines and their market search share. There is no argument about the mobile internet's contribution to the success of search engines leading the pack.

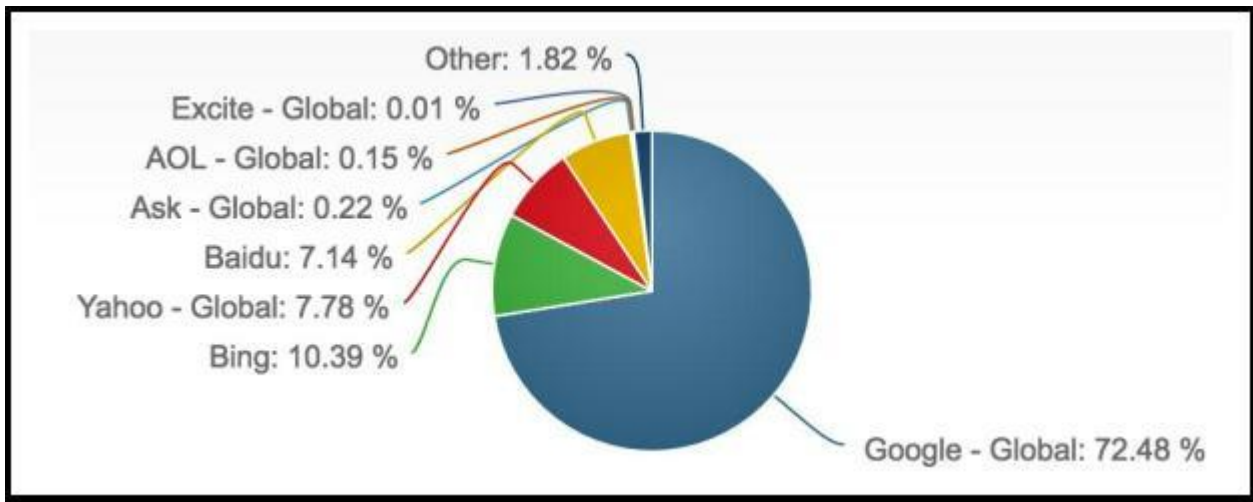


Figure 2.2: Top Search Engines

Source: Ratcliff (2017: 1)

The information contained in Figure 2.3 below also confirms Marvin (2017: 1) assertion that the internet is the fastest growing platform for advertising globally and is expected to outdo conventional television advertising by 2020.

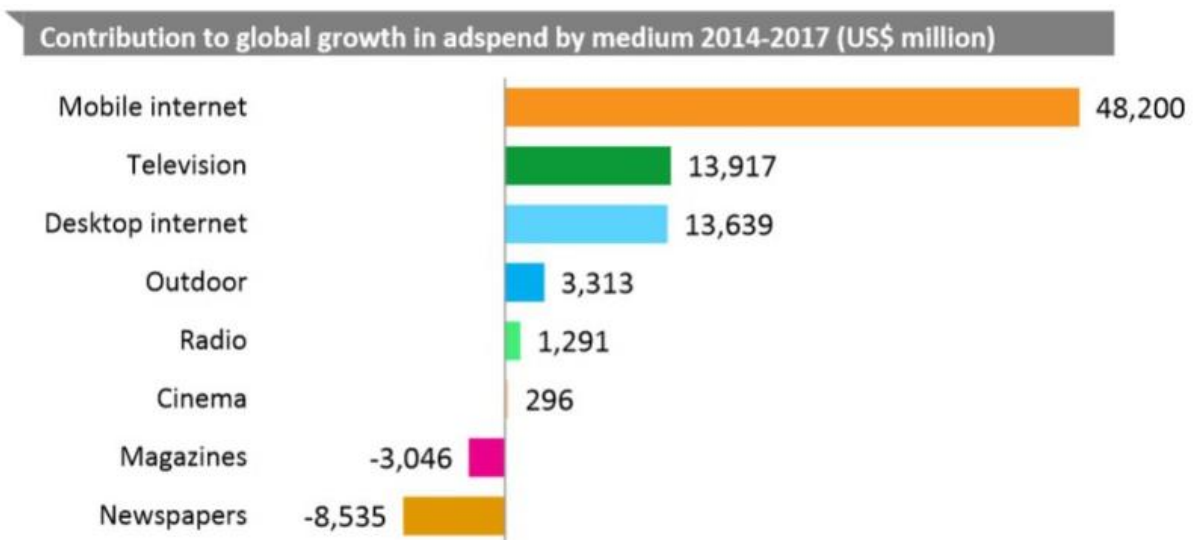


Figure 2.3: Advertising Media Comparison

Source: Marvin (2017: 1)

This study intends to understand what environmental information is available online using iterative searches on three major search engines and to determine who the providers of green information are.

2.13.2 Role of Search Engines

Online search engines are among the most popular tools that consumers use to discover information on the web and, as a result, search engine marketing is becoming a dominant form

of online advertising (Berman and Katona, 2013: 644). Cashman , Shelly and Vermaat (2008: 35) suggest that search engines are useful in finding webpages containing certain topics or in finding specific pages for which one does not have the exact website address.

The prime purpose of internet use is information retrieval even though there are many other different purposes, the biggest challenge is the retrieval of appropriate information considering the amount of information available online (Gordon and Pathak, 1999: 142). By utilizing search marketing, websites that wish to expose their content and merchandise to consumers can reach them when they search for specific keywords providing invaluable targeting opportunities (Berman and Katona, 2013: 644). Sünkler and Lewandowski (2017: 405) found that users heavily rely on Google and that Google produced more relevant results when compared to the closest competitor Bing.

Search engines offer three essential facilities: (1) they conceptually gather various webpages from which a searcher (data consumer) can retrieve information; (2) they present the webpages in a form that attempts to capture their content; and lastly, (3) they afford searchers a chance to issue queries (search phrases) using algorithms sorting information according to the search phrases' relevance (Gordon and Pathak, 1999: 142). Briefly, search engines provide easy access to specific websites based on specific topics and this is why it is imperative to utilise search engines to determine the type of green information and the providers of such information. There is a lack of previous research examining the green content and green information providers online, specifically on search engines.

2.14. Conclusion

The purpose of this chapter was to discuss the existing literature relating to the study. The environmental crisis, main consequences of the environmental crisis, responses to the environmental crisis which included government responses, business responses and consumers' responses were discussed. The Pro-Environmental Behaviour Theories covering the Theory of Reasoned Action, the Theory of Planned Behaviour Model and the Knowledge-Attitude-Behaviour Model were discussed in relation to the literature. Further, the concept of green consumer behaviour, factors influencing the green consumer behaviour, the role green knowledge plays in consumer behaviour which incorporated consumer knowledge were discussed. Lastly, the sources of the green information, search engines and their role was examined.

Based on the literature reviewed, the factors influencing green consumer attitudes and behaviour were reviewed. The research methodology describing the research design, data collection techniques, data analysis, and ethical issues is contained in Chapter Three.

CHAPTER 3 : RESEARCH METHODOLOGY

3.1 Introduction

This chapter explores and discusses the research paradigm relating to the proposed study. It covers the research design, research method, study location, sampling process, research instrument, data collection techniques, data analysis, and ethical issues of the study.

3.2 Statement of the Problem

The internet forms part of the external search of users. According to Zsóka et al. (2013) there is a strong correlation between the intensity of environmental education and environmental knowledge, which in turn increases awareness and consumption-related behavioural change. In this process, the consumer uses all kinds of information to decide which products to buy. The whole process of decision making is controlled by the availability of information (Saaty, 1990: 9). The question is what environmental information is available online which consumers have exposure to? Is there valuable information about green products and services to influence consumers' behaviour, and who are the providers of online environmental information?

3.3 Research Purpose and Objectives

The purpose of this research is to determine the extent and content of environmental information available online targeted at consumers; to find out who the providers of such online environmental information are; to better understand the audience targeted by the online green information providers; and to find out whether the information providers benefit directly from the information they provide.

3.4 Research Design

Quantitative research is defined as the administration of a set of structured questions with predetermined response options to a large number of respondents (Creswell, 2013: 86). Qualitative research involves collecting and interpreting data by observation of what people do and say and it affords rich insight into consumer behaviour (Saunders, Lewis, Thornhill and Wang, 2011: 476). Qualitative content analysis is considered one of the several qualitative methods currently available for analysing data and interpreting its meaning (Schreier, 2012: 55). Qualitative content analysis may be used in either an inductive or a deductive way. The nature of the study is a deductive content analysis, generally known to be a qualitative research method (Polit and Beck, 2004: 580).

When research is concerned with finding out *who*, *what*, *where*, *when*, or *how much*, then the study is descriptive (Cooper et al., 2006: 149). The objective of this study was to examine the websites (*who*) hits in online search engines (*where*) in which environmental information is available (*what*) in the month of November 2017 (*when*) by employing key search words (Nothnagel, 2007: 144). This justifies that this study was a descriptive study. The literature review was used to identify the various green behaviours that consumers can be involved in and those were looked for in the datasets from the search engines.

In large amounts of material, a content analysis enables a researcher to discover specific features; hence, this technique is commonly used in descriptive research (Newman, Stem and Sprott, 2004: 34). This study used a quantitative technique within a qualitative research method to analyse and interpret data. This implies that qualitative data from selected websites was analysed using a research instrument which was then analysed using numerical figures.

3.5 Content Analysis

Content analysis is a method that may be used with either qualitative or quantitative data; furthermore, it may be used in an inductive or deductive way (Elo and Kyngäs, 2008: 109). In inductive content analysis the categories are derived from the data; while a deductive approach is based on an existing theory and therefore moves from the general to the specific (Elo and Kyngäs, 2008: 109).

Previous researchers have used content analysis to identify and quantify properties and content of websites (Ha and James, 1998; Nothnagel, 2007; Scheidt, 2009; Luck and Ginanti, 2013). This research study employed content analysis of websites with environmental information to investigate and identify key concepts across the entire websites. Leedy and Ormrod (2014: 142) define content analysis as a detailed and systematic examination of the contents of a specific body of material with the intention of identifying patterns, themes or biases. Content analysis is favoured over other research techniques in that it is cost effective and minimises the many disadvantages associated with questionnaire return rate in survey research (Carroll, 2002: 76). This provides further support for employing this research technique in the current study. Thelwall's (2002) approach was followed by systematically exploring search engines to retrieve a reasonable number of hits. Google, Yahoo and Bing were the chosen search engines for this research as they are the largest search engines in terms of information content (Ratcliff, 2017: 1).

3.6 Sampling Process

This section discusses the sampling process in the form of the target population, sampling technique and sample size of the study.

3.6.1 Target Population

According to Saunders (2011: 469), a target population is the aggregate of all the units of analysis. The target population for this study were sites that have references to ‘green consumers’, ‘pro-environmental behaviour’ or ‘eco-friendly’.

