

SUSTAINABLE BUSINESS PRACTICES

By

DR. JACOB CHERIAN

M.Com., M.S.W., M.B.A., M.Phil., Ph.D.

Kripa-Drishti Publications, Pune.

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Author by: Dr. Jacob Cherian

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PREFACE

Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. The issue of sustainability and specifically sustainable business is of increasing interest and importance to students of business and also students in the sciences, government, public policy, planning and other fields. There can be significant benefits from students learning about sustainable business from the rich experiences of business practice. The contents of this book in various sections will enrich the knowledge base of upcoming generation of young scholars in various universities and colleges in gaining an insight into research studies. The book introduces students to the background and key issues of sustainability and suggests ways in which these concepts can be applied in business practice.

Chapter 1

Sustainable Marketing

Abstract

Increasing awareness on the various environmental problems has led a shift in the way consumers go about their life. There has been a change in consumer attitudes towards a green lifestyle. People are actively trying to reduce their impact on the environment. However, this is not widespread and is still evolving. Organizations and business however have seen this change in consumer attitudes and are trying to gain an edge in the competitive market by exploiting the potential in the green market industry. The current study introduces the concept of green marketing and looks into the various ways in which the different consumer attributes are related to the concept of green marketing. A conceptual framework is presented and the information is analyzed on the basis of the framework.

Keywords: green marketing, green products, consumer attitude

1. Introduction

Today the concept of sustainability is almost ubiquitous by showing application in corporate strategy, consumer choice, student education and academic research. The need for sustainable business practices by corporations around the world is identified to be a result of overall increase in the consumer awareness of lack of environmental protection and social inequities. Over the last decade environmentalism has emerged to be a vital aspect due to increasing issues related to acid rains, depletion of the ozone layer, and degradation of the land and many more pressing environmental issues. This resulted in increase in consumer concern with regards to restoration of ecological balance by presenting demands for eco friendly products in countries around the world (Doyle 1992; Vandermerwe and Oliff 1990). The research on environmental consumerism is a well researched topic with the first research dating back to the 1970s (Henion and Kinnear, 1976). There has been extensive growth in interest exhibited by marketing academics as well as practitioners with regard to the impact of marketing on promoting and maintaining ecological balance (Chammaro et al., 2009; Bhattacharya, 2011). There is a great deal of depletion of non renewable energy resources which accompanied by generation of non

bio degradable pollutants has lead to an increase in consumer and corporate awareness of green marketing issues.

The growth of green marketing research dates back to 1980s when there was emergence of concept of green marketing. Early literature indicates green marketing to be an approach which indicated signs of shift in consumer attention to green product. At that time green marketing research concentrated on the shift in consumer consumption of green products. There was a great deal of empirical research carried out to identify interest among consumers in using and purchasing green products (Mintel 1991). Green marketing approach was researched from a corporate interest point of view in the early 90s. Research indicated that 92% of MNCs from Europe changed their products to address growing concerns of environmental pollution. (Vandermerwe and Oliff, 1990). Green marketing research has come a long way since then. Consumers from the developed countries including USA and Western Europe were found to be more conscious about the environment (Curlo, 1999). Research in the last decade (Lee, 2009, Rahbar and Wahid, 2011, Lee 2008; D Souza 2004) has indicated that consumer are aware and are willing to pay more to "go green". There is limited research which has examined the impact of green marketing on consumers from emerging economies like India (Bhattacharya, 2011; Prakash, 2002).

Most of the studies related to green consumerism have been conducted in well developed countries. It is to be acknowledged that when considered from a developing country context there is a lack in number of studies. It is against this backdrop from the above discussion it is quite clear that there is a large research gap in terms conceptually identifying those areas of consumer awareness impacting the concept of green marketing.

1.1 Aims

The main objective of the current study is to understand the concept of Green marketing and to review some of the studies that have dealt with the concept of Green marketing and to identify the relationship between the various consumer attitudes and green marketing.

2. Literature Review

2.1 Green Marketing and Green consumers

Environmental marketing, more popularly known as green marketing or sustainable marketing can be defined as the effort by a company to design, promote, price and distribute products in a manner which promotes environmental protection (Polonsky, 2011). Green marketing has been defined as 'all activities designed to generate and facilitate any exchanges intended to satisfy human needs or wants such that the satisfaction of these needs and wants occurs, with minimal detrimental impact on the natural environment' by Polonsky (2011).

In this paper, green marketing covers the overall brand of marketing activities undertaken by companies in a manner that they promote manufacture of products which have a positive impact on environment or alternatively reduce negative impact on the environment. Today green marketing is a vital component of marketing research which began due to increasing media exposure and pressure on firms to present eco friendly behaviour. The growth in green marketing over the years has been promoted by adoption of product packaging and presenting to the public these improvements. Over the years there has been a subtle shift from practicing environmental marketing practices as a result of compulsion identified as a result of legislations and pressure from environmental groups to genuine efforts to improve sustainable marketing plans and behaving in an eco responsible manner (Polonsky and Rosenberger, 2001).

Consumerism can perhaps be identified as a movement which initially begun as a process which was presented to protect consumers against practices of unethical marketing. Over time this has extended and become broader in nature. When today's agenda with regards to consumer activism is taken into consideration it can be observed that protection of the environment is the most vital aspect (Dono et al., 2010). There is a resultant increase in the concern expressed towards environmental protection leading to "green consumerism" (Eriksson, 2002).

The growth of green marketing and green consumer is "perhaps the biggest opportunity for enterprise and invention the industrial world has ever seen" (Cairncross 1992: 177). A green consumer can be identified to be one who avoids any product which may harm damage to any living organism, cause deterioration of the environment during process of manufacturing or during process of usage, consume a large amount of non renewable energy, involves unethical testing on animals or human subjects (Elkington, 1994).

There have been a number of different factors which are instrumental in promoting green consumers to purchase green products. Extensive research over the years identify that heightened awareness of green issues; increased level of information availability on environmental sustenance; green advertising by corporations; increased concern for the environment; increase in popularity of green products by social and environmental charities as some factors. This overwhelming increase in the overall environmental consciousness among different consumer profile there have been efforts undertaken by firms to "go green" by presenting the concept of corporate environmentalism (Banerjee, 2003; Hay and Lichter 2000). Today green development are identified as opportunities by business firms as opportunities to improve their marketing niche rather than just actions which need to be carried out.

2.2 Global Scenario in Green Marketing

“Green’ is the buzzword that is gaining popularity among the current generation. A number of businesses right from private entities such as Wal-Mart trying to push the concept of organic food to public entities like the London governments congestion charge are all aimed at improving the environment by promoting ‘Green’ products and issues. 87% of people from various nations like Brazil, Canada, China, France, Germany, India, the UK and the US have shown an interest in reducing their impact on the environment, according to a survey by (McKinsey, 2007). However, showing interest and actually acting on the interest are two different deeds. This fact is proved by a survey that was conducted on a global scale, which was repeated in 2008 with the help of BBC World, which showed that not a lot of people were actually doing something to move their lifestyle to a green lifestyle.

The overall market for green marketing is said to be worth \$ 3.5 trillion by the year 2017, according to a report by Global Industry Analysts Inc. of 2011. The report also states that increasing awareness about the environmental issues among the people, businesses and the governments is one of the main reasons for such market potential. Another research study by Mintel, clearly showed that 12% of the American population actively sought green products.

There is a growing need to switch over to green products and services by both marketers and consumers. Even though the shift to ‘green’ will be expensive to both the consumers as well as businesses, it will most definitely pay off in the long run. There are a number of literatures that focus on various aspects related to green marketing and also delves into the various inter relationships between the customers attitudes and environmental strategies in relation to the

organizations use of marketing. Environmental issues are addressed in green marketing efforts. The core idea of green marketing is to create awareness among people on the environmental issues and how consumers would be helping the environment if they switch over to green products. Thus green marketing aims to provide more information to people and also gives those more choices to switch over to green lifestyle.

According to (Rex and Baumann, 2007), those aspects will spur businesses to develop more products from an environmentally friendly perspective. Green marketing is a part of marketing and therefore shares a number of aspects with traditional marketing such as price, promotions, products and place. Even green marketing requires that businesses develop and maintain a strong relationship with all their suppliers, their market intermediaries and significantly with the consumers, according to (Chan et al., 2012). A number of businesses have begun committing themselves to making their entire operation more environmentally friendly. Thus corporations are becoming more aware of their responsibilities towards the environment. This has forced the law makers, environment groups, consumers, financial institution, insurers and the organization's own employees to become more aware of environmental aspects and this in turn has led to an increase in the number of policies and schemes and regulations at both the national and international levels.

2.3 The Attitude-Behavior Link

It has always been believed by consumer behaviorists that an individual's actions can be predicted by their attitudes. There have been a number of attempts to improve the ability to predict an individual's actions and a variety of factors have also been suggested to involve factors which can be classified as either dispositional or situational. Spruyt (2007) indicate that prediction of behaviour is directly dependent on attitude of the consumer which is found to be associated with knowledge and personal experience they have (Davidson et al., 1985). The impact of beliefs and attitude on consumer buying habits has been studied extensively (Fazio and Zanna 1981; Ajzen 1989).

Furthermore research in this area has indicated that if attitudes are to be used in predicting the consumers behavior's then there are a number of methodological issues that have to be sorted out. According to (Ajzen and Fishbein, 1977), behavior and attitudes have to be measured at the same correspondence level.

There are a number of theories that have been put forth to explain the process by which attitudes predict behavior. According to (Ajzen and Fishbein, 1980, p. 5), theory of reasoned action, “people consider the implications of their actions before they decide to engage or not engage in a given behavior”. Thus according to the above theory, people’s attitudes play a significant role when it comes to their forming an intention to act in a certain behavior. The model primarily argues that people engage in processing that leads to the formation of attitudes, norms and intentions prior to performing the behavior.

However, the theory of reasoned action is not the only theory that deals with people’s attitudes and behaviors. Fazio (1986), proposed another theory in which he states that “attitudes guide behavior through an automatic and spontaneous process instead of a deliberate one as argued by the earlier two theories”. Furthermore Fazio (1989) also stated certain conditions in which behaviors and attitudes will be consistent. They are:

When the attitude influences perception. Thus when an individual forms a favorable (or unfavorable) attitude towards an object then the object will automatically be seen as one that has many favorable (or unfavorable) characteristics to the individual.

the attitude is accessed spontaneously by the mere presence of the object

In spite of the presence of theories that aid in prediction of behaviors from an individuals attitude, when it comes to environmental consumerism, the predictive ability of attitude is still being debated by researchers. There have been a number of attempts to provide a valid explanation to the presence of inconsistencies among behavior and attitudes, effects of external variables and lack of measurement reliability and validity (Mainieri et al., 1997), low correlations among environmental behaviors and different levels of specificity in the attitude behavior measures.

Previously done research studies have proven that there is no significant correlation between the pro environmental behaviors performed by an individual (Tracy and Oskamp, 1983-1984). Thus these studies showed that people who are into recycling may not be into carpooling. Therefore such inconsistencies exist because researchers tend to focus on a generalized view instead of measuring a specific behavioral aspect, according to (Mainieri et al., 1997). (Gadenne, 2011; Wulf and Schroder, 2003) recommended that in order to predict specific behaviors the attitudes measured have to be directed at a specific environmental issue like

purchasing of green products. Furthermore, according to (Mainieri et al., 1997), the relationship between environmental attitudes and behavior may be confounded by situational factors (social norms, other attractive choices or economic constraints) and personal factors (knowledge, motivation or attitudes).

3. Research Methodology

The current research paper is a conceptual study in to green marketing. Therefore the researcher adopted a qualitative research strategy. According to (Ader et al., 2008), there are no independent or dependant variables involved in a qualitative study as a qualitative strategy is not experimental in nature. (Saunders, M, et al 2003), states that when it comes to conceptual research, it is important to review previously done researches on the same subject matter. A qualitative approach allows for an elastic process during which changes can be made and incorporated into the research. The current study does adopt a purely qualitative strategy as this research involves a dependent variable (Consumer perception of green marketing) and its impact on independent variable (attitude and behaviour towards green consumerism).