3.6.2 Sampling Technique

According to Kyngäs, Elo, Pölkki, Kääriäinen, & Kanste (2011: 138), the most commonly used method in content analysis studies is purposive sampling as it is suitable for qualitative studies where the researcher is interested in specific knowledge concerning the research topic. Purposive sampling techniques are primarily used in qualitative studies and may be defined as selecting units (such as individuals, groups of individuals, institutions) based on specific purposes associated with answering a research study’s questions (DeVaney, 2016: 325). The research used the purposive sampling method which selected websites according to the three top search engines’ output results using inputs of keywords, ‘green consumer’, ‘eco-friendly’, and ‘pro-environmental behaviour’. The outputs for each search key were per Table 3.1 below.

Table 3.1: Total Population per Keyword Search as of November 2017

Search Engine	Search Keywords	Number of Hits
Bing	Green consumer	441 000 results
	Eco-friendly	10 800 000 results
	Pro-environmental behaviour	208 000 results
Google	Green consumer	13 400 000 results
	Eco-friendly	115 000 000 results
	Pro-environmental behaviour	428 000 results
Yahoo	Green consumer	468 000 results
	Eco-friendly	10 800 000 results
	Pro-environmental behaviour	3 300 000 results

3.6.3 Sample Size

Nothnagel (2007: 145) conducted a content analysis study where the target population comprised of 197 websites of South African lodges. Another study conducted by Ham (2005: 299) investigated the effectiveness of websites of the 25 top limited service chain lodging operations in the United States by means of a content analysis approach, according to seven themes using a Likert Scale. Cai, Card and Cole (2004) evaluated the websites of 20 tour operators in the United States that focus on tours to China, according to their content delivery performance. The study's focal point was the presence or absence of a feature in these sites. The population comprising of 250 organisations identified as the top performers in Financial Mail's 2001 survey were identified in a study conducted by Ehlers (2006: 208) where a census was done of the population elements as the population was less than 500 (Hair, Bush and Ortinau, 2000: 343).

Search engines present only a maximum of 10 to 15 links or search results in each page since search engine users are not keen to scroll down and more than half of search engine users only look at the first results page Hotchkiss, Garrison and Jensen (2005: 10). This finding was also echoed by Guan and Cutrell (2007: 417) stating that web searchers often choose to try the top few search results and seldom scroll to the bottom of the first page of search results when browsing for what they want. As per Table 3.1 above, it is evident that the population was extensively large and it was not possible for the researcher to use the entire population hence a sample had to be drawn. The sample size was based on 123 websites made up of the first 4 pages of search results providing roughly 10 items per page which appeared from each of the three search engines using iterative searches and using the search terms. The researcher followed the data search process per Appendix C (steps 1 to 5). This was considered sufficient as it is unlikely for search engine users to search beyond the first 4 pages of results.

3.7 Data Collection Method

The researcher collected data from the list of websites generated by the search engines from inputting keywords which were 'green consumer', 'pro-environmental behaviour' or 'eco-friendly'. These terms were then analysed by the researcher in line with the research objectives. Content analysis is a research method that derives repeatable and valid suggestions from data to their context, with the aim of providing knowledge, new insights, and representation of facts (Elo and Kyngäs, 2008: 109). The nature of the study was in the form of a deductive content analysis. Rayner, Wall and Kruger (2004: 71) defined content analysis as a method of accumulating and analysing huge amounts of data about the content of media products in order to draw appropriate conclusions. This method was applicable to the study as each search

keyword returned large number of web links wherein each selected web link had to be analysed in terms of its content. The literature review was used to identify the various green behaviours that consumers can be involved in and those were looked for in the datasets from the search engines.

The research code sheet for this research study was developed by the researcher based on the literature review conducted in Chapter Two. Coding units are defined as the smallest sections of content counted and assigned values in a content analysis (McMillan, 2000: 82). The ‘Yes’ or ‘No’ responses were assigned to either presence or absence of features in the websites respectively. The ‘Yes’ or ‘No’ responses were further assigned to ‘Yes = 2’ or ‘No = 1’ for the purposes of usability on Microsoft Excel 2013. The code sheet had four themes, namely, consequences of green challenges, potential green solutions, providers of the information and target population. Each selected website’s content was assessed on each of these themes.

Table 3.2: Support from the literature for each coding unit examined in this study

No.	Objective	Questions from the Instrument	Reference to Literature Review
1	To determine the extent and content of environmental information available online targeted at consumers.	Does the selected item have details about consequences of environmental challenges?	Section 2.2
		Does it offer solutions to environmental challenges?	Section 2.4
		Green consequences: ozone depletion; air quality issues; water quality/waste; waste management issues; land contamination issues; biodiversity issues and other	Section 2.2 and Section 2.3
		Potential Solutions: Recycle, reuse, reduce, conserve water, conserve electricity, green products, conserve biodiversity, energy efficiency and other	Section 2.4
2.	To find out who the providers of the online environmental information are.	Providers of the Information: Profit oriented companies, schools/ educational institutions, non-profit oriented organisations, government, individuals and other	Section 2.11
3.	To better understand what audience is targeted by the	Target Population: Kids, consumers, the public, managers, businesses and others	Section 2.12

No.	Objective	Questions from the Instrument	Reference to Literature Review
	online green information providers		
4.	To find out whether the information providers benefit directly from the information they provide	Benefits: The direct benefits accruing from the information provided by the green information provider.	Section 2.9

3.7.1 The Context Unit and Time Frame for Data Collection

McMillan (2000: 82) suggests that it is crucial to define the context unit and the time frame when considering the coding of data and data collection for a content analysis. The landing page was the context from which coding units were drawn. This was due to the fact that internet users decide, based on the information from the landing page, whether they want to continue browsing the entire website or not (Nothnagel, 2007: 161). The time frame for the study was two days. This is in line with the recommendations of Ehlers (2002: 205) who suggests that web content changes quickly and easily within a short space of time, hence, it is important to have shorter coding time frames.

A content analysis is useful when compared to other research techniques due to the fact that it is cost effective and minimises a number of disadvantages ensuing from survey research such as begging for cooperation from respondents, turnaround time to return surveys by some respondents and so forth (Carroll, 2002: 75).

3.8 Data Quality

According to Creswell (2013: 160), validity is about testing the accuracy of the outcomes by using certain measures to reach meaningful conclusions whilst reliability reflects that the research approach is consistent throughout different researchers when assessed on different research projects.

3.8.1 Reliability

This study followed the same approaches as a previous study conducted by Nothnagel (2007: 158) which used a code sheet that measured the presence or the absence of certain features in the selected websites. The research code sheet was made up of coding units. The researcher was the only coder of the selected websites which assisted in minimising the confusion associated with coding instructions. The data that was captured by the researcher onto

Microsoft Excel 2013 software was examined (reviewed) by a different person to check for coding errors and there appeared to be no errors. The requirements for reliability were met in that all meaningful provisions were taken by the researcher when coding and analysing the data (Saunders and Lewis, 2016: 204).

3.8.2. Validity

Saunders and Lewis (2016: 202) state that validity refers to the appropriateness of the measures used, accuracy of the of the analysis and the generalisability of the findings. The internal validity of a research design focusses on the extent to which the design can account for all the issues that may influence the outcome of the research questions to be answered, whereas external validity is concerned with the extent to which conclusions can be generalised to the ‘real world’ (Du Plooy, 2009: 84).

In addressing internal validity, the researcher cautiously completed the code sheets and took all necessary steps to ensure that accurate data was captured and avoided any variable manipulation in the process.

3.8.3 Trustworthiness

Guba and Lincoln (2015: 79), describes four questions of trustworthiness relating to ‘truth value’, ‘applicability’, ‘consistency’ and ‘neutrality’. (1) Truth value (internal validity) – defines how can one establish confidence in the “truth” of the findings of a particular study and its context? To ensure internal validity, the researcher used data available online on a specific date. (2) Applicability (external validity) defines how can one determine the degree to which the findings of a particular study may have applicability in other contexts? To ensure generalizability the researcher used different sources on data (search engines) and different providers of data (businesses, NPOs, government agencies). (3) Consistency (reliability) defines how can one determine whether the findin’gs of a study would be consistently repeated if the inquiry were replicated with the same respondents in a similar context? To ensure reliability the researcher used a standard questionnaire to assess all websites selected for the study and also the coding with was carried out by the researcher. (4) Neutrality (objectivity) defines how can one establish the degree to which the findings of a study are a function solely of respondents and not the researcher’s bias. The researcher used a standard template in analysing the website content and checked for specific features (per appendix C) based on the review of literature and relavant theories. Further the analyses and interpretation performed were checked by a supervisor to ensure there were no biases. To ensure objectivity of findings, the researcher took screenshots of the websites assessed for future reference. Based on the above (section 3.8.1, 3.8.2 and 3.8.3) this study is considered to have trustworthiness attributes.

3.8.4 Analysing and Interpreting the Results

Green (2003: 196) suggests that keywords are important to the target audience and should be found near the top of the web page in bold or in a form of a hyperlink. This is considered important as search engines index according to the location and frequency of terms (Green, 2003: 196). The researcher (coder) followed the links from the search engines and inspected if the landing page (context unit) contained any of the consequences for environmental crises and/or the solutions to address the environmental crises (as listed in the research instrument). These were used to measure the website if the website contained this information in bold or were visible and/or in a direct hyperlink form.

In assessing whether the information providers benefit directly from the information provided, the researcher analysed the web content and linked it to the organisation's core business. For example, an organisation selling green products would be considered to benefit directly from the information provided, whereas a non-profit organisation conscientising the public about environmental issues would not be considered to directly benefit from the information.

In determining the green information providers' target audience, the researcher browsed through each website to assess if the target audience was identifiable. The key target groups that were considered were categorised as kids, consumers, the general public, managers, businesses and others. These procedures were applied consistently throughout the study in analysis of the raw data. The target was coded to be Consumers if green information related to sales of green products. The target was coded to be Kids if the green information was selling green products specific to kids. The target was coded to be the General Public if the green information was for use by anyone. The Businesses code was applied when the green information specifically targeted businesses/business managers, and finally, the Other code was applied if the green information targeted other different groups e.g. Academia.

3.9 Data Analysis

In deductive research, the goal of the researcher is to test concepts and patterns known from theory using new empirical data. This approach is also called theory-testing research (Bhattacharjee, 2012: 3). The deductive role requires the use of a theory to design the coding scheme. The content of each website listed from the search engines was evaluated in line with a theory on green consumer behaviour.

The content analysis data was recorded and analysed using Microsoft Office Excel 2013 software. The research results were further recorded in terms of a frequency distribution for each variable of interest (i.e., environmental information, solutions, consequences, information providers and targets for information). Graphical frequencies, tables and percentages were used

to display the research results for ease of reference. Previous researchers that used content analysis of websites applied frequency tables to analyse and report data (Nothnagel, 2007: 154; Ehlers, 2006: 274).

3.10 Ethical Considerations

All the information that was used in the study was freely available and the assumption was that it was not of a sensitive nature as it had been made available by its publishers for public viewing and was not considered to contravene anyone's privacy or confidentiality. Furthermore, the permission for ethical clearance was sought and obtained from the University's Ethics Committee (Appendix B).

3.11 Conclusion

This chapter discussed the research methodology in the study and described how data was collected. Validity and reliability evaluation was discussed in relation to the application of content analysis in the study. Ethical issues were considered and were briefly discussed. The next chapter presents the research findings and data analysis.

CHAPTER 4 : DATA ANALYSIS AND PRESENTATION OF RESULTS

4.1 Introduction

This chapter focuses on data analysis and the presentation of research results. The raw data collected from three major search engines is interrogated and analysed using Microsoft Excel software. Graphs and tables were used to present data for ease of understanding. This chapter further presents research results according to the research objectives and in relation to literature.

4.2 Sample Profile

The following section discusses the findings from the different websites that were analysed. The websites were chosen using interactive searches by inserting keywords into three different search engines (Google, Yahoo and Bing). The following is the distribution (Table 4.1) of website entries or links selected from all the three search engines:

Table 4.1: Frequency Distribution of Websites Selected per Information Provider Type

No	Information Provider Type	N	%
1	Profit Oriented Organisations	59	48%
2	Schools/ Educational Institutions	28	23%
3	Non-Profit Organisations	18	15%
4	Government	8	7%
5	Individuals Bloggers	8	7%
6	Other	2	2%
		<hr/>	
		123	
		<hr/> <hr/>	

The keywords used to probe the search engines were Green Consumer, Eco-Friendly and Pro-Environmental Behaviour. The keywords returned more web links relating to profit orientated organisation followed by educational institutions, non-profit organisations, government and individual bloggers respectively. The information contained in Table 4.1 above suggests that the profit orientated providers (48%) and educational institutions (23%) are the major providers of environmental information available online.

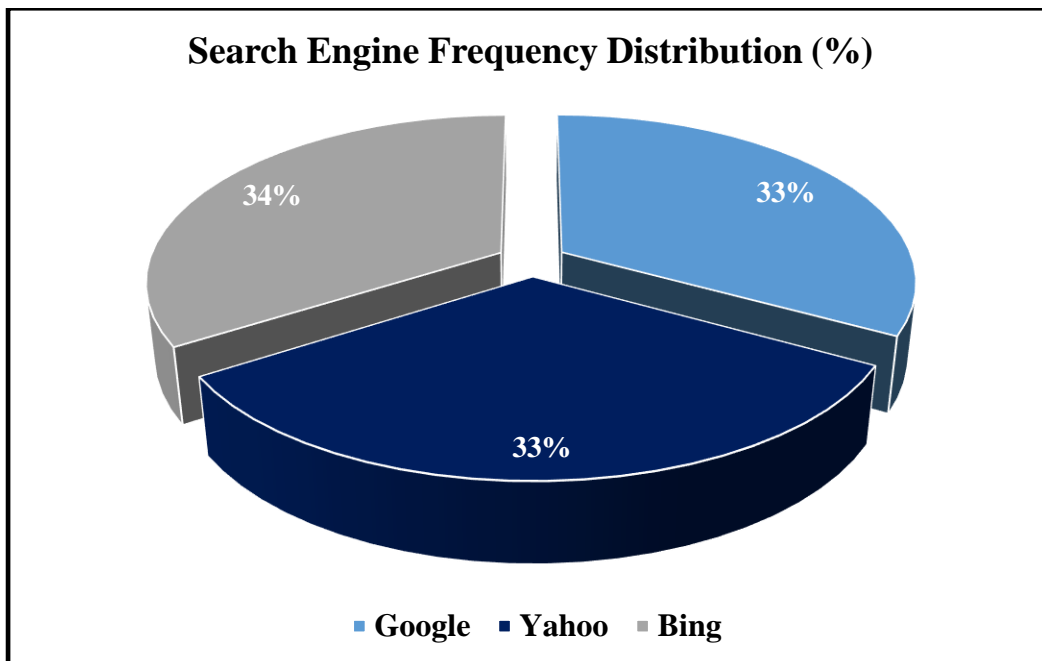


Figure 4.1: Search Engine Distribution Frequency

The three search engines used were Google, Yahoo and Bing. The search was distributed fairly equally between the 3 search engines. A total of 123 sites were analysed, 40 (33%) were accessed from the Google, 41 (33%) from Yahoo and 42 (34%) from Bing.

4.2.1 Source Types

The study sought to identify the type of platform which generated the analysed information.

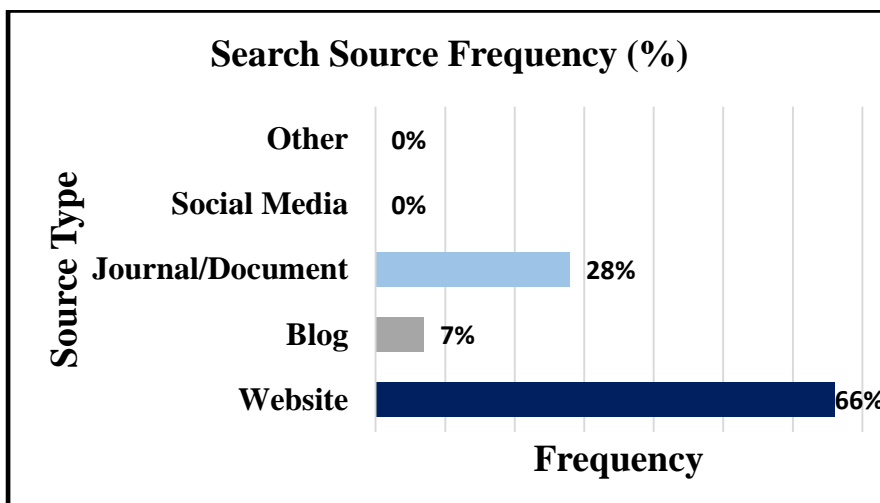


Figure 4.2. Source Type

Figure 4.2 above reflects that 66% (81) were websites, 7% (8) were blogs, 28% (34) were either journals or documents and social media and other returned nil results.

4.3 Environmental Knowledge and Behaviour

In this section, the researcher used a structured questionnaire to record findings from the iterative searches on the search engines. Table 4.2 provides the results of two questions relating to knowledge and behaviour.

Table 4.2 Features of items selected on knowledge and behaviour (all search engines' results)

Item	N	Yes (2)		No (1)	
		N	%	N	%
1. Does the selected item have details about consequences of environmental challenges?	123	77	63%	46	37%
2. Does it offer solutions to environmental challenges?	123	113	92%	10	8%

The first question asked in relation to the website content was, *does the selected item have details about consequences of environmental challenges?* The study found that 77 sites (63%) provide green information with the consequences of environmental challenges whilst 46 sites (37%) did not provide consequences per Table 4.2.

Table 4.3. Distribution Frequencies of Environmental Consequences by Green Information Providers

No	Green Information Provider	Consequences Discussed			
		Yes		No	
		N	%	N	%
1	Government	6	75%	2	25%
2	Individuals / Individual Bloggers	6	75%	2	25%
3	Non-Profit Organisations	15	83%	3	17%
4	Profit Orientated Organisations	25	42%	34	58%
5	Schools / Educational Institutions	24	86%	4	14%
6	Other	1	50%	1	50%
Totals (63% IP, Yes + 37% IP, No =100%)		77		46	

Table 4.3 above indicates frequencies of environmental consequences by green information providers. Most of the green information providers' categories discussed consequences of environmental challenges. Over 75% of the government agencies, Non-Profit Organisations (NPO), educational institutions and individual bloggers discussed consequences of green information. It is worth noting that the Profit Orientated Organisations have the lowest percentage of websites discussing consequences of environmental crisis. The 75% of government websites discussing environmental consequences are in line with one of the objectives which is dedicated to the full realisation of the right to an environment that is not harmful to human health and well-being (Environment, 2017). The 75% of the Bloggers (per Table 4.3 above) are in line with the findings by (Luck and Ginanti, 2013: 15) suggesting that bloggers hold a crucial role in creating change through environmental citizenship practice by creating an opportunity to share environmental knowledge and attitudes.

Among the leading categories of information providers were NPOs with 83% of the websites discussing environmental consequences. This supports the findings by Agarwal (2008: 933) that NPOs create awareness among the public on current environmental issues and solutions. Again, in support of this finding was the research conducted by Saleh and Saifudin (2017: 99), which found that NPOs play a vital role in environmental sustainability communication which in turn improves environmental awareness.

Developing capable, well-educated and skilled citizens is part of the mission of the South African Department of Higher Education (2017: 5) but is presumed to be widely applicable to other countries too. This justifies why the educational institutions have the highest number of websites discussing environmental consequences. Furthermore, a study which examined a set of major national and international educational institution policies related to environmental sustainability in universities, conducted by Wright (2002: 119), found that sustainability policies are useful to many institutions and capable of facilitating change to encourage pro-environmental behaviour.

Stávková et al. (2008b: 277) posit that it is essential to provide adequate information in order to bring about changes in consumer behaviour relating to a particular subject. A study conducted by Hassall (2000: 167) found that the NPOs' employees possessed comprehensive information of environmental sustainability including opportunities and constraints, as well as issues involving better quality of life. It is clear that NPOs play a pivotal role in an effort to influence behaviour around the issues of a sustainable environment.

Cortese (2003: 16), on the role of educational institutions warned that there is a huge need to transform educational systems and non-profit organisations (NPOs) and schools in

environmental sustainability to review the conventional educational system, which among other things, assumes that technology can solve most of society's problems, and that resources are inexhaustible. The majority of educational institutions' websites analysed in this study were found to have discussed the consequences of a green crisis. This finding is in line with the study examining a set of major national and international educational institution policies related to environmental sustainability in universities conducted by Wright (2002: 119) which found that sustainability policies are useful to many institutions and capable of facilitating change to encourage pro-environmental behaviour. This implies that educational institutions are trying to contribute towards green behaviour.

4.4 Environmental Consequences

The study sought to find the details of consequences of environmental challenges that the web search results contained. This was important as it would enable the researcher to adequately conclude on the content of each selected site for each search engine in the study. The consequences assessed per each website selected were, ozone depletion, air quality issues, water quality or wastage, waste management issues, land contamination issues, biodiversity issues, and other consequences which were not specified.

Table 4.3: Types of Consequences Discussed per Each Information Provider

No.	Consequences Discussed	Information Providers Websites													
		Government			Bloggers		NPOs		Profit Orientated Businesses		Educational Institutions		Other		
		N	N	%	N	%	N	%	N	%	N	%	N	%	
1	Ozone Depletion	27	5	63%	1	13%	10	56%	10	17%	1	4%	0	0%	
2	Air Quality Issues	48	5	63%	2	25%	11	61%	11	19%	18	64%	1	50%	
3	Water Quality / Waste	49	5	63%	2	25%	12	67%	12	20%	17	61%	1	50%	
4	Waste Management Issues	60	5	63%	4	50%	15	83%	18	31%	17	61%	1	50%	
5	Land Contamination Issues	33	4	50%	1	13%	10	56%	9	15%	9	32%	0	0%	
6	Biodiversity Issues	37	4	50%	2	25%	10	56%	8	14%	12	43%	1	50%	
7	Other	29	5	63%	2	25%	5	28%	9	15%	8	29%	0	0%	

4.4.1 Ozone Depletion

According to Chumakov et al. (2014: 360), ozone layer depletion takes place as a result of the emission of ozone-depleting chemicals into the atmosphere. The study revealed that only 27 (22%) out of the 123 websites discussed ozone depletion as consequence of an environmental crisis. The results of the study further showed that ozone layer depletion is highly discussed on websites from two categories which are government agencies (63%) and non-profit organisation (56%) whilst the rest of the information providers websites made minor reference to ozone depletion. The study found that most educational institutions did not discuss ozone depletion as a consequence, this is in line with study conducted with 50 school students in grade 7 and 8 by Pekel and Kirik (2016: 352) which revealed that learners lacked conceptual perceptions of different ways to address ozone depletion. This implies that limited information online about ozone depletions may negatively affect the initiatives improving the planet's sustainability.