4. Green Marketing: Consumer Attitude–Behavior Link

4.1 Consumer Attitude towards the Environment

Environmental attitude is identified as the judgment an individual has towards the protection and promotion of the environment. Conflicting results have been published with regards to the relationship that currently exists between attitude towards the environment and the resultant behaviour (Kotchen and Reiling, 2000). There has been other empirical research which has concluded that the relationship is moderate at best (Davis, 1995). Green marketing depends on the consumer's attitude towards the environment. If there is no strong demand for such a shift in consumer attitude, businesses will not put in the extra effort to move towards introducing green products and services. Based on this evidence three different aspects can be arrived at in terms of identifying the relationship between environmental attitude and behaviour:

- 1) Need for more specific studies identifying the relationship between attitude and behaviour.
- 2) Need to identify other variables which have a mediating effect on both these attributes.

4.2 Perceived Seriousness of Environmental Problems

There have been a number of studies that have dealt with the topic of perceived seriousness of environmental problems. According to (Dunlap, 1994), most of these studies concentrated on determining the subjects view of the problem, its seriousness and how it differs from the numerous cultures. The studies found that some of the most common problems were air quality, sewage treatment and water quality. People living in the Asian nations were found to be more concerned with such problems when compared to their counterparts from other Western nations. One reason for this is that the Asian community tends to perceive their local communities in a negative manner than their Western or European counterparts (Dunlap, 1994).

In recent times a lot of attention has been paid to the effect that mass media has on the audience's perceived seriousness of environmental hazards. An example of one such study is the research done by Moser and Uzzell (2003). In that study, the authors stated that the audiences are influenced by the way the mass media interprets the pollution levels. A study on perception of environmental risks by (Bord and O'Connor, 1997) revealed that women were more perceptible to the risks involved in global warming and other related hazardous wastes when compared to the males. Furthermore the study also found that women were more worried about the various negative impacts that global warming could have on their health on their family's health. Businesses have started to understand consumer's attitude towards environmental problems and have therefore started to provide 'Green' products/services that provide an alternative to consumers. Green marketing is done by businesses to increase awareness levels and to show that people worried about the environment can do something to solve some of the issues.

4.3 Perceived Environmental Responsibility

According to a study by (Lai, 2000), the citizens of Hong Kong were found to be much more literate when it comes to issues regarding the environmental problems over the past few years. This clearly shows that people living in Hong Kong are more responsible when it comes to protecting their environment. However the study also determined that even though they were more aware of the problems their sense of individual duty towards taking corrective measures was significantly weak. On one hand they expected their government to take full responsibility of ensuring that all environmental related issues were solved through more proactive public policies and on the other hand they were not ready to follow through with the proposals that the government was suggesting in a bid to improve the environmental quality (Lai, 2000). Zelezny

et al. (2000) have evidenced in their study that compared to males, females had higher levels of perceived personal responsibility towards environmental protection.

This difference in gender when it comes to the subject of environmental responsibility is explained mostly by the norm activation model that originated from the social psychology context (Schwartz, 1977). According to this model, most individuals are more likely to develop a helping behavior only when they become aware of the dangerous consequences that arise from global warming and when they actually feel responsible for their part in perpetuating this damage to the environment. In a sense, environmental behavior carries an altruistic meaning, whereby individuals may need to have a strong “other” orientation and willingness to sacrifice their time for preferred activities to protect the environment for the long-term benefits of the earth and human race. According to a study by (Gough, 1994), females tend to have a better ability to take control and take the responsibility for alleviating problems in the world and also they are the ones who have a stronger sense of ethics.

4.4 Consumer Behavior towards Eco Labeling

One important tool of green marketing involves the promotion of eco labels on environmentally friendly products (D Souza et al., 2006). Eco labeling is an effective measure which helps in bridging the gap between sellers and buyers by providing information on two aspects: Information function presenting intangible quality measures including product quality and Value function which presents the recyclability and CSR related brand prestige (Sammer and Wustenhagen 2006). Empirical research has concentrated on the need to look for ways by which eco labels will directly impact consumer purchase intention of products which are deemed to environmental safe (D Souza et al., 2006; Sammer and Wu`stenhagen 2006). There is a need to identify the impact eco labeling will have directly on the consumer environmental attitude in terms of decision making. The consumer awareness of eco labeling and its impact on consumer intent to purchase an eco friendly product has been researched and conflicting views have been expressed (D Souza, 2004; Rashid 2009; Lyer 1999).

Rashid (2009) has identified that when consumers are aware of eco labels they react more positively towards knowledge of green marketing and the purchase of green products. The research by Kuhn (1999) also adds value to his research by identifying that the promotion of eco friendly product manufacturing will definitely help improving a company's market share

due to the ability of the company to present sustainable marketing strategies. Conflicting view was presented by Leire and Thidell (2005) who identified that consumer awareness of eco labeling does not necessarily lead to their green purchase decisions. This is further augmented by the research of Bleda and Valente (2008) indicated that eco labelling schemes have been linked to negative firm performance. D Souza (2004) on the other hand identified that there is not enough empirical evidence available to identify the relationship between the use of eco labels on products and its ultimate impact on eco friendly labels. The reason behind this maybe due to lack of trust among consumers (Lyer, 1999) with regards to the effectiveness of eco labels which is result of their ignorance of the concept of eco labeling.

The reason behind this consumer cognition has not been very well understood. Overall the understood perception is that eco labels are instruments which draw consumers by explaining their impact on the environment. The first eco labeling scheme Blue Angel eco label was introduced in Germany and today 30 different eco labeling methods are available. Countries in Asia have recently begun implementing labeling schemes which are uniquely their own as seen in India, Thailand, China and Japan.

4.5 Consumer Behavior towards Environmental Advertisements

Along with the process of labeling their products, arriving at measures which promote manufacturing of eco friendly products and reduction of environmental pollution there is a growing trend among corporations across the world to present environmental advertisements. This process is identified to be a major factor influencing green marketing. The main aim of presenting green advertisements is to present to the consumer that the company is eco centric while at the same time making an effort to influence the purchase behaviour of the consumers by presenting them with choices of availability of products which do not cause harm to the environment and directing their attention to positive consequences of purchase behaviour. There are three elements which form the core of environmental advertising. These include presentation of the corporation's mission statement with regards to environment protection, presentation of the procedures adopted by the company to go green and finally one specific CSR activity which has been adopted by the corporation (Davis, 1994). The creation of a consumer value and the subsequent translation into purchase of products is strongly identified by the impact of environmental advertisements (Baldwin, 1993).

As stated by Chase and Smith (1992), “environmental messages in advertisements and product labeling was found to ‘sometimes’ influence the purchasing decisions of 70 percent of the respondent. In the same study, more than half of the respondents indicated that they paid less attention to such messages due to excess usage, and most respondents reported that environmental advertisements were not credible”. Chan (2004) states the main reasons for the low perceived credibility of environmental claims in environmental advertisement. The reasons are:

“The vague arguments to substantiate the environmental claim, the source country of the advertised product do not bear an eco-friendly image, the manufacturer (advertiser) of the advertised product does not bear an eco-friendly image and the alleged eco-friendliness of the advertised product does not match with the respondent’s previous consumption experience” (p. 431).

Consumer behaviour towards pro-environmental marketing

The formation of attitude and action is found to be dependents on the development of values (Rokeach, 1973) however the impact these may have on behaviour in a real life condition. Thoughts (cognitive function) and feelings (affective function) are directly impacted by the attitude people show hence impacting their overall perception of purchase related behaviour (Hoyer and MacInnis, 2004). This identifies with the idea that there is a need to change the overall attitude consumers have towards a product thereby impacting their decision making. This scenario will apply to a green marketing context also. If one were to consider the Theory of Reasoned Action (Ajzen and Fishbein, 1980) into account then it can be postulated that marketers of green products change their method of evaluation of consumer attitude and intention to understand exactly what consumers really want. The new beliefs and normative beliefs of consumers can be identified in this manner.

An effective brand management strategy involves a principle wherein companies convert rational reasoning to emotional ones (Travis, 2000). If enough effort is taken by the brands then there should be a shift in consumer attitude towards suitable measures of sustainable consumption. It can be noted that if affective marketing concepts are promoted then it is possible to shift consumers who are passive towards concepts of “green” to active ones who are willing to go the extra mile and pay premium price in order to arrive at products which are pro

environmental in nature thereby promoting effective green consumption behaviour (Ottman, 1998). A number of consumers have an ideal concept of being environmentally responsible but may not necessarily implement this concept thereby taking no efforts to move towards a lifestyle which is green. Thus any company which presents active measures of affective marketing may be supported by consumers as it presents an actual way of implementing the proposed concept as observed from the conceptual framework in figure 1.

There is not a lot of conclusive evidence on how the intention to buy can be developed under the context of environmental thinking and maintained within an integrated framework. Therefore the above framework strives to form a link between the consumer's attitudes and their behaviours in order to start the building process of environmental management towards green products. Thus the framework determines the relationships between consumer's attitudes and behaviour when it comes to the purchasing of green products. The concept of green marketing is still a new concept and it there are still far too much to be explored, according to First and Khetriwal (2008). However, a number of studies that have been mentioned above clearly indicate an increasing awareness among consumers on environmentally friendly brands and products. Brands have the capability to cause a change in consumer's attitudes. Similarly effective advertising strategies have the ability to cause a shift in consumers who are willing to pay a premium price for environmental products to green consumption patterns.



Figure 1. Conceptual framework

Lack of communication is considered to be a major reason for commercial failures of environmentally sustainable products mainly because communication is a major step in the development of a positive behaviour towards consumer's consumption patterns. A number of studies have dealt with the value perception of a specific set of environmental attributes.

Moreover, previous researches carried out in western nations supported that consumers have positive green perceptions on eco-branded products. However a number of studies have also depicted that people tend to have a negative view towards green products that according to them shows a marked tradeoff between its effects on the environment and the functional performance of the brand. Emotional brand benefits can therefore be stated as being an important factor in encouraging consumers to alter their actual buying behaviours and purchase eco friendly items.

5. Conclusion and Implications

One thing that is being reiterated is that the current consumption levels are too high and are unsustainable. Therefore there is a need for green marketing and a need for a shift in the consumer's behavior and attitude towards more environmental friendly life styles. The current study is a compilation of various aspects related to green marketing. It is clearly evident from review of literatures and the conceptual model that the majority of the consumers still lack 'green' knowledge and because of such low awareness towards green products organizations are still not pushing towards developing more green products nor are they working hard on green packaging. Organizations still believe that marketing aspects such as developing a proper supply chain, packaging, pricing etc take precedence over green marketing initiatives. However, this is all changing. People are beginning to realize their role and responsibilities towards the environment. Although this change is not happening quickly, it is happening. Businesses are looking towards gaining an edge in the green market industry by trying to re-package their products into a more environmental friendly product. They are cutting down on extras and wasted materials and turning their operations into more efficient and green operation. Companies are also starting to educate the masses with an increase in advertising that puts emphasis on green products and how they are more beneficial for the consumers. This kind of advertising goes a long way in educating the masses and promoting the concept of green products among the people. With more and more consumers willing to pay a little extra towards green products, organizations are taking notice of the demands and behavior and attitude of the consumers.

6. Recommendations

Green marketing is a continuous process that requires constant inputs from the suppliers, government legislations and policies and the people. This is required so that the businesses

green marketing strategy can be aligned to the target markets and so it can gain a sustainable competitive advantage. It is important that strategies and policies in relation to green products be developed and implemented so as to guide and help the retailers and customers towards a green change. Businesses should concentrate on focusing on developing a green product that have a demand from the general public and which also aligns to the company's core positioning. Furthermore businesses should also present efforts in a manner that reduces the risk related to costs. In conclusion, creating and implementing a green marketing strategy is not straight forward because it is not only complex, but also a relative concept that continuously varies over time.