4.4.2 Air Quality Issues

Air pollution is considered one of the key challenges facing the modern world due to its dreadful effects on human health (Zeng and Xiang, 2017: 2531). The results of the study show that 48 (39%) out of the 123 websites discussed air quality and air pollution as consequence and environmental crisis. The majority of government agencies' websites, NPOs and educational institutions' websites analysed in the study discussed emissions, air quality and air pollution as environmental consequences. Profit orientated businesses are among the lowest green information providers discussing air quality, pollution and/ or emission with only 19% sites discussing green consequences. This indicates that not all profit orientated businesses are concerned about the environment. In the case of Volkswagen wherein they misrepresented information about their diesel vehicles capabilities and carbon emissions which put about 1,200 human lives at risk of premature death is one case justifying the reason why there is less of a contribution by profit orientated businesses in discussing air quality (Graham, 2017: 4). These profit orientated organisations are the ones who are the biggest contributors to air pollution who end up trading on emissions credits to achieve the required levels of environmental compliance quality (Rubin, 1996: 269).

4.4.3 Water Quality, Water Resource Wastage and Contamination

According Daud et al. (2017: 1) a disturbing increase in population and industrial development has caused drinking water quality to worsen day by day. The results of the study showed 49 (40%) websites, from the total of 123, addressed water quality, water resource wastage and water contamination as environmental crises consequences. Profit orientated organisations and individual bloggers had the lowest number of websites discussing the water quality and wastage issues as environmental challenges with 20% and 25% respectively. The possible reason for these might be that business are hardly involved in bulk water sales or as being authorised national water service providers as this is normally the core business delivery of government agencies. This further supports the finding that profit orientated businesses only concern themselves with initiatives that have a potential inflow of future cash .

4.4.4 Waste Management Issues

The results of the study in Table 4.3 showed that 60 (49%) websites out of 123 discussed waste management as a consequence of the environmental crisis. Most information providers tend to discuss waste management in different ways. The study found profit orientated organisations as having the lowest number (31%) of websites discussing waste management. Other categories of green information providers discussed a wide variety of consequences associated with poor waste management such as a threat to human health, wildlife, land contamination, water pollution, soil contamination and so forth. The lower numbers recorded against the profit

orientated organisations contradict what most large organisations always assert in their annual reports in relation corporate social responsibility. This triggers the argument by Ahmad, Rashid and Gow (2017: 110) that the independent directors' ability to enhance companies corporate social responsibility (CSR) reporting is found to be industry specific and any qualitative information reported in the annual reports relating to CSR may not be easily verified as is the case with quantitative financial information (Wadhwa, 2017: 55).

4.4.5 Land Contamination

The results of the study show that 33 (27%) websites out of 123 discussed land contamination as a consequence of the environmental crisis. NPOs and government agencies are leading the pack with 56% and 50% of websites discussing land contamination issues respectively. Government agencies of developing industrial economies are confronted with two significant sources of environmental degradation, one from past activities and two from current ongoing activities (Swickard, 2008: 121). This is why government agencies tried to avail as much data as possible to influence behaviour. One other possible reason is associated with the fact that agricultural activities contribute largely to most countries' economic growth (Azam et al., 2015: 9), thus forcing government agencies and NGOs to put ample efforts into disseminating land degradation related issues. Profit orientated organisations and individual bloggers were among the lowest information providers' discussing land contamination.

4.4.6 Biodiversity Loss

Biodiversity is important because it improves ecosystem efficiency wherein each species, regardless of size, all have an important role to play (Shah, 2017: 2). The results of the study as per Table 4.3 revealed that websites owned by NGOs were leading in the discussion on biodiversity loss as a consequence of the environmental crisis. Some of the implications discussed included rhino poaching, uncontrolled spread of invasive alien species and a threat to the extinction of endangered species due to habitat loss. The promotion of economic growth with a lack of incentives and rewards for business activities promoting environmental sustainability is one of the reasons for biodiversity loss (Wood et al., 2000: 3). This assertion justifies the 14% recorded for profit orientated organisations.

4.4.7 Summary

The above analysis of the 123 (100%) websites revealed that 27 (22%) websites addressed ozone depletion, 48 (39%) addressed air quality issues, 49 (40%) addressed water quality and water wastage, 60 (49%) addressed waste management issues, 33 (27%) addressed biodiversity issues and 29 (24%) addressed other types of environmental consequences. The analysis revealed that within sites that spoke about environmental consequences, the most prevalent

topics were waste management issues, water quality and water wastage and air quality issues indicating a higher concern on these topics relative to the others.

4.5 Environmental Solutions

In determining the extent of environmental information, the study sought to find the details of solutions to address environmental challenges that the web search results contained. This was important as it would enable the researcher to conclude on the content of each website selected for the study.

Table 4.4: Distribution Frequencies of Environmental Solutions by Green Information Providers

No	Green Information Provider	Solutions Discussed			
		Yes		No	
		N	%	N	%
1	Government	8	100%	0	0%
2	Individuals / Bloggers	7	88%	1	12%
3	Non-Profit Organisations	18	100%	0	0%
4	Profit Orientated Organisations	55	93%	4	7%
5	Schools/ Educational Institutions	23	82%	5	18%
6	Other	2	100%	0	0%
Total		113	92%	10	8%

The second question per Table 4.2 asked in relation to the website content was *whether the site offered solutions to environmental challenges*. The study results on Table 4.4 revealed that 113 (92%) of the selected sites had offered solutions to environmental challenges and that only 10 (8%) sites did not provide solutions. Most of the green information providers discussed solutions to address the environmental challenges. The results in Table 4.5 depict that on average, over 80% of green information providers' websites discussed solutions to address environmental challenges. The green information providers were all consistent in providing effective environmental solutions.

Table 4.5: Types of Solutions Discussed per Each Information Provider

No.	Solutions Discussed	N	Information Providers Websites											
			Government		Bloggers		NPOs		Profit Orientated Businesses		Educational Institutions		Other	
			N	%	N	%	N	%	N	%	N	%	N	%
1	Recycle Elements	74	6	75%	5	63%	13	72%	27	46%	22	79%	1	50%
2	Reuse Elements	41	4	50%	1	13%	10	56%	14	24%	11	39%	1	50%
3	Reduce Elements	58	5	63%	2	25%	15	83%	17	29%	18	64%	1	50%
4	Water Conservation	46	5	63%	2	25%	13	72%	12	20%	13	46%	1	50%
5	Electricity Conservation	38	3	38%	1	13%	10	56%	11	19%	12	43%	1	50%
6	Green Products	65	5	63%	5	63%	8	44%	40	68%	6	21%	1	50%
7	Biodiversity Conservation	33	4	50%	2	25%	10	56%	9	15%	7	25%	1	50%
8	Energy Efficiency	67	7	88%	4	50%	16	89%	22	37%	16	57%	2	100%
9	Other	27	1	13%	1	13%	7	39%	10	17%	8	29%	0	0%

4.5.1 Recycle Elements

The concept of recycling transpires when material from the waste stream is recovered and is prepared to serve as part of raw material input of a new product (Rajpal, 2002: 24). The majority of the providers of green information speak frequently about recycling elements, with the exception of profit orientated organisations, who speak the least about recycling elements as part of green solutions. The results of the study indicate that 74 (60%) of the 123 websites assessed discussed recycling elements as green solutions. Most of the websites discussed recycling initiatives such as recycling of plastics, recycling cardboards, paper and so forth for use at work, at school and so forth. Table 4.5 above clearly shows that governments, NPOs and educational institutions provide the most recycling information. Most solutions from profit orientated organisations are green products that the companies offer and their promotion of recyclable packaging.

4.5.2 Reduce and Reuse Elements

Reusing is a process of finding new ways to use refuse to avoid disposing of it (Abdul-Rahman and Wright, 2014: 55). The majority of the green information providers seem to promote or discuss reduction and reuse elements, with the exception of profit orientated organisations and bloggers which had 30% or less of websites, as part of green solutions. One of the reasons why profit orientated organisations may promote a reduction in use of resources is that it may lead to a reduction in purchasing of new products offered in the market. Reduction of biodegradable waste for home composting purposes appeared frequently from different websites. Reduction of carbon emissions was often discussed by most profit oriented organisations. Another reduction strategy that was prevalent was the reduction in the disposal of materials like paper, glass and wood by reusing them for other projects or recycling it. This supports the suggestion by Edgerton, McKechnie and Dunleavy (2009: 152) that in reducing the amount of waste that needs to be disposed of, individuals should be encouraged to separate out certain products from normal household waste, with the purpose of recycling it, for example, glass, paper, food.

4.5.3 Water Conservation

The study found that, on the topic of water conservation, NPOs are leading the discussion with the topic appearing in 72% of their websites. The second being the government with about 63% of websites discussing water conservation as a green solution. Some of the examples noted during the analysis were the implementation of water restrictions, rising municipal tariffs, and population and household size control policies. The other categories contained a relatively low level of discussion within their websites falling below 50 percentiles. The lowest is the profit orientated organisations with only 20% of sites that discussed water conservation. An issue of concern is that industries or profit orientated organisations are the major consumers of water (United Nations, 2017: 6); hence, one would expect them to lead in water conservation discussions. One can conclude that government and NPOs are making an effort to address the water crisis whilst other information providers are not putting much emphasis on water conservation at all.

4.5.4 Electricity and Energy Efficiency

Currently, energy saving has become a significant issue due to the shortage of energy reserves (Cuce, Young and Riffat, 2015: 596). The study found that the number of websites discussing electricity conservation is quite low relative to the other categories of solutions discussed with the highest number of websites discussing electricity being 56% by non-profit organisations. The rest of the providers fall below the 50% range with the lowest being bloggers at a 13% level of discussion. The study found that a very high number of websites within government agencies and NPOs discuss energy efficiency with a rating of 88% and 89% respectively. The

following examples were noted to appear frequently during the analysis: At work (performing energy audits and staff training programs), at home (using smart showers, geyser timers, buying energy efficient appliances, using solar heating, insulation), and for industries (reduction of compressed air, managing heating, ventilation, air-conditioning, the utilisation of energy efficient lighting, use of electric cars) were found to be dominant solutions. These strategies were supported by studies reviewing energy saving strategies conducted by some researchers as strategies that may be a solution to energy challenges (Abdelaziz et al., 2011: 164; Cuce et al., 2016: 55). There is a need for concerted efforts by all stakeholders including profit orientated organisations to win the battle against natural resource depletion as it has more benefits in the long run. This is confirmed by the study conducted in the United States of America by Wei, Patadia and Kammen (2010: 928) who found that rapid energy efficient measures can generate over four million full time jobs by 2030 taking into account the fuel sector job losses.