The framework that is presented in the current paper is based on the need to explain inconsistencies in attitudes and behaviors that have been revealed in past researches. The current framework will be framing the gap between the attitudes and behaviors as a social dilemma and also attempts to understand the gap by trying to identify individual factors by using the reference group theory. Furthermore, the framework also tries to recommend certain ways to cover the research gap. The current study will provide a valuable insight to both practitioners and theoreticians who want to understand environmentally conscious individuals. Since the success of green products depend on the consumers adopting or changing their attitude and behavior towards such products, it is imperative that green marketers identify all the factors that encourage cooperation. Thus the current study will also be of benefit to the green marketers as it aids in developing a marketing strategy that persuades consumers to seek the value of collective gain over self-interest.

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Chapter-2

Sustainable Human Resource Management

Abstract

There is a great deal of increase in the adoption of environment management systems by the corporate sector. Literature has given importance to adoption of environmental practices as a key objective of organizational functioning making it important to identify with the support of human resource management practices. Today there is debate and uncertainty associated with how green management principles can be implemented effectively amongst the workforce of the organization. This review article identifies how corporations today develop human resource policies for promoting environment management initiatives.

Keywords: Green HRM, environment management initiatives, retention, training, rewards

1. Introduction

There is a need for a proactive approach to environmental management across the world (González-Benito & González-Benito, 2006; Daily et al., 2012; Jabbar et al., 2010). Earlier success of a firm was strongly dependent on promotion of economic value. However today, organizations have to consider for the reduction of ecological footprints and give importance to social and environmental factors along with economical and financial factors in order to enable the organization to be successful in the corporate sector thereby enabling attainment of profit by the shareholders (Sroufe et al., 1998; Daily et al., 2012; Govindarajulu and Daily 2004). There is a great deal of increase in the level of environmental pollution and waste emerging from industries which has resulted in increase in implementation of policies by governmental and private sector with the aim of reducing the rapid destruction to the non renewable resources and the ultimate negative impact it would have on societal consequences (Martinez- Fernandez, & Hinojosa, 2010). There is enhanced adoption of environment management systems by the corporate sector (Boiral 2006. González-Benito and González-Benito, 2006). This resulted in the emergence of a new strategic maneuver called green management. According to Lee (2009)

the approach was considered to be quite effective and profitable since early 2000. He defined green management to be the strategy which is adapted by an organization in order to organize the environmental management strategies for protecting and measuring environmental aspects. Daily and Huang (2001) recommended that organizations essentially need to balance the industrial growth and ensuring that the environment where one lives is well preserved and promoted. The adoption of these practices has been presented with a number of different advantages which would ultimately benefit the firm which has led to the emergence of “green and competitive” mantra (Wagner, 2007; Molina-Azorin et al., 2009). Some of the benefits associated with this adoption include improvements related to firms operational performance (Jackson et al., 2012), promotion of teamwork (Jabbar et al., 2010), improvements in organizational culture (Jabbar et al., 2012) and reduction on overall cost (Hart 1997). It is identified that the management of environmental systems will enable improvements in synchronization with other management strategies of the firm (Wagner, 2007). From the above discussion it is identified that researchers give importance to adoption of environmental practices as a key objective of organizational functioning making it important to identify with the support of human resource management practices (Jackson et al., 2011; Daily and Hung, 2001; Sarkaris et al., 2010). Today there is debate and uncertainty associated with how green management principles can be implemented effectively in organizations thereby arriving at improved sustainability for the organization. Therefore the main aim of this article is to present a review of research which helps in identifying how corporations today develop human resource policies for promoting EMS initiatives.

2. Review of Literature

2.1 Environment Management System

The incorporation of environmental objectives and strategies into the overall strategic development goals of a company helps in arriving at an effective environment management system (Haden et al., 2009). There are a wide range of factors which influences the adoption of an environmental strategy by a company (Berry and Rondinelli, 1998) including financial performance (Sroufe, 2003), stakeholder pressure (González-Benito and González-Benito 2006) and corporate image (Suhaimi 2011) emerging to be the most important reasons. There is also a great deal of empirical research which highlights the impact of environment

management practices on performance of the organization using a number of different indicators (Crowe and Brennan, 2007, Yang et al, 2010; Iraldo et al., 2009).

2.2 Importance of HRM in Environment Management Policy Development

Lado and Wilson (1994) defined the HRM system as “a set of distinct but interrelated activities, functions, and process that are directed at attracting, developing, and maintaining (or disposing of) a firm’s human resources.” HR practices are generally implemented with the strategic systems that are in line with with the culture and business strategy (Boselie, 2001). There are various researchers who support the HRM practices to be effective for promotion of human capital and results in providing to contributors of organizational performance and competitive advantage (Boselie, 2001; Paauwe and Boselie, 2003).

In order to implement an effective corporate green management system it is important to promote a great deal of technical and management skills among all employees of the organization (Daily et al., 2012; Unnikrishnan and Hedge 2007). Organizations look at development of innovative tools and initiatives of environment management which will significantly impact sustainability of the firm and promote a competitive advantage (Hart 1997; Lin et al., 2001). Therefore to develop such a framework it becomes ideal to have effective human resource management practices including presentation of strict recruitment strategies (Grolleau et al., 2012), appraisal and reward systems which include environmental awareness and implementation in their evaluation process (Jabbar et al.,2012) and training and empowerment programs (Unnikrishnan and Hedge 2007) which will enable the development of new set of skills and competencies amongst the employees of “pro green” firms. All of these researchers promote the ideology that is important for proper alignment of human resource management principles with objectives of green management in an organization. It is identified that the greater the strength of green human resource policies the greater is the intensity of adoption of environment management systems (EMS) and policies by the different companies (Bohdanowicz et al., 2011).

3. Research Methodology

The researcher made use of systemic search methodology by identifying articles related to green HR practices in Science Direct and Emerald databases from March 1992- March 2012 (ten

years) by using the following key words: Green management, environment management system, human resource management, training, development, recruitment, rewards and feedback. Following this 19 articles related to the keyword search were identified. The researcher independently extracted data using standardized data extraction forms. When any doubts or conflicts arose they were resolved by consensus or, when necessary, by a second reviewer. Reviewers extracted information on study design.

4. Results and Discussion

This section presents the different articles which were identified from the literature research and summarizes the findings in relation to HRM principles in table 1 in the following categories.

4.1 Rewards and Compensation

The study by Taylor et al., (1992) presented a generic view on importance of green management. In this study a qualitative approach was adopted wherein 16 companies were identified from 5 different countries. It was seen that when companies offered an incentive in terms of green awards employees were more inclined to follow principles of green management

The study by Denton (1999) examined the impact of employee involvement in pollution control. This study adopts a qualitative case study approach wherein employees from Dow chemical were interviewed. It was observed that employees were motivated and given rewards when they came up with innovative waste reduction ideas.

The study by Forman and Jorgensen (2001) studied the participation of employees in environmental work programs in different companies. This study adopted a qualitative research approach in which two different Danish companies were identified and employee participation in environmental programs was identified. The study presented a theoretical framework of which provision of rewards or compensation to employees in order to undertake the additional responsibility of participating in environmental efforts was undertaken.

The study by Ramus (2001) identified the importance of non financial incentives on impacting environmental policy implementation. This study is empirical in nature and conducted a survey among employees of European companies. It was identified that when there was perceived supervisory support and better acknowledgment in terms of praise letters and plaques there was

an increased commitment from employees towards upholding environmental policies. 4.2

Recruitment

Dechant and Altman (1994) studied the importance of employee perception of a firm's environmental behavior. This study is review article which identifies the importance of contemporary environmentalism in leading companies of America. In their review they argue that the employee perception is vital as employees are willing to work in a firm only when they feel it adds to their value profile.

Bauer and Aiman-Smith (1996) studied the effect a pro environmental stance would have on recruitment efforts. The study was empirical in nature and considered a fictitious firm. Their findings indicate that when a firm presents a proactive stand towards protection of the environment then it would help improve the attractiveness of the firm. Their study also indicated that intention to pursue employment with the pro environmental company will be higher along with acceptance of a job offer.

In the study by Frank (2003) the importance of ethical behavior of a company and its impact is presented. As a part of this survey it was identified that most of the respondents would prefer to choose an ethically and environmentally responsible firm like American Cancer society instead of for one like Camel cigarette even if their wages were slightly lesser.

The study by Brekke and Nybord (2008) identified how companies attracted responsible employees. Their study adopted a theoretical approach and arrived at a model which indicated that when there is equilibrium between socially responsible and socially non responsible firms then motivation among new recruits to join the companies would be higher towards green firms. Their research also identifies that if the wages presented as similar in both firms then applicants who approach socially responsible firms will be much higher than those who approach brown firms.

The study by Grolleau et al., (2012) identified the impact of environmental standards of a company on recruitment of an employee. This study makes use of a bivariate probit model hence adopts an empirical approach by adopting specific survey presented to different private firms in France. The study results indicate that environmental commitment of the company adds to

profile of a company. They were able to differentiate and identify those professionals more than non professionals were concerned with respect to the environmental stance of a company.

4.3 Training and Development

The study by Perron et al., (2006) examined importance of environmental training in promoting business value. This study involved a multiple case study approach wherein it was observed that two different companies were compared to identify the effectiveness of a developed environmental training program. It is observed that one company developed a training program for all their employees while the other was considered as a control which offered no training. From the results of the study it was identified that despite training presented to one group the level of knowledge with respect to environment management system was similar among employees of both the companies. This is despite the amount of investment that has gone into green training for employees of one company. The authors conclude that it is vital to develop specialized and customized environmental training programs to suit the needs of the organization and also identified the need for development of validated instruments to evaluate the resultant training.

Daily et al., (2007) conducted a study on EMS training framework and its relation to practices of HR in the organization. This study was empirical in nature as a survey was conducted among 437 employees. From the results of the survey it was identified that the formation of an effective green management system was directly dependent on environmental training. The study concluded that in order to manage effective green HR practices it is vital to promote environmental training in an organization as it presents essential knowledge for promoting green teams in an organization and presents them with the ability to deal with the different issues which emerge as a result of problems related to environment and the associated opportunities.

The study by Unnikrishnan and Hedge (2007) studied the importance of environmental training and its relationship to cleaner production strategies. In their paper they identify different types of organizational training strategies in Indian industries. This was an empirical study which examined eight firms from two different industrialized states in India. From the results it was observed that environment management training was focused however learning processes were not very strong. The study observed a lack in top management commitment, lack of suppliers of cleaner technologies and a gap between academic institutes and industries with respect to

implementing green training policies as the key areas which Indian manufacturers should focus on to improve their green training programs.

The study by Sarkaris et al., (2010) identified the effect of stakeholder pressure and its relationship with promoting effective environmental training. This study was empirical in nature and conducted surveys across 157 companies in Spain. From the results of the study it is clearly identified that good environmental training by the management mediates the presence of a good green management practice. The authors propose the idea that companies which promote novel and effective green management practices always provide a methodological environmental training program to their employees.

The study by Jabbar et al., (2010) made an attempt to identify importance of HRM in promoting environmental management of a company. This study adopted an empirical approach wherein data was collected from 94 companies in Brazil and methodological triangulation was carried out. The results of this study identify that recruitment, training, employee motivation and rewards are important human dimensions which contribute to the improvement in employee implementation of green management principles.

The study by Teixeira et al., (2012) identified the relationship between management of green HRM practices and its ultimate impact on environmental training in companies at Brazil. This study identified nine case studies in ISO 14001 certified companies and conducted interviews. From the results of the study it was observed that good practices of environmental training are intertwined with the promotion of good organizational culture and teamwork. The study also proposed that the relationship between environmental training and green management is directly related to level of commitment expressed across all levels of the organization.