4.5.5 Green Products

Dangelico (2016: 561) defines green products as those products that use less resources, have lower negative impacts on the environment and reduce waste generation as early as at the product conception stage. Green product innovation has become more pertinent for policy makers, strategy developers and community as a whole (Dangelico, 2016: 560). The study found that the leading category of green information providers are the profit orientated organisations, with 68% of their websites discussing green products as a solution. It is interesting to note that throughout the consequences and solutions this is the only category in which profit orientated organisations are the highest providers of information. The average percentage levels of information discussions within their websites on all other topics excluding green products fall below the 25% margin. This supports what Gule and Maduku (2017: 2) highlighted that it is crucial for businesses to initiate strategies which stimulate the consumption of green products among consumers. Another study by Sarkis (2001: 682) concluded that the long term sustainability of an organisation will rest upon on the sustainability of the natural environment and the way organisations integrate their systems to address environmental concerns. This implies that green product sales motivate profit orientated organisations to provide green information online. This observation is further echoed by Albino et al. (2009: 92) who found that the levels of adoption of different environmental strategies are higher on green products. One can conclude that green product sales motivate profit orientated organisations to provide green information online.

4.5.6 Biodiversity Conservation

Conserving biodiversity is an important part of protecting the biological life support systems on our planet, as all creatures depend on these systems to live (Cox and Underwood, 2011: 1). The conservation of biodiversity has a relatively low level of discussion across most providers of green information with only one information provider above 50%, which is non-profit organisations. The lowest provider being educational institutions with 15% of their websites discussing biodiversity conservation. Some of the examples of solutions discussed included rhino protection, eradication of invasive alien species and protection of endangered species. There seems to be a lack of urgency from different green information providers relating to biodiversity loss. Interestingly, in a study conducted on university students, climate change and water pollution were perceived as being the most critical environmental consequence followed by a decrease in biodiversity (Kukkonen, Kärkkäinen and Keinonen, 2012: 102). There is a need for all stakeholders, particularly educational institutions, to create an environment that enables academics to contribute to the body of knowledge concerning the issue of green biodiversity conservation.

4.6 Online Information Providers

The study sought to further determine the number of websites which provided comprehensive environmental information which included both green consequences and solutions. West (2017: 1-10) concluded that the major sources of environmental information are Grist Magazine (Online), The Environmental Magazine (Online), The Environmental News Network (Online website and a blog), Environmental Health News (Online), People & the Planet (Online NPO), The Earth Policy Institute (Online NPO), Daily Newspapers, News Aggregators (Online), and government agencies. This shows some consistency with a study on Finnish university students' found that the major sources of environmental information were television, newspapers and the internet (Kukkonen et al., 2012: 93).

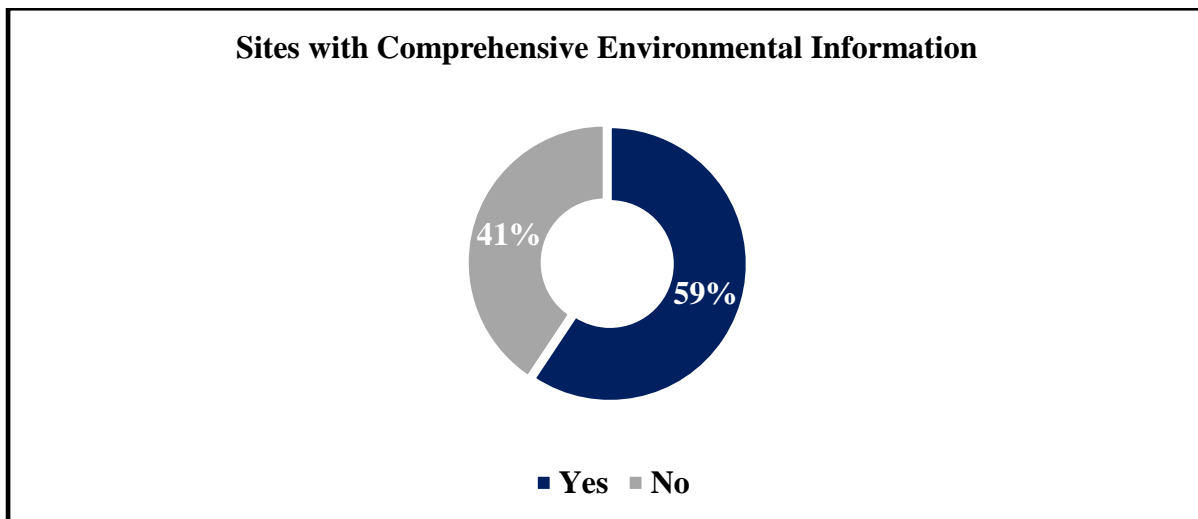


Figure 4.3: Sites with Comprehensive Environmental Information

Figure 4.3 above reveals that 73 (59%) sites had comprehensive environmental information which contained both consequences and solutions to environmental challenges as compared to 50 (41%) sites that lacked these features. This suggests that the majority of sites attempt to give a holistic view of environmental challenges and offer solutions to internet users.

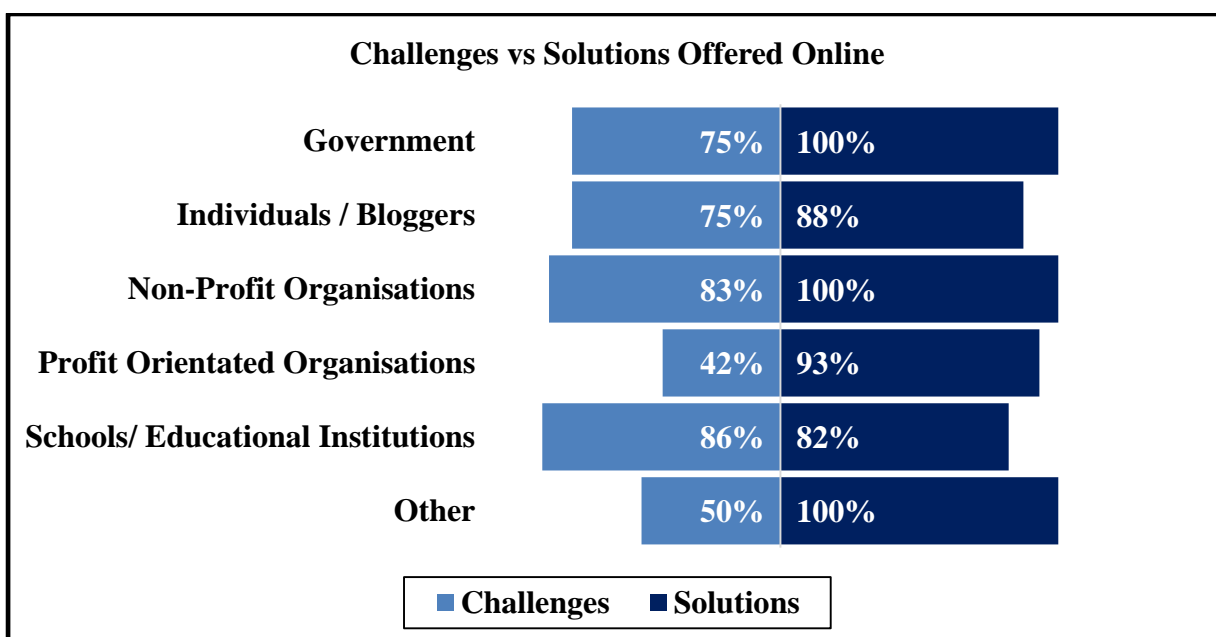


Figure 4.4: Comparison of Challenges against the Solution Offered Online

4.6.1 Profit Orientated Organisations

Based on Figure 4.4 above, we can conclude that profit orientated organisations offer fewer challenges (42%) and more solutions (93%), which are largely the green products that the companies offer and their promotion of recycled packaging. This depicts that businesses would be keener to provide information about their products (which are income generating) than

proving information about implication. This observation is in line with Welford (2013: 17) who states that environmental sustainability may be considered after profit. A study by Watts and Zimmerman (1990: 153) also concluded the decision to demonstrate social and environmental responsibility to relevant stakeholders often depends on management's financial considerations. This is because environmentally sustainable initiatives are costly and voluntary by nature, profit companies only embrace them as a long-term business strategy (Jamali and Mirshak, 2007: 259). Lastly, this finding is in agreement with the assertion that businesses are about enhancing bottom lines and more often than not, investors face the dilemma of choosing to be either environmentalists or economists (Zokaei, Lovins, Wood, and Hines 2013: 53).

4.6.2 Government Agencies and Non-Profit Organisations

This study found that the government agencies and non-profit organisations provide large volumes of environmental data online which includes environmental challenges and solutions which would generally assist in the implementation of environmental laws. This is in line with the findings of Tirado-Valencia, Rodero-Cosano, Ruiz-Lozano and Rios-Berjillos (2016: 410) who discovered there is consistency in the sustainability information disclosed by large European government agencies on their websites, however, the intensity of the information provided was not the same.

4.6.3 Educational Institutions

The research study found that educational institutions supply enormous amounts of environmental data online in the form of academic journals. The extent of the data supplied covers the consequences of the environmental crisis as well as potential solutions to address the environmental crisis.

4.6.4 Bloggers

Blogs are receiving consideration as the most useful platforms for information management in a shared work environment (Chai and Kim, 2010: 408). There are over 156 million public blogs in existence managed by individuals or a group of members sharing information online (Lambert, Barry and Stokes, 2012: 41). Bloggers play a vital role in information sharing online which in turn may influence consumer behaviour. This study found that individual bloggers supplied a lot of green information online; however, the information provided was mostly focused on information relating to waste management, green products and energy efficiency. Findings from this study contradict the study conducted by Keinonen et al. (2014: 49) which found that Blogs, YouTube, emailing lists, Facebook, Twitter and other such online forums were perceived to be sources that provided the least environmental information. Pattberg and Zelli (2015: 214) however, posit that blogs are the best media channels as they allow many

different voices to define and redefine existing solutions addressing the environmental challenges which allows for behavioural changes.

4.6.5 Preferred Search Engines by Green Information Providers

To provide a holistic view of the research results, the researcher further sought to analyse the green information providers' preferred search engines.