4.4 Employee Empowerment, Employee Training, Employee Teamwork and Managerial Environmental Training

The study by Jabbar et al., (2012) identified the impact of human resource management on principles of environmental management implementation in company and identified the link to operational performance. The study adopted a primary empirical approach and identified that HRM practices including recruitment, feedback and compensation were found to have an impact on environmental management practices of the company.

The study by Daily et al., (2012) proposed to identify the impact of training and empowerment of employees and its link to environmental performance of a company. The study adopted an empirical approach among companies in Mexico. The results of the study strongly identified that HRM factors including employee empowerment, employee training, employee teamwork and managerial environmental training had an impact on environmental performance of the company.

The study by Chinander (2001) makes an attempt to identify internal drivers related to environmental awareness. The study adopted a qualitative case study approach by identifying a steel manufacturing company. It was identified that the promotion of an effective environmental management program is dependent on the level of feedback that is obtained on specific environmental issues. Their results strongly identify that the promotion of feedback ensures that both employers and employees are well aware of their responsibilities and communication requirements thereby ensuring better promotion of environmental management and green promotion in the organization.

Govindarajulu and Daily (2004) presented a theoretical framework by identifying environmental performance of a company and its relationship to employee motivation. Their study identified that management commitment, employee empowerment, rewards and recognition, feedback and feedback and review are important factors which need to be addressed in the HRM policy of a company in order to promote effective green management practices.

Table 1. Studies reviewed in the paper

Author	Area of HRM function	Objective	Data type	Findings
				Offering of incentives identified better
Taylor et al., (1992)	Rewards and compensation	Importance of green management practices in an organization	Primary – Case Study Approach	implementation of environment management

				policies
Dechant & Altman (1994)	Recruitment	Employee perception of a firms environmental behaviour	Review Article	Employee recruitment is found to be related to profile of the company
Bauer & Aiman-Smith (1996)	Recruitment	Impact of pro environmental stance of a company on recruitment related activities	Primary – Empirical Analysis using Surveys	Prospective employees are more willing to work in a firm which promotes pro environmental characteristics for lowered wages Offering of rewards helped arrive at innovative ideas of environmental management Offer of compensation to take up duties in relation to
Denton (1999)	Rewards and compensation	Role of employees in pollution control	Primary – Case Study Analysis	environmental responsibility helps improve employee commitment to environment management programs.
Forman & Jorgensen (2001)	Rewards and compensation	Importance of employee participation in environmental programs	Primary – Case Study Approach	

		Impact of supervisory support on employee		Presentation of non financial incentives like acknowledgement of support
Ramus (2001)	Rewards	implementation of environment management program	Primary – Case Study Approach	from supervisor helps improve employee motivation to take part in environment management programs
Chinander (2001)	Feedback and review	Identification of internal drivers impacting environment management program	Primary – Case study Approach	When employees are allowed to present feedback on environmental policies and when their suggestions are included there is better motivation to follow the same
Frank (2003)	Recruitment	Ethical behaviour of a company and its impact on employee perception	Primary – Survey Approach	Employees willing to work for environmentally friendly company for lowered wages
Govindarajulu & Daily (2004)	management commitment, employee	Impact of employee motivation on environmental	Review Article Developing Theoretical	HRM practices impact environment management

	empowerment, rewards and recognition, feedback and review	performance of company	Framework	
Perron et al., (2006)	Training and development	Impact of training on environmental performance	Primary – Case study	Training needs to be customized to suit needs of specific company
Daily et al., (2007)	Training and development	Impact of training on impacting green management principles	Primary – Survey approach	Training will help employees identify with challenges and opportunities of EMS framework Top management support , presence of clean supplier technology important to promote environmental training
Unnikrishnan & Hedge (2007)	Environmental training	Impact of environmental training on promoting clean production strategies	Primary – Survey approach	
Brekke & Nybord (2008)	Recruitment	Impact of green principles of a company on attracting employees	Theoretical Model	Employees will prefer green companies more than brown companies if offered same pay

		Impact of stakeholder pressure on environment management principles		Employees presented with better training have better perception of EMS.
Sarkaris et al., (2010)	Training and development		Primary – Survey approach	
Jabbar et al., (2010)	Training, recruitment, rewards	Impact of HRM on EMS	Primary – Case study	Human dimensions impact implementation of green management principles Employees with better training is vital to promote a good
Teixeira et al., (2012)	Training and development	Impact of green HRM practices on teamwork, organizational culture	Primary- Case study	EMS system in any organization and build an effective organizational culture
Grolleau et al., (2012)	Recruitment	Impact of environmental principles on recruitment	Primary - Survey	Professionals were concerned with respect to the environmental stance of a company
Jabbar et al., (2012)	employee empowerment, rewards and recognition,	Impact of HRM and EMS on organizational performance of the company	Primary - Survey	Human dimension impacts organizational performance as well as mediates EMS implementation

	feedback and review			
	Recruitment			
	Employee empowerment, employee training,	Impact of training and development related to environmental management on performance of employees	Primary - Survey	All other facets of HRM related to implementation of green management principles are directly associated with good training.
Daily et al., (2012)	employee teamwork and managerial environmental training			

5. Conclusion

From the above review it is to be acknowledged that the importance of green HRM practices is vital to promote employee morale and this may help in arriving at a great deal of benefit for both the company and the employee. For example some of the benefits that an organization can attain as a result of introducing green HRM principles in EMS include:

- Improvement in retention rate of employee
- Improvement public image
- Improvement in attracting better employees
- Improvement in productivity and sustainability
- Reduction in environmental impact of the company
- Improved competitiveness and increased overall performance

Apart from this it is to be identified that employees who are actively involved in environment management principles may play a vital role in arriving at better environmental strategies to be implemented. Employees may feel empowered to adopt specific environment management principles as a resulted of promoted human resource policies which present better opportunities

for improvements related to reduction of waste and promotion of lean manufacturing. This also may help in arriving at greener products and green savings from waste elimination. The promotion of such values will also indirectly improve consumer satisfaction. Today most consumers look for companies which adopt environmental standards. Through this article the author has highlighted the importance of green “HR” principles which an organization should adopt during implementation of an environment management program. In specific different implications can be arrived at for managers and supervisors.

The results obtained from the study are determined to have implications for scholars and business personnel. From the perspective of scholars the literature highlights “green and competitive” (Porter and Van Der Lindle, 1995) and “learn and green” (Florida, 1996) and “green human resource management approach” are identified for the observed organizations (Jackson et al, 2011). The suggestion made for the business managers are:

- The relation between diverse approaches and managerial practices are to be examined and understood in systematic procedure
- Role of human in environmental management that enhances the operating performance is to be given more importance

The results also identify the need to bridge the gap between professional implementation of green HRM and its links to the research and teaching environmental management. The main limitations of this study are the number of databases chosen for the study. The researcher has focused mainly on two different databases. Identification of more databases will enable the identification of more studies. Another limitation of this study is the lack of a quantitative approach. Despite the number of studies which have adopted an empirical approach this study has not used any statistical tools to present a Meta analysis of the conducted studies.

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Chapter 3

Sustainable Accounting

Abstract

This article is located within a broad body of literature concerned with environmental accounting and critical of the current role of accounting. The main purpose of this paper is to analyze the available literature based on the Environmental accounting (green accounting) and sustainability and to understand how it has been studied and evaluated by different authors who are working in this area. Current literature focuses on environmental sustainability and lacks quantitative ways to make capital budgeting decisions. The study suggests that there should be wide empirical studies in this area so that, through the environmental accounting system we can analyze the environmental performance of each companies or organizations. A possible conceptual model for environmental accounting and reporting by Michael John Jones is also suggested in this article. The study concludes that Environment Management Accounting can likely support decision making in companies towards better environmental performance today, through structured cost assessment that support effective decision making, and future proofed product mixes, strategies and investment.

Keywords: green accounting, environmental accounting, sustainability accounting, conceptual model, accounting

1. Introduction

Green accounting is considered to be an important tool for understanding the influential aspects of natural environment with respect to the economy. The data and information provided by environmental accounts are determined to be in relation to the involvement of natural resources in economic development and costs occurred due to pollution or resource degradation. The advantage of corporate environmental accounting initiative is identified as the ability to determine and create awareness regarding costs related to environment, which in turn helps in identifying the techniques for reducing and avoiding costs of such type. Due to this advantageous feature, the performance of the environment has also been improved. The environmental costs that occur due to the financial outcomes of the firm's operation can be

determined by means of a green accounting tool. The operational performance of the organization can be determined with the help of certain process like documentation and reporting the emissions of green house gases (GHG). However, the conventional accounting system is determined not to be considered for new or existing demands for natural resources. This demand on natural resources may destabilize sustainability of economic performance and growth, depletion of natural capital, environmental degradation as a social cost of economic activity and also the account of nonmarket goods in gross domestic product (GDP).

Aronson and Lokfgren (1999) make the argument that society recommends for the environmental responsible behavior from both government and business concerns by examining the ecological disasters and degradation of earth's ecosystem. It is a general fact that expected results will be obtained when the business managers are given the responsibility for solving the ethical problems by considering either promoting their profit or preserving the environment. Hence there should be standardized and quantitative measures in order to control the business activities polluting the environment before implementing a condition in which the business organization are forced to clean the pollution made by them (Stanovic, 2010).

As most of the damages cannot be restructured, it is best to prevent it rather than avoiding. Asheim (1997) suggests the establishment of green or environmental accounting system is in order to prevent the pollution or damages. The system considers the economic measures that have an impact on power production and consumption on environment. Due to the process the power plant that affects the natural capital highly is considered and corresponding actions required are conducted. Rubenstein (1992) suggests that ethical problems can be solved when the environmental stewardship is put in terms of financial manner, and which attains more importance from the business.

The importance of the environmental problems has been increased due to the continuous degradation of environment and increasing environmental disasters. Lafontaine (2002) makes the argument that in order to involve environmental problems in normal life it is essential to consider them with respect to economic, legal, accounting, financial and technical levels. Considering the environmental aspects in terms of economy such as costs of services and products, the organizations are able to reduce the consumption of natural resources leading to save in greater extent and address the environmental compliance consumer health requirements. In order for the entity to undertake the responsibility one has to experience the legal

consideration of the risks involved in the environment. The main source for the responsibility is due to the failure in obeying the environmental legislative resulting to administrative sanctions. Betianu (2008) suggested that the performance of the work can be measured by means of documenting environmental costs and identifying environmental costs with respect to accounting and financial perspective and their association with financial disclosure.

Hence in the modern business world the implementation of green accounting is considered to be an important factor. But the demerit identified with respect to green accounting system is the lack of appropriate implementing techniques. Saving environment and developing the economy is a challenging feature for developing countries. The organizations that are determined to be in the field of or related to Energy-reliant manufacturers and power generating utilities are measured to be under more pressure with respect to implementing green accounting. At the same time firms from all business sectors are assumed to be implementing green accounting tool to a certain extent in the upcoming years.

1.1 Objectives

The main purpose of the paper is to examine the literatures that deals with Environmental accounting or green accounting and sustainability. The study also makes an attempt to understand how green accounting has been considered and evaluated by different authors who have done researches in the same field. Based on different studies considered, a procedural model suitable for most of the developing countries is to be selected.

2. Literature Review

The section examines various studies that are dealt at international and national levels with respect to Environmental and sustainable development.

Gary Otte (2008) suggested in the article of ‘GHG Emission Accounting’ that the organizations may have certain internal and external benefits by means of implementing green accounting system. He declares that GHG accounting emission involves, tracking emissions, accounting and reporting. The communication process between suppliers and firms may be developed by implementing GHG accounting which would lead to reduction of costs. The study also expresses the techniques used for GHG calculation by means of explaining the five steps. It has been declared that green accounting also involves certain limitations and barriers. Certain

solutions have been provided by the author in order to compensate for the barriers. The author's point of view is that the organization can reduce the costs and experience certain beneficiary factors related to environment.