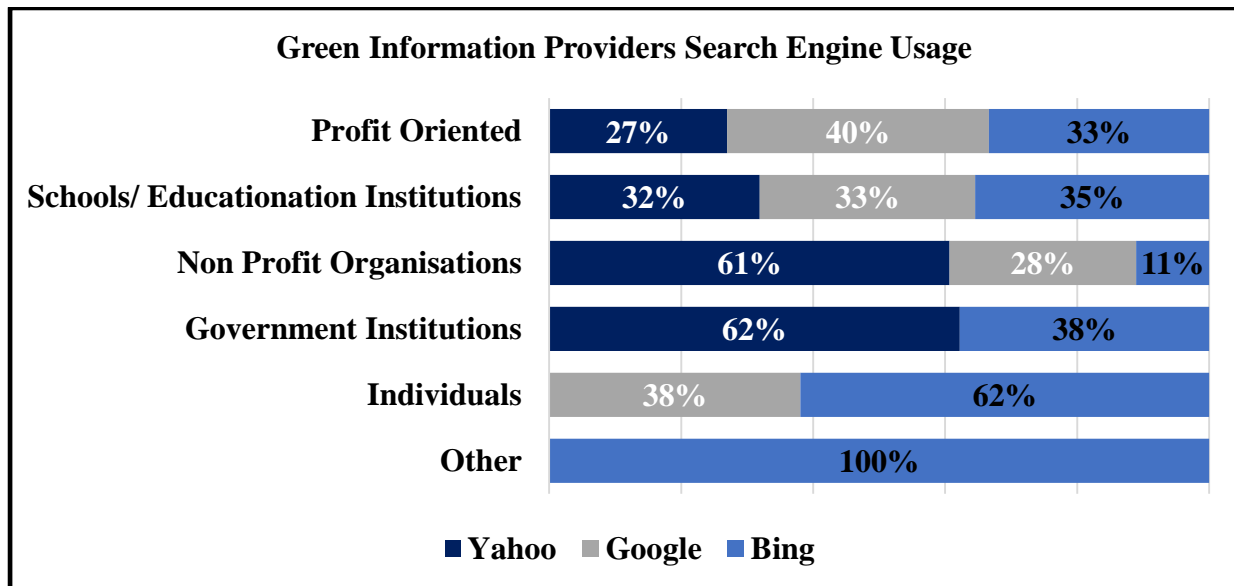


Figure 4.5: Providers of Environmental Information Comparisons per Search Engine

Figure 4.5 above shows the analysis of the green information providers from the three different search engines. The results show that Google is the main search engine used by profit orientated companies (40%) providing green information, Yahoo preferred by non-profit organisations (61%), and government institutions (63%) and Bing preferred by individual bloggers (63%) and other providers. The results from the study are contrary to what Feijoo (2016: 5) found in relation to government agencies; that almost one-third of search results linking to government websites in 2014 came from Google. (27%), Bing (3%), and Yahoo (1%). However, a limitation in Feijoo's findings is that search keywords were not about environmental sustainability.

4.7 Benefits to the Information Provider

In this section the researcher wanted to assess whether information providers benefit directly from the information provided and analysed the web content and linked it to the organisation's core business. For example, an organisation selling green products would be considered to benefit directly from the information provided about a specific green product, whereas a non-profit organisation conscientising the public about environmental issues would not be

considered to benefit directly from the information. In this section the researcher examined if the websites selected were providing green information with the main purpose of selling/advertising their products to consumers. Table 4.6 below provides a ‘snap shot’ of the research results.

Table 4.6: Information Providers Benefits from Information Offered

No	Green Information Provider	Directly Benefit			
		Yes		No	
		N	%	N	%
1	Government	0	0%	8	100%
2	Individuals / Bloggers	0	0%	8	100%
3	Non-Profit Organisations	1	6%	17	94%
4	Profit Orientated Organisations	41	69%	18	31%
5	Schools/ Educational Institutions	7	25%	21	75%
6	Other	0	0%	2	100%
Totals		49		74	

4.7.1 Government Agencies

The role of governments is to introduce laws with the objective of discouraging indiscriminate promotion and sale and consumption of non-eco-friendly products (Rajasekar and Devi, 2014: 2585). In analysing the content of government agencies, the study found that none of the government websites could be identified as benefiting directly from the green information provided. However, it was noted that every information provider stands to benefit indirectly from the information uploaded on to their websites. For example, government agencies provided information that would assist businesses and the general public to implement and comply with certain environmental regulations and policies. This in turn assists government to achieve its millennium goals relating to environmental sustainability and societal behavioural changes.

4.7.2 Individual Bloggers

According to Rowse (2004: 34) one of the most common systems bloggers use to generate revenue is through placing of paid adverts on their sites. The study found that none of the

individual bloggers were selling green products to internet users; hence, none of the bloggers were directly benefiting. In short, there is always an indirect way in which the blogger is benefiting rather than the actual selling of green products to internet users such as adverts placed on their blog spots.

4.7.3 Profit Oriented Organisations

Businesses are about enhancing bottom lines and most often than not, investors face the dilemma of choosing to be either environmentalists or economists (Zokaei, Lovins, Wood, and Hines 2013: 53). Business are likely to sell product which are eco-friendly up to the point that it doesn't negatively impact on a business' ability to generate a profit (Tran, 2015: 96).

The study finds that most profit orientated organisations (69%) offer green information because they benefit from it and very few (31%) of them offer information which does not directly benefit them. Wills (2009) suggests that green businesses tend to have a competitive advantage: (1) this is because modern consumers are aware of social and environmental issues and keep themselves informed about which businesses are acting responsibly in the community; (2) investors are equally aware of environmental issues and there is a trend developing towards investing in environmentally sustainable companies. This best explains why businesses upload information that benefit them at the end (i.e. uploading environmental sustainability information when they intend to sell a green product along the information provided). Even in the case of the 31% which does not directly benefit from the information directly, there is a strong possibility that they intend to attract more pro-environmental investors in the near future.

4.7.4 Non-Profit Organisations and Educational Institutions

Very few Non-Profit Organisations and Educational Institutions benefit directly from the information they provide. There were a few instances where these organisations were making direct monetary benefits from the information provided. For example, educational institutions may be selling their articles or journals containing environmental information. Similarly, some Non-Profit Organisations were selling environmental information on their websites.

Figure 4.6 below indicates that a total of 49 (40%) websites directly benefit from the online information provided as opposed to 74 (60%) which do not benefit directly.

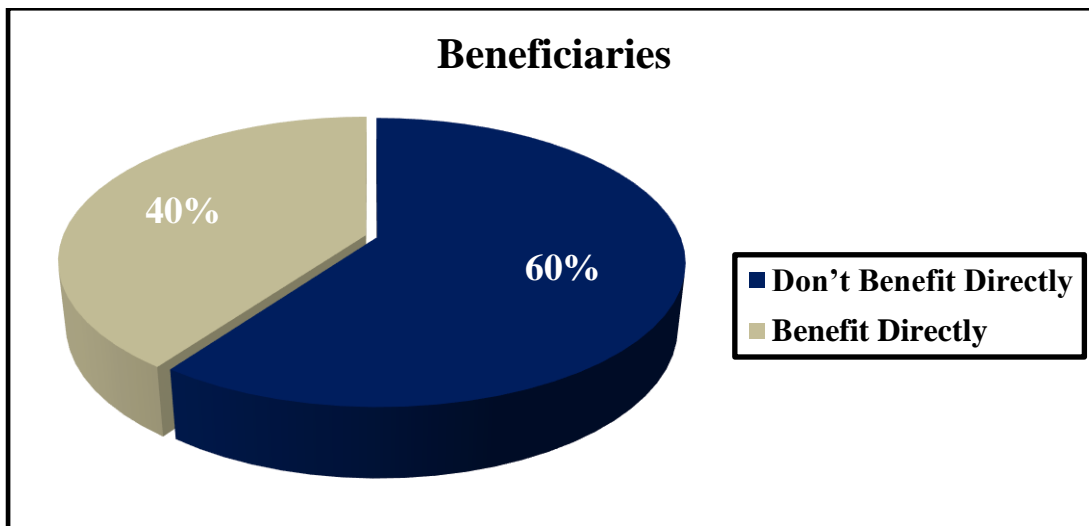


Figure 4.6: Beneficiaries

The study revealed that the majority (60%) of environmental information providers do not benefit directly from the information they provide about environmental information. This in a nutshell, means that the organisations that upload environmental information online are not benefiting directly through green product sales. However, they may benefit indirectly through improved company goodwill or through increased website ‘hits’ or donations (NPO).

4.8 Green Information Providers' Target Population

The study sought to establish the online environmental information providers’ target population. The researcher categorised the target population into Consumers (green information relating to sales of green products not specific), Kids (green information selling green products specific to kids), General Public (green information for use by anyone), Businesses (green information targeted specifically to businesses/business managers), and Other (green information targeted at different groups such as academics). This section depicts the results of the study relating to target population. In determining the green information providers’ target audience, the researcher analysed the information providers’ core business and the information content for each website to assess if the target audience was identifiable.

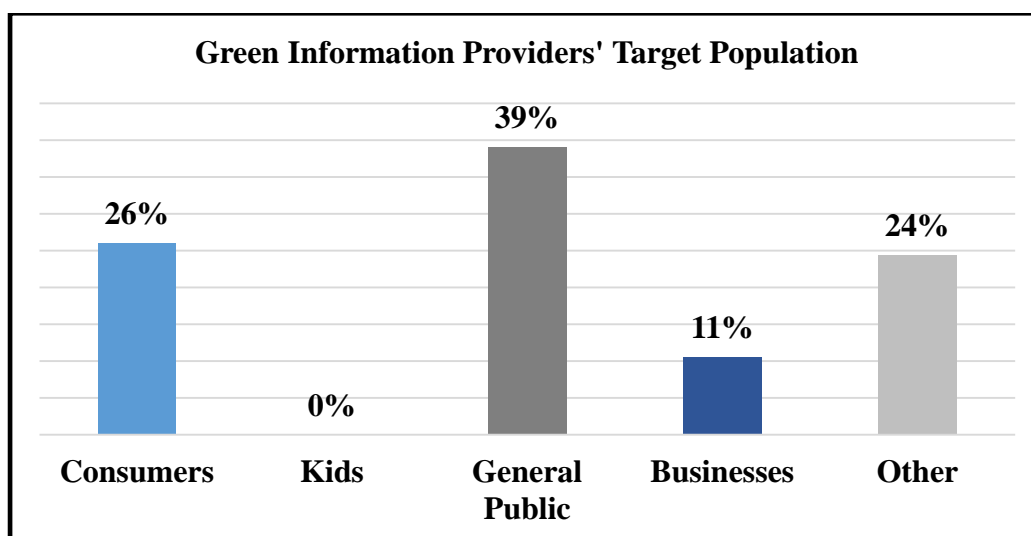


Figure 4.7: Green Information Providers' Target Population

The study found that most of the green information providers target the general public (39%), the second target group being consumers (26%) and then businesses (11%). The rest of the information uploaded online is targeted to other groups (24%) with mostly academics and nothing targeted at children (0%).

Table 4.7: Green Information Providers' Target Population

No	Green Information Provider	Target Population - N (%)									
		Consumers		Kids		General Public		Businesses		Other	
		N	%	N	%	N	%	N	%	N	%
1	Government	0	0%	0	0%	8	100%	0	0%	0	0%
2	Bloggers	0	0%	0	0%	3	38%	1	13%	4	50%
3	Non-Profit Organisations	0	0%	0	0%	15	83%	1	6%	2	11%
4	Profit Orientated Organisations	32	54%	0	0%	16	27%	8	14%	3	5%
5	Educational Institutions	0	0%	0	0%	4	14%	3	11%	21	75%
6	Other	0	0%	0	0%	2	100%	0	0%	0	0%
Totals		32	54%	0	0%	48	39%	13	11%	30	24%

4.8.1 Government Agencies and Non-Profit Organisations' Target Population

This study found that government agencies (100%) and Non-Profit Organisations (83%) largely targeted the general public. Government is accountable to the general public hence, they make sure that there is adequate information available to address environmental challenges. A study by Chen and Chai (2010: 33) found that a relationship exists between consumers' attitudes to government's role and their attitude to green products. When government agencies upload green information, it influences community members' attitudes towards green behaviour.