Heba Y M & Yousuf (2010) examined the concepts of environmental accounting by exploring the techniques to develop the environmental reporting that enables the government to utilize and making businesses more responsible for their externalities. Moreover, as the consideration for the environmental accounting increases, there is a parallel increase in measuring the environment performance (Yajhou and Doreweiler, 2004). In this study the integration of environmental and business policy has been considered to a great extent. The author reveals that the public's consideration for the environmental accounting and government led incentive based regulation are the main reason for the study. In upcoming years the companies will be facing challenges with respect to establishing and implementing business strategies that are concerned with environmental accounting.

International Union for Conservation of Nature (IUCN) (2003) detailed the introduction of environmental accounting in brief in their booklet 'Environment Accounting: What's it all about'. The environment and system of National Accounts are discussed in the first part of the study. The advantages of Environmental accounting with respect to the existing system of National Accounts have been declared in the section. Harazain and Horváth (2011), in the article 'Relation between Environmental Accounting and Pillars of Sustainability' described four challenges related to sustainable development. The main objective of the study is to provide an appropriate solution for the question: is it true that social and integration point of view is outside of the concept environmental accounting? With the help of literature review and primer research, the author was able to conclude that the environmental accounting is not beyond the social and integration challenges of sustainability.

With the help of the article 'Green accounting methodology for India and its states' Haripriya (2008), was able to determine the importance of green accounting. They have described that the existing GDP accounting system will result in unsustainable development. The main reason why the author suggested for green accounting framework is due to the fact that the existing GDP developments reduce the measure of economic growth rather than measuring national wealth. The current paper also tends to differentiate the traditional GDP and green accounting apart from the demerits of existing GDP can be compensated by green accounting methodology.

A balance set of financial and nonfinancial measures are essential for the managers in order to make successful decisions (Moller and Schaltegger, 2008). The aspects considered by such measures are various requirements, strategic goals, strategies, resources, capabilities, and casual relation between these domains. The association between sustainability balanced scorecards and eco-efficiency analysis are detailed in the paper. The organization can be made more sustainable and reliable by means of implementing the sustainability accounting tool (Bent and Richardson, 2003).

A report was published by United Nations Division for Sustainable Development (UNSD) (2001) and was titled as ‘Improving the Role of Government in the Promotion of Environmental Management Accounting (EMA)’. The report was published in order to describe certain principles and procedures related to Environmental Management Accounting, focusing particularly on techniques to quantify environmental costs for the development of national EMA guidelines and framework. According to this report, both conventional cost accounting and non environmental costs of the accounts are assumed to be hidden with respect to management. It has also evidentially proved that the management of the organization has underestimated the development and extent of such costs.

A proposal has been made by the Department of Economic and Social Affairs in Statistics Division (ESASD) of United Nations (UN) in order to establish a comprehensive system of economical and environmental national accounts in association with the World Bank’s environment department. According to the proposal, Millennium Ecosystem Assessment (MEA) determines the main reason for the issue to be failure of the value ecosystem services and also declares that environmental accounts may include better policy. The manager and policy makers despite their experience at governance consider the environmental and economic accounts to be complex. With the help of environmental accounts, countries are able to monitor the process of providing a sound basis for policy interference and reliability with sustainable development at each stage.

Arroyo (2006) in the article titled as ‘The three dimensions of a sustainable management accounting system’ suggested that the traditional role of management accounting system has been determined to be complex due to certain factors mainly identification, classification, measurement and reporting of environmental and social information for the past few years.

The work of Lehman (2011) establishes the art of interpretation to management accounting, to be a way to think about the natural world. The main objective of Interpretive Accounting Research (IAR) has been determined to be influenced by the desire to understand how accounting disciplines like management accounting are related to existing issues like global warming, carbon emissions and sustainability considerations. The issue for management accountants is to keep in mind the need to broaden and conceptualize how we theorize cultural and environmental dilemmas that confront the discipline. The art of interpretation with respect to accounting research is a technique that highlights responsibilities to our shareholders and the natural world. The report of International Federation of Accounts (IFA) (2005) on EMA evaluates the physical and monetary accounting process of EMA. The association between material balances, material flow accounting and physical environment performance indicators (EWPIs) are detailed in the physical accounting section. Over the past few years, sustainability was incorporated with policy statements of various organizations (Jasch and Stasiskiene, 2005).

Bailey (1995), in his case study reported that the developing process of Green Accounting in AT&T's is based upon the definition provided by AT&T in July, 1995. According to AT&T, Green Accounting is defined to be "identifying and measuring AT&T's costs of environmental materials and activities, and using this information for environmental management decisions." The perspective of AT&T is represented by concepts, terms and approach and the perspectives of the US Environmental Protection Agency (EPA) are not considered in the article. Further, the case study illustrates about how the AT&T, a multinational high technology organization has initialized the implementation of Green Accounting.

The importance of "Performance Measurement Systems" including balanced cards as environmental management measures has been investigated by Lansiluto and Jarvenpaa (2010). In their article on Greening the Balanced Score Card, they discuss the importance of factors which support and ensure that the performance measurement systems can incorporate metrics to identify with better environmental measures. The change of the performance measurement systems should be in a manner that the culture of the company is considered before suggestions are implemented. The study also identified that environmental challenges in the performance measurement systems can be identified in a better manner if balanced score cards are implemented.

A compound manifold theoretical framework was presented by Jones (2010) to identify the measures related to accounting of environmental issues and issuing reports in a manner, to ensure in terms of corporate responsibility, associating it between the type of industry and environment, impact of industry on the environment and voluntary disclosure.

The drive towards sustainable reporting was identified by Ambe (2009). He reported the legislative conventions which govern the internal decisions taken by a company in terms of generation and documentation of energy output from material, its resultant flow; the generation of waste from the end product was quite evident. In contrast when monetary issues were considered in terms of environmental accounting it was observed that the cost, profit and the savings of the company were together. The legislations as presented by Monetary Environmental Management Accounting (MEMA) in association with rehabilitation, decommission, restoration and production costs were observed in the mining and petrochemical industries. The examined case study in this regard presents the evidence of information on environmental management.

An effective environmental management accounting system presents the concepts of sustainable accounting with regards to cost measurement, d social aspects and its ultimate value in addition to the corporation was identified by Cullen (2010) in his conceptual model; Sustainability Management Accounting System (SMAS). This model presented efficient cost allocation measures to create better measures of cost accounting which would ultimately enable the management to arrive at decisions and present better disclosure. In his paper titled 'Theoretical Framework for Environmental Accounting- Application on the Egyptian Petroleum Sector'. Hamid (2002) identified a framework of environmental accounting which covered issues relating to environment, ecology, natural resources and green accounting. His paper presented the latest concepts and definitions related to green accounting as well as identified the need for environmental accounting measures. Further, his study concludes on the idea that traditional measures of accounting do not take into account sustainable development measures and policies required for promoting better environment safety but delves into economic aspects only.

3. Discussion

This paper identified the various literature associated with environmental accounting and sustainable practices. The ultimate aim of the same is to present varying views associated with

environmental management and accounting measures which helps in arriving at a decision making tool for companies to implement sustainable accounting measures and thereby present better environmental performance. From the study it can be concluded that empirical research in the field of green accounting is relatively less with most of them being qualitative in nature. From the results of the present study one can conclude that the establishment of an accounting system which has been tested empirically will enable the identification of environmental performance of different companies and organizations. Current literature centers on sustainability without presenting concrete measures by which budgeting decisions can be made by organizations. Majority of the author's present qualitatively possible development measures for arriving at indices related to lifecycle production and organizational sustainability related factors. The implementation of these indices may help arriving at levels of sustainability for businesses. There is room to develop tools, which link the profitability from sustainability, to evaluate project acceptance.

The maintenance of productivity, diversity, balance in eco system and equity across generations is directly linked to decision making processes which encompass business, social and environmental procedures of the company. This management system implemented by organizations is called as sustainable management. Sustainable accounting benefits over traditional measures as it takes into account the different externalities which are in place. In this type of accounting the cost-benefit ratio in terms of risk control, adjustment costs, overhead costs and disclosure notes can be identified in an effective manner so as to present better sustainable practices.

The importance of sustainable accounting is found to be linked to greening of national income accounts by integrating sustainability and valuation of ecosystem. The assessment of performance of a country in relation to others is often presented by national income as they present the main foundation of information with regards to current status of the country's economy. This income account however presents a number of pitfalls associated with treatment of environment. The increasing government and consumer pressure has increased the environmental cost and future internalization of costs for external effects. Overhead accounts are identified to be filled with costs of electricity if it is recorded and regularised. This review identifies that analysis and discussion of possible sustainable accounting measures is found to be associated with decision making aspects relating to monetary measures, cost, revenue, cash flow, the related flow of energy and the energy related costs. To enable this it is important in

implementing the Environmental Management Accounting (EMA) which helps in presenting a decision making systems for corporations with regards to measures promoting better performance environmentally by identifying effective cost assessment structures. Hence, these measures ensure that future products of organizations help in presenting better product mixes, strategies and investments.

3.1 Important Points towards Building a Conceptual Model

A conceptual model is sorely required in order to form framework over which regulations and rules can be developed and implemented towards making the industry more eco-friendly. The literature review presents a number of models. There are a number of aspects that a model has to incorporate in its framework. Some of these aspects are the responsibility of the firms towards the environment, the dangers posed to the environment, the relationship and impact of the industries on the environment and the measurement of the impact of industries on the environment. The conceptual model can include aspects of other models that have previously been researched by various authors. For example Heba Y M and Yousuf (2010), examined the concepts of environmental accounting. In their study they explored the techniques to develop the environmental reporting concept that would enable the government to utilize the concept and make businesses more responsible for their externalities. The techniques they used would be beneficial when it comes to measuring the environmental impact. Cullen's (2010) model presented efficient cost allocation measures to create better measures of cost accounting which would ultimately enable the management to arrive at decisions and present better disclosure. Some of these models were used as a base for developing a proper model that is presented in the next section.

3.2 Conceptual Model

This article is presented in relation to a broad body of literature which is concerned with environmental accounting measures. From the evidences collected from prior literature it can be observed that a multilayered model which has eight different indices is identified. This model aims at presenting justifications related to environmental accounting and reporting practices. The aim of this model is to present a novel view of the different factors associated with environmental accounting without denying the possible impact that other models have. This

model also aims at presenting debates related to the identification of corporate attitude towards environmental sustainability.

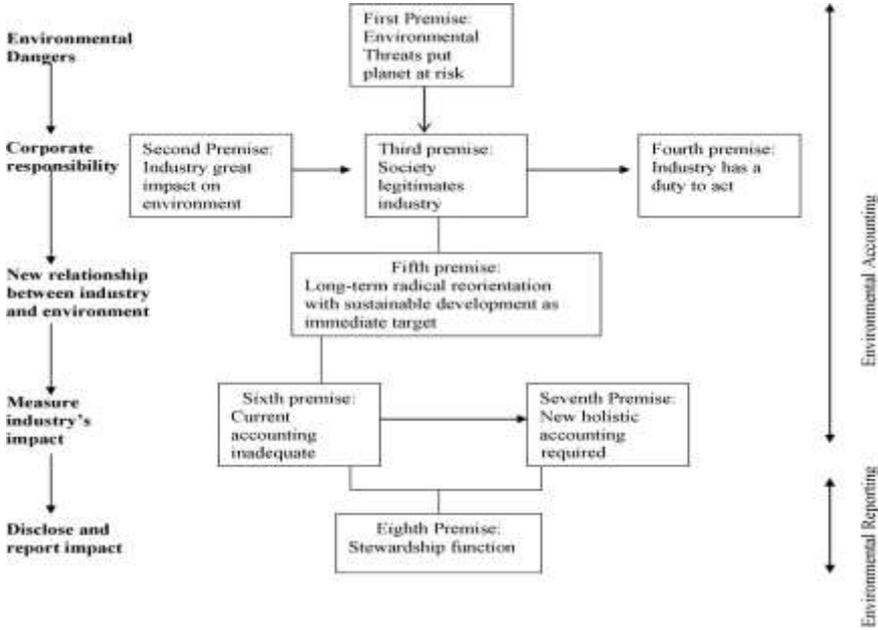


Figure 1. A possible conceptual model for environmental accounting

Source: Michael John Jones (2010)

4. Conclusion

The current paper has delved into the various ways in which different researchers have carried out their respective researches in relation to environment accountability and sustainability. Limited literature is available on social and environmental accounting in emerging and developing nations when compared to their western counterparts. In the case of emerging and under developed nations, their socio economic realities are quite different as are the corporate motivations for undertaking social and environmental accounting. Accountants and managers may not accept the fact that projects that are in violation of critical ecological functions will not be approved even if they are quite profitable and efficient. Managers who are more environmentally inclined will persuade clients to accept responsibility for a bigger share in their participation when it comes to global clean-up activities. The internal accountants will be made to work in tandem with the environmental engineers in a bid to teach them the methodologies involved in environmental accountability and the statistical techniques needed to measure compliance with the environmental regulations.

The article developed a multilayered theoretical framework to underpin environmental management (severe environmental dangers; corporate responsibility; new relationship between industry and environment; measure industry's impact and disclose and report impact) thereby presenting a model for green accounting. The model was developed from a personal conviction that companies should make an attempt to ensure that environmental issues are addressed. The model also strived to be realistic by recognizing the political and social realities of the current scenario. This particular model is not meant to be exclusive or a measure which is more effective than other theoretical models. However, it is one model by which environmental progress can be measured.

The contribution of this paper and other academic work in green accounting does not completely embrace the views of the business world while at the same time it does not present radical views which cannot be implemented in any real world scenario. The paper makes an attempt to point out that there is a need for a great deal of sensitivity towards how green accounting practices are carried out and how their needs are to be valid and feasible critical theoretical policy prescription. The researcher feels that future research should be presented in a manner that academicians are completely sensitive to approaches related to green accounting promotion and mobilize risks so that the problems of contemporary green accounting practices are recognized and a viable instrument is developed keeping in mind all sensitivity issues.

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Chapter 4

Sustainable Publishing

Abstract

Currently online news sites have greatly satisfied the expectations of the readers, and there has been a decrease in the circulation of print newspapers. Proliferation of various e newspapers has given a lot of choices to people so that there is a growing competition between the two. Here an attempt is made to gather all the available literature resources so that the research will enable the printing industry to think of moving in a different direction. As the world is moving fast in terms of technology the easiest option to save time and get the information via internet. The senior citizens still opt for the traditional form of newspapers. The development of multiple communication mediums such as the internet, smart phones or e-readers supports the UAE youngsters to get the news rapidly. It also provides the information up-to-date, faster by using internet technology. The online media impact on print media begins on the different views of print media such as print revenue, demand, market share, profitability, subscription and advertising revenue. The male students in UAE colleges prefer reading newspapers in online than the female. This research focuses on the qualitative study of the e newspapers advantage over the Print News papers.

Keywords: print media revenue, customer subscription, advertising revenue, market share, profit

Introduction

The digital era has profoundly changed the information delivery and communication system through the mediums like newspaper, radio, etc., which has enhanced the environmental stewardship for a sustainable growth. The changes caused by human activities seek to balance and integrate with sustainability's key factor, namely social, economic and environmental. Substantially, these changes have influenced the current newspaper industry (Veglis & Pomportsis, 2004). Even though studies have stated that online advertisements have an positive effect than the newspaper ads (Van Duyn, 2007), but no concise evidence have been proved to attain the sustainable level (e.g., Nesbitt & Lavine, 2004; Ernst, 2007; Lemberg, 2007; Pfanner,

2007; Albers, 2007; Kubas & Kubas, 2007; Jones, 2007; Cohen, 2007). Hence, the current report aimed at identifying the factors that influence the proliferation of e-newspapers over the traditional newspapers in the UAE context by reviewing the previous studies conducted elsewhere.

Research Objectives

The major objective of this study is to collect analyze the data and study the literature related to Proliferation of E-Newspapers over the Traditional Newspapers in UAE. Following are the research objectives of the study.

- 1). Identify the preference for the type of newspapers and its reasons;
- 2). Examine the major reasons behind falling circulation and advertising revenues of the traditional newspapers;
- 3). Examine the impact of e-newspapers on traditional newspapers;
- 4). Identify possible suggestions to increase the demand for traditional newspapers.

Literature Review

In the global business world, around 90 percent of people in UAE are literates and majority of these individuals have reading habits via daily newspapers and periodical publications. With the advent of digital media and World Wide Web (WWW) a dynamic shift to the online platform is created, especially among the youths in UAE. News reading habit supports a never-ending tendency towards notifying a person's day-to-day activities and acts as information gathering system. Researches on perfunctory information seeking activities and news reading among the UAE youth depicted tremendous growth has been achieved from traditional to e-newspaper modes. Hence, the present section reviews the previous literature on sustainable development of e-newspapers from traditional newspapers among UAE Business firms. Especially it discusses about the factors which influence the e-newspapers habit among UAE individuals.

A preliminary survey was conducted by Cass (2001) of newspaper holdings and archives available from commercial, university and government archives in emirates of Abu Dhabi, Dubai and Sharjah. This study supports the detailed explanation of UAE press origin and

correlated the existed newspapers effort to save the generation of Emirati publications. Further, this study showed that Arabs prefer traditional news paper over e-newspaper as majority are published in Arabic language. Since e-newspapers in general are published in English, native Arabs find difficult in reading these papers due to language barrier. However, few other outsiders arrived and settled in UAE preferred e-newspapers as their top most news reading.

Likewise the study by Alshehri (2000) examined the satisfaction level of Arab e-newspapers over the traditional newspaper. The study adopted triangulation methodology where both qualitative and quantitative design was adopted. The Arab journalists were interviewed while survey was conducted among the readers and publishers. From the study findings it was evident that majority of the traditional newspaper firms preferred the online medium instead of printed version. However, there was poor response because majority of the e-content were in the same format as of in printed version. However, despite their interest over publishing online, their strategy was identified to be poor and also no awareness about the importance to their traditional business activities. Moreover, study also showed that there was similar demographic profile among Arab and non-Arab e- newspaper readers in which these demographic characterises include the education, age and occupation. The satisfaction level of e-readers was identified to be high than print media. Therefore, this study recommends it is essential for the Arabic print media to adopt appropriate online strategy and advanced techniques to achieve the sustainable position in online printing.

Sharma (2009) analysed the ratio of importance given to print media (National English Dailies) (Text) and Visuals (include graphics, pictures etc.) in two significant countries of Middle East region such as Oman Sultanate and UAE. Their study focused on the rapid development of electronic media and reduction of print media process. Both Primary and secondary sources are used in this study during the data collecting process. The study findings revealed that due to the advancement in the electronic media, the print media was experiencing a series of threat. In particular, these study findings revealed that the current competitive fast moving world has caused time limitation were readers needed the information via visuals and pictures than words. Therefore, this study has recommended that the print media has to adopt more attractive picture or visuals in order to attract current news readers. Further, print media applied the critical media analysis which is helpful for the sustainable growth of educators in the media, multinational company's policy makers, students of media studies and local government authorities.

Jacob (2011) examined the free Online Publications impact on Print Media. The study was conducted focusing on single Saudi's familiar firm, the Saudi Research and Publishing Company (SRPC), a leading publishing industry across the UAE. Their study observed the readership practice of SRPC staffs in online magazines and newspapers. The study findings revealed that there was no significant relation between the personal attributes and type of media. Majority of participants, irrespective of their educational background, age group and gender, they preferred the online media, especially the internet. However, citizens above 50 years preferred to read traditional newspapers due to the unawareness about the online media. Further, this study assured that there is no statistically significant relation between preference and the reasons for the media type. Moreover, this study has assured empirically the online resource diminish the print media. Some online media impacts on print media are print revenue, advertising revenue subscription, demand, profitability and market share.

Ayyad (2011) investigated the traditional media versus Internet usage among the university students at the University of Sharjah (UOS) in UAE. This study used the approach of 'uses and gratification' to describe in what way students are goal-oriented in usage of the Internet and mass media. A questionnaire included 21 questions was designed and examined by using the sample size of 270 UOS students. These 21 questions have covered the usage of the Internet and traditional media patterns such as newspapers, radio and television among students. Their study findings revealed that the exposure patterns to the new and mass media among the UOS students were mostly the Internet when compared to traditional media. Their results show that internet is widely used by almost all the students for different purposes. The effect of internet reflects as exposure of student in traditional media such as reading newspapers and watching TV. The gender preference was also observed were the study findings revealed that males prefer watching and browsing internet for watching TV and reading newspapers to obtain information and current affairs rather than females.

Wisichenbart (2012) conducted the survey on reading habits and multimedia usage among UAE individuals. Data was collected from 503 interviews among the International Sharjah Book Fair visitors. Questionnaire was designed to cover personal background, questions relevant to reading habits of individuals includes the perception of readers among the online and print books, content analysis (context) as well as cultural practices of reading. Their results were correlated with numerous indicators, age, gender and reading education, etc. Further this study appreciates the UAE individuals because of their reading habit and also heavy competition was

observed among the media. In online source, the different source of materials are viewed and searched within as short time rather than printed publications. The major factors that were observed in this study are the internet impact on reading habits and also competition between different groups. Further increase in the choice selection and accessibility of various materials in content wise has been improved with books. Thus leads to achieve the sustainable growth in traditional media.

Al-Shaqsi (2013) focused on the perception of readers and readership among the Omani newspapers in the current modern world. This study has evaluated attitudes and the reading habit of individuals to the layout and contents of various free weekly tabloids and nine newspapers. Based on the non-probability convenience sample selection, a survey was carried out on 747 subjects from Muscat, the Oman capital. Their findings reported that only 5.5% of the participants do not have the habit of reading newspapers. The main reason of avoiding the newspaper reading habit due to lack of time and using other media sources availability. Moreover the study observed that most of the readers of Omani newspapers are males with university and diploma degree holders who were working in the public sector. Therefore, readers have not much of time to read the newspaper in text format. Additionally, the study has observed the frequency of reading and has compared in the aspects of professionalism and content type more than the presentation (design & layout) and the appearance of Omani newspapers.

Cherian and Jacob (2013) stated that the individual's enjoy reading both print and online news papers. Further, the study evaluated the choice of consumers in both online and print media regarding the format preference and demographics. Data collection was adopted by the study through the primary quantitative approach while the survey was carried out among the post graduate university students of 150 colleges. Their study finding noticed that the printed papers have the current choice, but it needs more advanced techniques in the preference viewpoint of respondents. Further, the present e-newspapers have formulated special techniques to attract the news readers and reduce the print circulation. Moreover, the young college going students are more interested in reading the news which become a habit in UAE. They require most advanced techniques in the modern world. Therefore this study suggested that the print publications need to develop some novel techniques for their sustainable practice.

The internet advent has changed the traditional trend of print publication. Satarupa (2014) analysed the online reading habits of UAE youth of 18 and 25 age group youths. This study focused on the analysis of youths' reading behaviour such as how to recognize the news and follow them and frequency in order to attain the conclusion of the news. In this study both quantitative and qualitative studies were conducted. Their study finding observed that the youths are recognized with the e-newspapers and are delivered as rapid and easily attained by the most preferable mediums like the internet, smart phones or e-readers by the way of giving information. This is an important factor for the youth to provide more preference to e-newspapers.

The report of Arab Youth Survey (2014) analysed attitudes of the Arab youth in the age group of 18-24 years at 16 countries includes the six Gulf States (Oman, Kuwait, the UAE, Bahrain, Saudi Arabia and Qatar) Lebanon, Egypt, Algeria, Iraq, Libya, Jordan, Morocco, Yemen, Palestine and Tunisia. There were 200 respondents for each country represented in the survey, except the UAE, Saudi Arabia, Egypt with 300 respondents each, and Iraq with 250 and Palestine with 150. This study finding reported that television was the mass media where the Arab youth obtained day-to-day information. At the same time, the influence of smart phones impacted the youngsters as to pursue the news in online. Therefore, the reduction of reading the traditional newspapers was observed. The study concluded that out of five, three of the youngsters (59%) viewed online as their preferred choice of news. While out of ten, only three members viewed traditional newspapers to obtain information.