4.8.2 Profit Orientated Organisations

The findings show that Profit Orientated Organisations target consumers 54% of the time, the general public (27%), businesses (14%) and others (5%). This finding is logical as profit orientated organisations are trying to sell products to consumers and endeavor to transform the general public to green consumers. Bhaskaran, Polonsky, Cary and Fernandez (2006: 684) affirmed that the adoption of environmental standards is often determined by the market power of value-chain intermediaries and not necessarily by the consumer market power. This assertion explains why Profit Orientated Organisations target about 14% of other businesses.

4.8.3 Individual Bloggers

Blogs are being received as the most useful information sharing platforms for information management in a shared work environment (Chai and Kim, 2010: 408). The results indicate that individual bloggers focus on providing data that targets the general public (38%), business (13%) as well as other (50%) stakeholders. Some of the examples noted under the 'Other' category are students and teachers as the target population. This is in agreement with the finding by Farmer and Bartlett-Bragg (2005: 200) that in most educational institutions, many teachers have incorporated blogging into their online teaching strategies to improve their lessons effectiveness. The current study found that there is still limited environmental sustainability information shared by bloggers.

4.8.4 Children as the Target Population

Holloway, Green and Livingstone (2013: 4) found that there is an emerging trend for children to use internet enabled devices such as touchscreen tablets and smartphones. However, there is only limited information available regarding children's internet search behaviour (Kuiper, Volman and Terwel 2005: 286). In this category the study found that all of the environmental information providers do not target children. This makes sense as most children do not normally browse the internet for green products, most online information targeted at children is introduced via parents (Blomqvist, 2012: 5). Another possible reason for lack of information

providers targeting children may be the limited information about children's internet search behaviour or possibly the adherence to the codes of conduct regarding targeting children.

4.9 Discussion of Results per Research Objective

The following section discusses the research findings in line with each research objective.

4.9.1 Objective 1

To determine the extent and content of environmental information available online targeted at consumers.

Information on environmental sustainability has long been considered as an essential pillar for the achievement of sustainable environmental behaviour. The study found that most of the websites analysed provide green information with consequences of environmental challenges whilst about a third did not provide any consequences. Most of the green information providers' categories discussed consequences of environmental challenges. Among the leading categories of information providers were the Non-Profit Organisations (NPO) discussing environmental consequences. This supports the findings by Agarwal (2008: 933) that NPOs create awareness among the public on current environmental issues and solutions. Saleh and Saifudin (2017: 99) found that NPOs play a vital role in environmental sustainability communication which in turn improves environmental awareness. The majority of educational institutions' websites analysed in this study were found to have discussed the consequences of a green crisis. This is in line with what Wright (2002: 119) found that sustainability policies are useful to many institutions and capable of facilitating change to encourage pro-environmental behaviour.

The research objective was achieved as the study revealed the extent and the content of environmental information available online. The most prevalent topics (environmental consequences) were waste management issues, water quality and water wastage and air quality issues indicating a higher concern on these topics relative to the others. The majority of green information providers' websites discussed solutions to address environmental challenges with a high focus on recycling, reducing, buying green products and energy efficiency.

4.9.2 Objective 2

To find out who the providers of the online environmental information are.

The profit orientated organisations and educational institutions were the major providers of environmental information available online. The analysis of website content revealed that 48% of sites with environmental information were provided by profit orientated companies, 23% were provided by educational institutions, 15% by non-profit organisations, 7% by government institutions, 7% by individual bloggers, and 2% of the information was provided by other

sources. Within this objective, the information service providers' preferred search engines were analysed and the results showed that Google was the main search engine preferred by profit orientated organisations in providing green information, Yahoo was preferred by non-profit organisations and government agencies, whereas Bing was preferred by individual bloggers and other providers. The objective of the study to better understand the providers of online environmental information was achieved as the study revealed that the profit orientated organisations and educational institutions were the major providers of environmental information available online whereas, about a third of online information is from non-profit organisations, government agencies, bloggers and other sources.

4.9.3 Objective 3

To find out whether the information providers benefit directly from the information they provide.

The majority (60%) of environmental information providers do not benefit directly from the information they provide about environmental information. Profit orientated organisations, however, were found to have the highest number of information providers to have direct benefits accruing from the information provided (such as marketing of green products, online sales and so forth). These institutions that upload environmental information online may benefit indirectly through improved company goodwill or through increased website 'hits'. The objective to determine whether information providers benefit directly from the information uploaded was achieved.

4.9.4 Objective 4

To better understand the audience targeted by the online green information providers.

The study found that government agencies and NPOs largely targeted the general public. Profit Orientated Organisations targeted mostly consumers, the general public and other businesses (mostly suppliers). Individual bloggers focused on providing data that targeted mostly the general public as well as other stakeholders (dominated by students and teachers). There is limited environmental sustainability information shared by bloggers. The area of concern though, was the children category where the study found that none of the environmental information providers targeted kids. The justification for this may be that most online information targeted to kids is introduced via parents (Livingstone et al., 2010: 1).

Based on the above findings, the research objectives were to a large extent achieved.

4.10 Conclusion

This chapter focused on the data analysis and presentation of the study's results. The raw data collected from three major search engines was interrogated and analysed using Microsoft Excel Software. Graphs and tables were used to present data for ease of understanding. Research recommendations, limitations and final conclusions are contained in Chapter Five.

CHAPTER 5 : RECOMMENDATIONS, LIMITATIONS AND FINAL CONCLUSION

5.1 Introduction

The aim of this study was to investigate the content of green consumer information on three major online search engines which are Google, Bing and Yahoo. This chapter presents the research conclusion, practical research implications, study limitations, and recommendations which are meant to solve the research problem and for future research studies.

The study found that there is a gap between green environmental information available online and what is meant to happen to influence consumer behaviour to be more environmentally friendly. This is caused by the limited information provided by profit orientated companies which are the major providers of green online data. This chapter intends to provide recommendations contributing to the body of knowledge and to assist in improving consumers' pro-environmental behaviour. This study provides numerous recommendations based on the research findings:

5.1.1 Consequences of Environmental Challenges

The majority of environmental information sources cited consequences to environmental challenges. The analysis revealed that sites which spoke about environmental consequences had the most prevalent topics such as waste management issues, water quality, water wastage and air quality issues indicating a higher concern for these topics relative to the others. Therefore, businesses intending to improve or develop green products may need to focus on these categories.

It is further essential for environmental information providers to provide more information on the consequences of environmental crises focusing on areas which had low frequencies such as biodiversity loss, land contamination and ozone depletion; this would ensure better understanding by consumers, which would potentially influence behaviour.

5.1.2 Solutions to Environmental Challenges

The majority of environmental information websites offered solutions to environmental challenges. This suggests that most companies position themselves to be positively aligned with environmental solutions. The research study shows that recycling, reducing waste, green products and energy efficiency are the most prevalent solutions in environmental information

sites. Businesses and bloggers that intend to gain a market share or contribute new environmental data online should focus their efforts on reusing solutions, biodiversity conservation solutions, and water conservation solutions as these had lower frequencies per the study.

5.1.3 Providers of Online Environmental Information

Profit orientated companies and educational institutions are the major providers of environmental information as they collectively contributed 71% of the information available online. Emerging business managers should start a trend of providing environmental information on their business websites in order to benefit from green consumers, as not doing so may put those businesses at risk of losing green consumers.

Government agencies and NPOs should be the primary communicators of environmental information as the study found that they provide comprehensive data which discusses environmental challenges or consequences and potential solutions to address these challenges.

Bloggers particularly provide answers, disagree with users, agree with users or thank users and let users interrogate responses from other bloggers which enhances the usefulness and the reliability of the information shared online (Bolander, 2013: 39). In line with this observation, bloggers should discuss more green information in order to influence consumer behaviour as an increase in available green information may ultimately improve pro-environmental behaviour by customers.

5.1.4 Target Audience

The study found that most of the green information providers target the general public (39%), the second target group were consumers (26%) and thirdly others at (24) which mostly represented academics and lastly, businesses (11%). As a result, online environmental information providers should improve green environmental information targeted to consumers and businesses.

Even though Holloway et al. (2013: 4) found that there is an emerging trend for children to use internet enabled devices in a form touchscreen tablets and smartphones, this study found that none of the information providers had green information appealing to children. It is recommended that information providers should consider uploading environmental information which appeals to a children's audience to improve environmental knowledge and attitudes of our next generation.

5.1.5 Benefits Accruing from Environmental Information

The majority (60%) of environmental information providers do not benefit directly from the information they provide. This indicates that most information providers are concerned about

the environment rather than financial benefits. On the other hand, this may mean that information providers are providing information to improve consumers' goodwill towards them and comply with government laws. In light of this, government should incentivise companies complying with environmental laws to harness an environmental compliance culture (Haas, 2015: 264) as this is likely to improve green consumer behaviour and likewise, impose penalties on those that are not complying with environmental laws.

5.2 Limitations of the Study

There is a limited amount of research conducted on search engines (content analysis), on the providers of green information and its reach. There have been limitations in linking findings to what other researchers have found. This research will however, form the basis for future research that is directed at improving the environmental information content uploaded online by various information providers.

It is important to note that there may have been some bias due to the search sequence in which the data was drawn from the search engines. Yahoo was the first search engine to be interrogated, Bing second and then Google which resulted in all sites that have been noted under Yahoo being ignored under Bing and Google respectively. This means that the findings, views and conclusions from this study were informed by a sequence limitation. Generalisation in some other circumstances may be limited as the sample size was only 123 sites (about 41 for each search engine). Search engines present only a maximum of 10 to 15 links or search results on each page since search engine users are not keen to scroll down and more than half of search engine users only look at the first results page (Hotchkiss et al., 2005: 10). This finding was also echoed by stating that web searchers often choose to try the top few search results and seldom scroll to the bottom of the first page of search results when browsing for what they want. This implies that it is very unlikely that internet users search through more than 40 search results.

This study was only conducted using three different search engines which are Google, Yahoo and Bing. The results of the study may have limitations in the generalisation as there are some search engines such as Ask, AOL, Wow, WebCrawler, MyWebSearch, Baido and so forth which were not looked into due to limited time.

The study investigated the extent of the environmental information contained on each web link selected and the providers of such information; however, it did not investigate the effects produced by the type of data provided to internet users (whether or not it improves pro-environmental behaviour) after reading it the information.

Lastly, another limitation was that the researcher was the only coder which may have introduced the risk of coding errors thus affecting the trustworthiness of the findings.

5.3 Recommendations for Future Studies

There is a need for research on the effects of online environmental information on green behaviour, as this research only analysed the content and reach of environmental information provided online.