Alanazi (2014) analysed the usage of e-newspapers via smart phones among the Saudi Arabian students in the United States. Researcher collected the information from Face book page and Twitter account with the support of the Saudi Arabian Cultural Mission by distributing the Qualtrics survey technique. Consequently, the sample size of the study was observed to be 789 Saudi Arabian students in US. Further this study used non-probability convenience sample technique. Specifically, this study was used the Uses and Gratification Theory for the identification of usage of smart phones and also analysed the experience of students for using these phones as news reading habit. Data analysis was carried out by the participants who have the habit of checking the news frequently. Their study results revealed that the participants without using these phones felt that they were left alone and also overwhelmed by getting higher information from the short time. In addition the study findings described that the use of smart phones helped in sharing information through the social sites is an added advantage. Their

finding concluded that the smart phones also increase the delivery of news through online and also support in achieving the sustainable growth.

According to the report of Booz and Co. company explored the status of print publication across the gulf region (Chahine, Molina, & Sheikh, 2009). Their study findings reported that the print media publication attained the inflection point as a result the digital media gained more interest. Further this study analysed the print media migration and study findings identified the factors such as low of rich digital media content, low level of penetration in digital devices and issues in infrastructure included download speeds on fixed networks and low broadband capacity in companies of traditional media. Therefore, there is a necessity to improve the access of the digital source in print media publications to achieve the sustainable position.

From the empirical results it was evident that the factors like poor online strategy, no awareness about the importance of internet over traditional, no time due to the fast moving world, language barrier influence the proliferation of e-newspapers over the traditional newspapers in the UAE.

Conclusion

From the findings of several past studies in the UAE context, it is showed that the majority of them preferred the e-newspapers (herein referred to as online newspapers). In the current technological world, individuals have not much of time to read the news from text format, readers need to get the news from visual form, it takes only less time. From this reason, the print media has changes into more visual to attracting the audience. The only exception the senior citizens who are aged above 50 prefer the print media especially traditional newspapers. The development of multiple communication mediums such as the internet, smart phones or e-readers supports the UAE youngsters to get the news rapidly. It also provides the information up-to-date, faster by using internet technology. The online media impact on print media begins on the different views of print media such as print revenue, demand, market share, profitability, subscription and advertising revenue. The male students in UAE colleges prefer reading newspapers in online than the female. Due to the availability of internet communications, the students get information easily. Some of the major reasons concluded from this study is there is a lack of time to read newspapers and availability of other major communication resources. Majorly this e-news is considered as time consuming. Finally, the study concluded that the online news has highly satisfied the reader's expectations and also reduced the print news papers

circulation. This is major reason of the proliferation of e-newspapers over the traditional newspapers in UAE.

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Chapter 5

Sustainable Waste Management

Abstract

Waste management is a complex process that requires a lot of information from various sources such as factors on waste generation and waste quantity forecasts. When operations related to promotion of waste management systems are considered it is observed that generation of waste and planning is found to be influenced by different factor of which are impacted by socio demographics. The main aim of this paper is to review previously tested models related to municipal solid waste generation and identify possible factors which will help in identifying the crucial design options within the framework of statistical modelling.

Keywords: solid waste management, empirical models, socio economic factors

1. Introduction

Waste management is a complex process that requires a lot of information from various sources such as factors on waste generation and waste quantity forecasts (Bovea et al., 2010; Zurbrügg et al., 2012). Data on the various factors that play a role in waste generation is important as it aids in estimating the consequences of changes in general conditions like economic system (Sjöström and Östblom 2010; Wang et al., 2011) demography (Bandara et al. 2007), domestic heating systems or waste management measures (e.g. increasing the rate of home composting) ((Lebersorger and Beigl 2011) and policy measures (Mazzanti and Zoboli, 2008). A number of studies have focused on the influence of socio economic factors in a bid to understand, define and forecast the unit rate of waste generation and composition of solid waste (Mazzanti, M., & Zoboli, R. 2009; Bandara et al., 2007; Emery et al., 2003). Some of the most common variables that are analyzed are number of individuals in a dwelling, age, sex, land usage, communications, ethnicity of the populations and productive activities (Emery et al., 2003).

When operations related to promotion of waste management systems are considered it is observed that generation of waste and planning is found to be influenced by different factor of which are impacted by socio demographics including amount of waste generated and personnel

required: This is directly dependent on the population density and other factors (Henry et al., 2006).

Cost of operations: Greater the amount of waste generated, greater is the cost of operations (Christensen, 2011).

A significant issue that every nation faces is the need for a proper disposal system of the huge solid wastes that are generated every year. According to (Alhumoud, 2005; Christensen 2011), developed countries have always had to face significant difficulties in trying to devise a manageable way to dispose the waste that they generate. When it comes to non industrialized countries, (Koushki and Alhumoud, 2002; Al-Khatib et al., 2007; Henry et al., 2006), state that a lack of awareness and knowledge coupled with the increasing amount of lands being cleared for waste disposal and storage purposes are one of the major concerns.

Therefore although a specific waste disposal protocol or solution cannot be implemented or set due to the ever changing demographics and needs of the population, there is a need to identify the influence of socio demographic factors on municipal solid waste management systems which are currently planned and operated and arrive at different models which will help forecast better models of solid waste management.

The main aim of this paper is to review previously arrived at and tested models related to municipal solid waste generation and identify possible identifiers related to socio economic factors. From the review and discussion of models the research aims at arriving at limitations of previous models which will help in identifying the crucial design options within the framework of statistical modelling.

1.1 Defining Urban Solid Waste

Any and all solid waste that is created in an urban environment is classified as Urban Solid Waste (USW). USW is further divided into two different categories – RSW and NRSW. RSW refers to waste that is generated by households and NSRW is the waste that is produced by the commercial sector (industries, organizations). Both these sources create different kinds of waste that are classified as follows as identified by different authors (Buenrostro et al., 2001; Singh et al., 2011; Gomez et al., 2008):

- (1) RSW: The solid waste that is generated by a single family or in a multiple family dwelling like an apartment.
- (2) CSW: The solid waste generated by commercial institutions such as temporal ambulatory markets, supermarkets, markets, department stores and hotels.
- (3) Industrial solid waste: the solid waste generated in all processes of extraction, transformation, and production.
- (4) Institutional and services solid waste: the solid waste generated in recreational centres, like cinema theatres and stadiums, educational centres, libraries, private and governmental offices, museums, and archaeological zones.
- (5) Special solid waste: This refers to the wastes that require special precautions and methods when it comes to their removal, management and disposal due to their hazardous nature or due to the requirements of the prevailing legal regulations. Usually such wastes are generated by automotive or industrial maintenance workshops, research laboratories, terrestrial transportation terminals, airports, medical institutions or facilities, drug stores and veterinary facilities.

When it comes to making appropriate decision in relation to the waste management of urban solid waste (USW), two factors are important – the total volume and composition. Both these factors change with time and socio economic conditions (Singh et al., 2011). Socio economic variables are among the most important factors when it comes to planning management programs of USW in developing countries mainly because the socio economic variables are not yet fully understood (Maldonado, 2006). According to (Agamuthu et al., 2007; Hockett et al., 1995), the effects of socioeconomic variables such as income, level of consumption, and cultural and educational environment on the generation of USW are specific and vary from place to place

1.2 Impact of Social Demographics on Solid Waste Generation

In the residential sector, socio-economic status and housing characteristics affect not only the amount of municipal waste that individuals generate, but also how they manage it (Emery et al., 2003). When the level of participation as well as the overall waste segregation individuals in a community make at the source was considered there has been determination of a positive correlation (Noehammer and Byer, 1997). Apart from this positive relationship has also been identified when the frequency of collection (Singh et al., 2011), Apart from this a link has been

identification between consumer participation as well as economic incentives (Thanh et al., 2010; Maldonado 2006; Noehammer and Byer, 1997) provided and the time of collection of garbage (Folz, 1991). The degree of waste management has also been identified to have a direct link with the level of social pressure which is presented in the community (Barr et al., 2003). The design and management of any waste management program should be promoted in a manner that the needs of the different community members in terms of the actual requirements of their household is met (Lansana, 1993). The degree of variation of these needs among different housing types and areas thus will be a predictor of how effective the waste management system is making identification of the variation of waste generation across the socio demography an important aspect. The generation of solid waste is found to be different as there is a difference in the level of consumption pattern in different locations (Singh et al., 2011; Sjöström and Östblom 2010). When different consumption patterns are considered they are found to vary with a wide range of factors including environment, demography and socio economic factors. These factors need to be examined in order to identify and develop a solid waste management system which can handle as well as minimize the overall rate of waste generation (Wang et al., 2011).

A number of studies have examined the impact of socio economic and demographic factors on the generation of waste (Buenrostro et al., 2001; Banar and Ozkan, 2008; Afon, 2007; Hockett et al., 1995; Dyson and Chang 2006; Daskapoulos et al., 1998; Beigl et al., 2004).

From all these studies the most common factors which impact the generation of waste include the level of income, the overall size of the household, the level of education, the attitude towards the environment (Afon, 2007). However these effects are found to be different across different locations and may vary across countries, cities and even zones in one particular city. It becomes very difficult to predict the level of association between each of these factors on a larger level as what is a predictor in one level need not necessarily be a predictor in another (Banar and Ozkan, 2008).

From the review of literature on types of solid waste generation and importance of understanding impact of socio economic factors on managing solid waste it is identified that there is growing demand for availability of reliable information on amount and composition of waste generation which is characterized areawise. Measurement of waste generation according to different models needs to take into account the different socio demographic factors which

will enable further evaluation of disposable habits, the current trends and changes which may occur. In order to the same it is vital to arrive at an effective model. The following section describes the methodology followed in arriving at these models.

1) **Research Methodology**

The researcher systematically searched the Science Direct, Sage and Emerald databases through March 2012 using the following key words: solid waste generation, solid waste management, household waste, municipal solid waste. References from published prospective studies, relevant reviews, and previous Meta analyses were hand searched for additional studies not identified in the database search. Five characteristic classification criteria were focused by a systematic review of 10 waste generation models and these include: modeling method, type of modeled waste streams, location, regional scale and independent variables.

2.1 Eligible Studies

- 2) Were focused on solid waste management.
- 3) Included models that were used in solid waste management.
- 4) That incorporated independent variables like Removal and utilization of solid waste.
- 5) Were published in the English language.

Studies not meeting these criteria were excluded. In addition to the above criteria's, studies that carried out a review of SWM and included a Meta analyses in relation to solid waste management were also excluded.

2.2 Data Extraction

The researcher independently extracted data using standardized data extraction forms. Disagreements were resolved by consensus or, when necessary, by a third reviewer. Reviewers extracted information on study design, including the duration of follow-up, the setting.

2.3 Classification of Criteria Used in the Study

2.3.1 Type of Place

Constituency (C): One of the main reasons for the smallest regional unit being a district is due to the readily available data and competence of regional planning according to (Hockett et al., 1995). In the current study, the term ‘Constituency’ refers to an administrative unit that includes cities as well as municipalities. This particular research design allows a proper coverage of the federal states (ParWtt et al., 2001; Hockett et al., 1995; Salhofer and Graggaber, 1999). According to (Bach et al., 2004; Gay et al., 1993; Karavezyris et al., 2002), ensuring that modeling is not just restricted to a particular place will ensure that the samples cover a significant number of small to medium sized municipalities.

Households (H): In the case of household related studies, relationship between a wide range of individual habits or characteristics of the representatives of the household itself are analysed. Generally the sample size is setermined to be anywhere between 40 and 800 depending on whether the study is considering a survey on a single household dwelling or an entire community. Typical manner of attaining the required information is through personal interviews and surveys. Due to data protection issues census information is usually not available on an individual level. According to Lebersorger et al., 2003), household community generally refers to the smallest administrative unit.

2.3.2 Type of Waste Stream

2.3.2.1 Material Streams

Material streams refer to all the waste that is generated by the final consumer and material streams can only be determined through input output analysis. This method is not aimed at taking into account the collection procedure that is applied mainly because of its nature. The records pertaining to the amount of waste generated is not necessary and may be required only for the purpose of validation. Other studies have used dependant variables that are based on other input – output analysis (Daskalopoulos et al., 1998; Christiansen and Fischer, 1999; Skovgaard et al., 2005).

2.3.2.2 Collection Streams

The waste statistics are derived from the official statistics when modeling of the total Municipal Solid Wastes is required (e.g., Beigl et al., 2004; ParWtt et al., 2001; Hockett et al., 1995; Chen and Chang, 2000) or the sum of all recyclables (ParWtt et al., 2001) or single recyclable

materials, like glass, plastics or metals or paper and cardboard (Bach et al., 2003 Lebersorger et al., 2003 1) or single collection streams, like residual waste (Mertins et al., 1999; Grossman et al., Dyson and Chang, 2005; Jenkins, 1993;). Some of the models also address other ways of disposal of wastes, like private wiring, illegal disposal and informal collection, other than the officially reported waste streams.

2.3.2.3 Independent Variables

According to Salhofer (2001), there are two different ways to classify models when it comes to analysis of waste generation and they are:

- Factor models that use factors describing the processes of waste generation (Consumption or Utilization).
- Input–output models based on the flow of material to or from waste generators (Removal).

There are a number of independent variables that have been used to explain the overall quantity of partial or entire MSW streams. Some of these variables are mentioned in studies by Salhofer (2001), Beigl et al. (2003), Hockett et al. (1995) and Jenkins (1993). As per the above depicted classifications, grouping is done based on the various stages of product life cycle which are: disposal-related variables, consumption related and production and trade related.

Forecasting of future solid waste is important and this is where solid waste management models are extensively used. There have been a number of studies that have dealt with various solid waste management models and their uses. These models are discussed below

Karavezyris et al., (2002) in their study looked into the application of system dynamics and fuzzy logic to forecasting of municipal solid waste. The study delved into the impact of demographical factors as well as costs of materials recovery and facilities, environmental behavior, treatment and disposal schemes on solid waste management. The study concluded that systems dynamics can be used to forecast and manage municipal solid wastes in a efficient manner. Fuzzy logic modeling was used in this study and it was evident from the study that it could be used for modeling exogenous elements like influences and thresholds. This model

discussed constituency based features by identifying different collection streams. It focused on solid waste removal only. The limitation in this study was that the parameters examined were curtailed to amount of waste generated.

The importance of planning and proper design of a solid waste management was again reiterated in a study by Dyson & Chang (2005). The authors clearly identified a limitation when it comes to research or system planning in relation to solid waste management and the limitation was the lack of official historical records of solid waste quality and quantity. These limitations mainly occurred due to lack of sufficient financial resources and lack of proper management

6) Results and Discussion

Table 1. Summary of reviewed references

Reference	Type of Place	Waste Streams	Type of Independent method variables	Modelling	Parameters examined related to socio demographics
Karavezyris et.al (2002)	Constituency	Collection streams	Solid waste Removal	Systems dynamics	Amount of waste generated
Dyson & Chang (2005)	Constituency	Collection Streams	Utilization	Systems Dynamics	Waste generated in relation to income and population
Chen & Chang (2000)	Constituency	Collection Streams	Utilization and Removal	TSA	Amount of waste generated in relation to yearly time periods

Chang & Lin (1997)	Constituency Streams	Collection Removal	TSA	Waste generation in relation to seasons and density
Zhang et.al (2011)	Multiple cities Streams	Collection Removal	Reverse Logistics Waste management	Amount of waste generated
Dalemo et.al (1997)	Urban Areas Streams	Material Removal	ORWARE	-
Bandara et al., (2007)	Constituency Waste	Household Removal	Univariate Regression	Amount of waste and type of waste generated in relation to income
Skovgaard et al., (2005)	Country Streams	Material Utilization	Time Series Analysis	Waste generation in relation to household sizr, expenditure and population
Navarro Esbri et al., (2002)	Constituency Stream	Collection Utilization	Time Series Analysis	Amount and time of waste collected and seasonal waste generation

Dyson and Chang (2005), in their study again used system dynamics modelling to predict solid waste generation which would greatly aid in the management of the municipal solid waste. A case study based research was undertaken by the authors and five planning models were considered based on the various kinds of system dynamics models. This study also concentrated on presenting a model which was constituency based and identified different models of collection. The study identified consumption and utilization patterns by including data on income and population density. The modeling results are directly useful for associated system

planning with regard to site selection and capacity planning of Material Recovery Facility in the near future.

Chen & Chang (2000) in their research also stated that solid waste management system requires accuracy in terms of knowing exact amount of solid waste being generated. However, the authors also contend that the manner in which the amount of solid waste generated is predicted is different in both developed and developing countries. This study focused on the city of Tainan in Taiwan. The study discovered that grey fuzzy dynamic modeling helps in reducing the inconsistency between the predicted values and the observed values. This is also a constituency based study focusing on different collection streams. There is presentation of both utilization and removal related factors. The one disadvantage in this type of modeling is that there is only seasonal data available for waste generation without taking into account any other parameters. Once again lack of proper and sufficient financial resources and unavailability of a good management task force is stated as the main reason for the above stated differences. The authors therefore contend that a special analytical technique must be developed and applied before the subsequent system planning for urban solid waste management is carried out. With this aim in mind, the authors presented a grey fuzzy dynamic modeling model to forecast the amount of waste generated in an urban environment. Zhang et al., (2011) proposed an inexact reverse logistics model for municipal solid waste management systems (IRWM). The study developed an inexact reverse logistics model in order to better facilitate the interactions between production and transport planning and inventory features in the system. Some of the limitations of the study include the non inclusion of parameters such as resource conditions and differences in the legislation, economic and social conditions. This study though being constituency based also identifies a number of specific areas across different cities which is a strength. This study classifies waste collected based on the type of material and focuses only on removal of waste. Despite these specifics the lack of any parameters related to socio economic factors is a limitation to be acknowledged in this study. This model can greatly benefit managers to develop a good solid waste management program. The study concluded that this model could be further advanced through incorporating methods of stochastic or fuzzy parameters into its framework.

Dalemo et al., (1997) conducted a study into handling of the waste from urban areas. The study made use of an ORWARE model to simulate various scenarios in urban waste management. The study provides a detailed view on the energy turn over, environmental effects and plant nutrient consumption in relation to solid waste management. This study focuses on specific

urban areas but does not classify specific constituencies in these areas. The study is focused on different material streams identifying removal of waste. The limitation of this study is that none of the parameters related to any socio economic features are identified. The study concluded that the model affects the input data to the model, i.e., amount and composition of waste, and transport distances and therefore information has to be gathered separately for each area that is under review.

Bandara et al., (2007) also carried out a study to develop an effective waste management strategy for a specific place. The study focused on determining the relation of waste generation and composition to socio-economic factors. Some of the socio economic variables that the study used were the population density and average income of the individuals. In addition to these variables, level of education, climate, religious and cultural beliefs, living habits and social and public attitudes were involved. The study focused on a suburban municipal area in Sri Lanka. The study identified that there is a reduction in per capita generation of waste when there is an increase in number of occupants of one house. The study focused on a single constituency and identified only one type of waste which is a limitation. The socio economic factors identified include only amount of waste generated related to income

Chang & Lin (1997) conducted a study into solid waste generation and delved into the impact that time series intervention modelling has on it. The study concluded that recycling impacts is important when it comes to forecasting the amount of solid waste generation. This study is constituency based focusing on variety of collection streams. This study is unique in that it does not focus on consumption factors and focuses solely on removal of waste. The only factor examined is generation of waste without identifying population density. Furthermore the authors also determined that time series model will be a very useful tool when it comes to prediction of solid waste generation.

Navarro Esbri et al., (2002) proposed some tools for time series analysis and forecasting MSW generation. This study made use of a prediction based technique which focused on non linear dynamics which presented different performance measures by making use of a seasonal Autoregressive and Moving Average (SARIMA) methodology. The model presented a forecast model which clearly identified a possible practical implementation for an effective MSW management. In this study a community based waste collection approach waste classified across

different waste streams and identifying consumption patterns was observed. However only amount and time of waste generation are identified.

Skovgaard et al. (2005) proposed a model for overcoming the issue by means of providing a forecast for all required predictors and MSW forecasts for potential users. By means of implementing comparable and predictable variable like socio-economic variables, the model can be promoted to greater extent. The independent variables are hypothesized, collected and analyzed. It is vital and complex to ensure for the quality of such data. Due to the issues related to data availability and comparability, there are restrictions with respect to the implementation of data intensive approaches. The model on the same context is determined to have major objective of developing prediction tool. The reader is determined to be enabled for making inter-temporal forecasts or inter-regional predictions. Due to the inadequate data with respect to model parameters, the most of the models are unfeasible. In this study a country level analysis was carried out by focusing on different types of material used. This identified consumption types and size of household and income in relation to population were identified thereby overcoming the limitations of previously cited studies.

7) **Conclusions**

The process of waste management planning considers the evaluation of impacts on existing and future waste streams are vital and essential aspects. It is evident from the literature review considering for the previous implemented approaches that there is variation to greater extent among the adapted models in the concept. The variations are determined regardless of solving the issues in similar manner. There are five aspects that describe the models:

- Focused regional scale that ranges from perspective of household to county
- Type of modeled waste streams
- Hypothesized independent variables
- Socio economic factors
- Modeling method

In order to determine critical design options that have impacts on information gathered and cost efficiency of waste generation models, procedural and systematic guideline needs to be developed

From the discussions on the concept in previous studies and paper the following aspects can be proposed

- Beneficial choices considering for regional sampling that includes number and size of observed areas
- Waste stream definition and investigation
- Select appropriate independent variables
- Model validation procedures

The findings of the study are derived from the practical analysis and consideration of two case studies having varying settings:

- Survey-based analysis of household waste generation at multi-family dwellings and
- A census-data-based development of a forecasting tool for cities

The hypotheses derived by means of comparing the two case studies make the suggestion that implementation of single optimum procedure is not adequate for varying research objectives and circumstances as there exists various issues related to planning process. Balancing of information gain and implementation costs are essential in order to establish or determine the minimum requirements and standards for modeling procedures.

From the review a series of general check list like aspects with respect to current models can be identified. It is identified that there is a need for an overall forecast model which identifies both planning, location, type of waste generated and future growth in waste generated per capita. The discussion in this review also reviews certain shortcomings. The study has focused on a small number of models while there are a many more models which may have better insights to share. The study has also adopted a purely qualitative approach without involving statistical tools. Future research which presents statistical analyses may enable better insight into current models.

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ABOUT THE AUTHOR



Dr. Jacob Cherian
(M.Com., MSW., MBA., M.Phil., Ph.D.)

Dr. Jacob Cherian is Associate Professor of Management with College of Business, Abu Dhabi University since 2007. He has a diversified international experience of 32 years in various positions such as Chairman of Department of Marketing, College of Business Administration, Jeddah, KSA; Head of the Department of Commerce, Rizvi College, Mumbai, India; HRD Manager in Sadaca O & M Group, Riyadh, KSA and R&D Manager, SRPC, Media City, Dubai, UAE. He has also worked as HRD and Export Consultant. Dr. Jacob has attained four Masters Degrees of M.Com., M.S.W (University Rank Holder), M.B.A., and M.Phil. and also Ph.D. in Human Resource Management. He has published around fifty research papers in International Peer Reviewed Journals out of which seven are in A Journals and has presented several research papers in International conferences. Dr. Jacob is the reviewer and an editorial board member of various International Journals in Business and Management and has authored six books in business and management.*

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