It would be interesting to conduct a study on businesses' motivations for uploading environmental information online. It may assist in knowing the direct benefits accruing from the process, which may be (1) to attract green investors, (2) improve organisational goodwill (the public's feelings of goodwill towards the organisation) or (3) to merely comply with the social corporate responsibilities.

There is a need for a research which will analyse which search engines provide more green information by applying an approach that does not skip sites that have already been seen. This would identify which search engines are linked to sites with solutions, consequences and the comprehensiveness of information uploaded on to those websites.

5.4 Summary

After presenting the findings of this study, this chapter presented recommendations for businesses and green marketers on some of the issues that may assist in improving green information to be uploaded online. Recommendations for future research were provided and a number of limitations of this study were also discussed.

The purpose of the study was achieved and the details of key conclusions relating to the research problem are discussed below.

5.4.1 Online Green Information: Consequences

The availability of online environmental information is an indication that many stakeholders are concerned about natural resource depletion caused by various non-eco-friendly behaviours. The study found that most of the websites provide green information with consequences of environmental challenges whilst about a third did not provide consequences. The majority of the government agencies, NPOs, educational institutions and individual bloggers discussed the consequences of green information. Among the leading categories of information providers were the NPOs and educational institutions discussing environmental consequences. One can conclude that NPOs and educational institutions play a pivotal role in influencing behaviour related to issues of sustaining the environment by providing both consequences and solutions

on their websites. Profit orientated organisations and individual bloggers had the lowest number of websites discussing water quality and wastage issues as environmental challenges which supports the finding that profit orientated businesses only concern themselves with initiatives that have the potential to make money.

5.4.2 Online Green Information: Green Solutions

The green information providers were all consistent in providing effective environmental solutions. The majority of the providers of green information analysed spoke frequently about recycling elements, with the exception of profit orientated organisations who spoke the least about recycling elements as green solutions. The area of concern in this study is that the only solution found in profit orientated organisations was the green products that the companies offer and their promotion of recyclable packaging. Green product solutions are the only area where profit orientated organisations (68%) were concerned about the environment. It is interesting to note that throughout the consequences and solutions, this is the only category whereby the profit orientated organisations are the highest providers of information. This implies that green product sales motivate profit orientated organisations to provide green information online.

The conservation of biodiversity had a relatively low level of discussion across most providers of green information with only one information provider. There is a need for all stakeholders, particularly the educational institutions, to create an environment that enables academics to contribute to the body of knowledge concerning the issue of green biodiversity conservation.

5.4.3 Online Environmental Information Providers

Profit orientated organisations offer less challenges and more solutions which are largely the green products that the companies offer and their promotion of recyclable packaging. The logic created in this is that businesses would be keener to provide information about their products (which are income generating) than providing information about the implications to environmental sustainability. The government agencies and NPOs provide large volumes of comprehensive environmental data online as it includes environmental challenges and solutions. Educational institutions supply enormous amounts of environmental data online in the form of academic journals. Bloggers supplied a lot of green information focusing on waste management, green products and energy efficiency, which means that there is a need to focus on other areas such as biodiversity loss, land contamination and so forth.

5.4.4 Benefits by Environmental Information Providers

The study revealed that the majority (60%) of environmental information providers do not benefit directly from the information they provide about the environment. None of the

government websites could be identified as benefiting directly from the green information provided, however, it was noted that every information provider stands to benefit indirectly from the information uploaded on to their websites. Very few NPOs and educational institutions benefit directly from the information they provide. There were a few instances where these organisations were obtaining direct monetary benefits from the information provided. This implies that the institutions that upload online environmental information are not benefiting directly through green products' sales but they may benefit indirectly through improved company goodwill or through increased website 'hits'.

5.4.3 Target Population

The study found that government agencies (100%) and Non-Profit Organisations (83%) largely targeted the general public. The profit orientated organisations target mostly consumers and the general public whilst the individual bloggers focus on providing data that targets general public and other stakeholders. The study found that there is still limited environmental sustainability information shared by bloggers.

Lastly, the study found that all the environmental information providers do not target children. This is logical as most children don't normally browse the internet for green products, most online information targeted at kids is introduced to parents.

5.5 Conclusion

The aim of this study was to investigate the content of green consumer information on three major online search engines which are Google, Bing and Yahoo. This chapter presented the research conclusion, practical research implications, study limitations, and recommendations which were meant to solve the research problem and for future research studies.

The study found that there was a gap between green environmental information available online and what is meant to happen to influence consumer behaviour to be more environmentally friendly. This is caused by the limited information provided by profit orientated companies which are the major providers of green online data. This chapter provided recommendations contributing to the body of knowledge and to assist in improving consumers' pro-environmental behaviour.

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Appendix A: Research Instrument or Code Sheet

RESEARCH INSTRUMENT: THE CONTENT ANALYSIS OF GREEN MARKETING INFORMATION ON THREE MAJOR ONLINE SEARCH ENGINES (GOOGLE, YAHOO, BING)

(Tick the appropriate box)

Search Engine Name	Google	Bing	Yahoo
Search Word			
Site Name		Date Accessed	

(Tick the appropriate box)

Source Type	<input type="checkbox"/> / <input checked="" type="checkbox"/>
Website	
Blog	
Journal/ Document	
Social Media Page	
Other	

Questions Relating to Knowledge and Behaviour

(Tick the appropriate box)

Details	Yes	No
Does the selected item have details about consequences of environmental challenges?		
Does it offer solutions to environmental challenges?		
Is it just informative with no solution?		
Is it just informative with no consequences?		

Elements of Green / Consequences

(Tick the appropriate box)

Details	Yes	No
Ozone Depletion		
Air Quality Issues		
Water Quality / Waste		
Waste Management Issues		

Land Contamination Issues		
Biodiversity Issues		
Other		

Types of Potential Solutions (*Tick the appropriate box*)

Type	What Material / Resource	Yes	No
Recycle Elements			
Reuse Elements			
Reduce Elements			
Conserve Water			
Conserve Electricity			
Green Products			
Conserve Biodiversity			
Energy Efficiency			
Other			

Providers of the Information

(*Tick the appropriate box*)

Providers	Yes/No
Profit Oriented Companies	
Schools/ Educational Institutions	
Non – Profit Oriented Organisations	
Government	
Individuals	
Other	

Target Population (*Tick the appropriate box*)

Providers	Yes/No
Kids	
Consumers	
The General Public	
Managers	
Businesses	
Other	

(Tick the appropriate box)

	Yes	No
Does the provider gain directly from the information provided		

Appendix B: Ethical Clearance



17 May 2018

Ms Mandy Gweneth Mabaso (206503334)
School of Management, IT & Governance
Westville Campus

Dear Ms Mabaso,

Protocol reference number: HSS/1289/017M

New project title: A content analysis of green information on three major online search engines

Approval Notification – Amendment Application

This letter serves to notify you that your application and request for an amendment received on 04 May 2018 has now been approved as follows:

- Change in Title

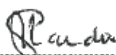
Any alterations to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form; Title of the Project, Location of the Study must be reviewed and approved through an amendment /modification prior to its implementation. In case you have further queries, please quote the above reference number.

PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for period of 3 years from the date of original issue. Thereafter Recertification must be applied for on an annual basis.

Best wishes for the successful completion of your research protocol.

Yours faithfully



.....
Dr Shamila Naidoo (Deputy Chair)

/ms

Cc Supervisor: Professor Debbie Vigar-Ellis
Cc Academic Leader Research: Professor Isabel Martins
Cc School Administrator: Ms Jessica Chetty

Appendix C: Search Process Step 1




Appendix C: Search Process Step 2

Search Results

15 Easy Ways to Become Environmentally Friendly - Conserve Energy ...
<https://www.conserve-energy-future.com/15-easy-ways-to-become-environmentally-f...>
"Environmentally friendly, environment-friendly, eco-friendly, nature-friendly, and green are marketing claims referring to goods and services, laws, guidelines and policies that inflict reduced, minimal, or no harm at all, upon ecosystems or the environment."

eco-friendly Meaning in the Cambridge English Dictionary
<https://dictionary.cambridge.org/dictionary/english/eco-friendly>
eco-friendly meaning, definition, what is eco-friendly: Eco-friendly products have been designed to do the least possible damage to the... Learn more.

Images for Eco-Friendly



→ More images for Eco-Friendly Report images

What Does Eco-Friendly Mean? | Home Guides | SF Gate
homeguides.sfgate.com > Home > Home Improvement > Sustainability
In recent years, terms like "going green" and "eco-friendly" have become buzz words on talk shows, commercials and product packaging. The term "eco-friendly" has been used for so many different products and practices, its meaning is in danger of being lost. By understanding the true meaning of eco-friendly, you can ...

Appendix C: Search Process Step 3



15 Easy Ways to Become More Environmentally Friendly

Learning to be more environmentally friendly is easier than you think. You don't have to jump in by changing everything, start small to make the changes more sustainable and a part of your normal life. Here are 5 ways you can begin to become more environmentally friendly.

1. Become More Aware of Resources: Start by living with a greater awareness of the resources that you use in your daily life. Pay attention to how you choose to heat, to travel, to use water and use products that were made by manufacturing practices. Awareness is what will allow you to then begin to make [environmentally friendly choices](#).

2. Practice Conservation: With your new awareness of how natural resources are used

Solutions



Appendix C: Search Process Step 4

<https://www.conserve-energy-future.com/current-environmental-issues>

Crucial environmental issues are no more a blame game. While most of us crib about dirty air, smelly garbage or polluted water, least do we know it is “us” who is responsible for this unfavorable circumstances leading to cautionary environmental issues.

Here are 10 significant current environmental issues, where human beings play an important role in its cause.

1. Pollution: More than half of the human population knows what is pollution, but we are still not ready to face its damaging consequences. **Pollution** is not only limited to water, soil and noise but has extended to light visual, point and non-point sources. Human beings and their actions are majorly responsible for causing all types of pollution. **Water pollution** is essentially cause by oil spills, urban runoff and ocean dumping. **Air pollution** rises from burning of fossil fuels, hydraulic fracturing and gases emitted by vehicles. Water and soil pollution are majorly cause from industrial waste.

Consequences



Appendix C: Search Process Step 5

environmental issue: X Mining the internet for linguist X G jtes-2014-0002.pdf X EBSCO Information Services Se X Language and Pow

https://www.conserve-energy-future.com/current-environmental-issues

10. Urban Sprawl: Not only India and China are classic examples of over population and urban sprawl leading to land degradation. Today almost all countries are using the land irresponsibly to meet the ever-growing demand of the greedy human wishes. The expansion of industrial areas has not only led to land degradation and soil pollution, but the habitat destruction is a terrible misery. Natural environment consisting of **flora and fauna** is indiscriminately destroyed and lost completely instead of being replaced. This in the long run has harmful impact for human survival and cause serious environmental issue.

Image credit: bob angel, machinoschita

About Latest Posts

Rinkesh

Rinkesh is passionate about clean and green energy. He is running this site since 2009 and writes on various environmental and renewable energy related topics. He lives a green lifestyle and is often looking for ways to improve the environment around him. Follow him on Facebook [here](#).

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10 Best Hybrid
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