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Green Marketing and Carbon Footprint in Chemical Industry

Master Thesis

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T.C.
İSTANBUL TİCARET ÜNİVERSİTESİ
SOSYAL BİLİMLER ENSTİTÜSÜ

ONAY SAYFASI

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Hazırlamış olduğum tez özgün bir çalışma olup YÖK ve İTİCÜ Lisansüstü Yönetmeliklerine uygun olarak hazırlanmıştır. Ayrıca, bu çalışmayı yaparken bilimsel etik kurallarına tamamıyla uyduğumu; yararlandığım tüm kaynakları gösterdiğimi ve hiçbir kaynaktan yaptığım ayrıntılı alıntı olmadığını beyan ederim. Bu tezin ihtiva ettiği tüm hususlar şahsi görüşüm olup İstanbul Ticaret Üniversitesinin resmî görüşünü yansıtmamaktadır.

The thesis entitled

GREEN MARKETING AND CARBON

FOOTPRINTS IN CHEMICAL INDUSTRY

Is presented by Bahadr Beadin,

and hereby is certified that it is worthy of acceptance.

Professor name1

Professor name2

Professor name3

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Abstract

This study is designed to answer various questions relevant to green marketing and carbon footprints in chemical industry. The topic is presently of great concern globally. Several researches are made on green marketing and carbon footprints with the help of significant information provided by the experienced researches which assisted the thesis in deriving conclusion. Organizations (specially the chemical industries) are getting aware of the importance of green marketing and hence mending ways to produce eco-friendly products.

The study used several quantitative and qualitative methods to ensure how much does green marketing influence carbon footprints in chemical industry. Data is collected primarily with the help of questionnaires that were filled in by the respondents of different genders, age groups and professions. The data was collected using non-probability sampling. Calculations and estimations were therefore performed to get quantitative answers.

The research also emphasizes upon how chemical industries are contributing to the increasing number of carbon footprints in atmosphere. It finds how well chemical organizations are doing to minimize harmful effects of production of their goods. Metrics of carbon footprints are focused. The study concludes its search and data estimations in a generalized way, giving possible solutions to our problem and finding ways to minimizing carbon footprints.

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Abbreviations

CO2: Carbon Dioxide

EF: Environmental Footprint

dLUC: Direct Land Use Change

OECD**:** Organization for Economic Cooperation and Development

POP: Point of Purchase

IPCC: Inter-governmental Panel on Climate Change

POS: Point of Sale

PVC: Polyvinyl Chloride

PAHs: Polycyclic Aromatic Hydrocarbons

CDC: Centre for Disease Control

CIR: Cosmetic Ingredient Review

EC: European Commission

GWP: Global Warming Potential

AMA: American Marketing Association

CCS: Carbon Capture and Storage

SPSS: Statistical Package for the Social Sciences

MC: Monte Carlo

EU: European Union

CPG: Consumer Packaged Goods

GHG: Greenhouse Gas

SRIC: Socially Responsible Investment Coalition

WOM: Word of Mouth

OECD: Organization for Economic Co-operation and Development

FMCG: Fast Moving Consumer Goods

WWF: World Wide Fund for Nature

1. INTRODUCTION

1.1 Background

As Victor Lebow (American retail analyst) states:

"We need things consumed, burned up, worn out, replaced, and discarbed at an ever increasing rate"

For past thirty to forty years, global warming is an essential topic for discussion. According to OECD, world energy demand will increase up to 80% in 2050 in addition to 50% increase in greenhouse gases like CO2. In a study of attitudes of Europe towards global warming and consumption, it was get to know that 80% citizens of Europe agree that impact of products on environment helps to decide which product to buy (Flash Eurobarometer, 2009).

Green marketing is now becoming topic of great importance due to deterioration of atmosphere and increasing emulsion of greenhouses gases. Chemical industries have been doing green marketing to follow green policies. A number of opportunities are available for the reduction of emissions from this sector. There are around 71 such chemicals found, that contribute to 95% of emissions from chemical industries. The exact/actual amount by which emissions are to be reduced is unknown up till now.

1.2 Problem discussion

The harmful effects on environment led the customers to change their attitudes of buying products to preserve planet (Luck et al, 2009, p. 2).

The problem discussion of the thesis includes the effect of green marketing on the environment. Furthermore, how chemical industries are offering their services to protect environment. Carbon footprints, according to global researches are increasing so the problem increases side by side. The thesis therefore tends to give answers related to such problems caused due to chemical industries.

1.3 Research gap

Purpose of the report is to view green marketing and its relation with carbon footprints in chemical industry. Hence, the four marketing mix elements are analyzed here. The thesis further talks about purchase of chemicals using eco-friendly techniques. This study may have a vital influence over the readers since two significant practices are inter-linked with each other i.e green marketing and carbon footprints.

1.4 Purpose of study

The purpose of this study is to identify factors that influence the chemical industries and its customers to buy environment friendly products. The study was to analyze the identified factors from the customers' view that ultimately led them to think in different way.

1.4.1 Research questions

To be more specific, following are some basic questions that this study tends to answer:

- What is the impact of chemical industries on environment?
- How do chemical industries contribute to the carbon footprints?
- What is the impact of green marketing on carbon footprints caused by chemical industries?
- Contribution of chemical industries in green marketing?
- What is the impact of green marketing on customers' attitude towards purchases of chemical products?

1.5 Limitations

The study focus on few phases and aspects of factors that have influenced the chemical industries and customers to change the style of selling and purchasing. The study largely

focus on customers point of view and less focus on sellers' view as it has always remained easier to know customers' view rather than sellers' view. Social sites were largely used to answer the questionnaire. Therefore, people of different regions could submit their responses. Wide variety of products could not be analyzed separately due to a large number of them. However, focus was laid down on basic and essential chemical products though out the study.

1.6 Thesis outline

The thesis is outlined within six parts as shown in figure below:

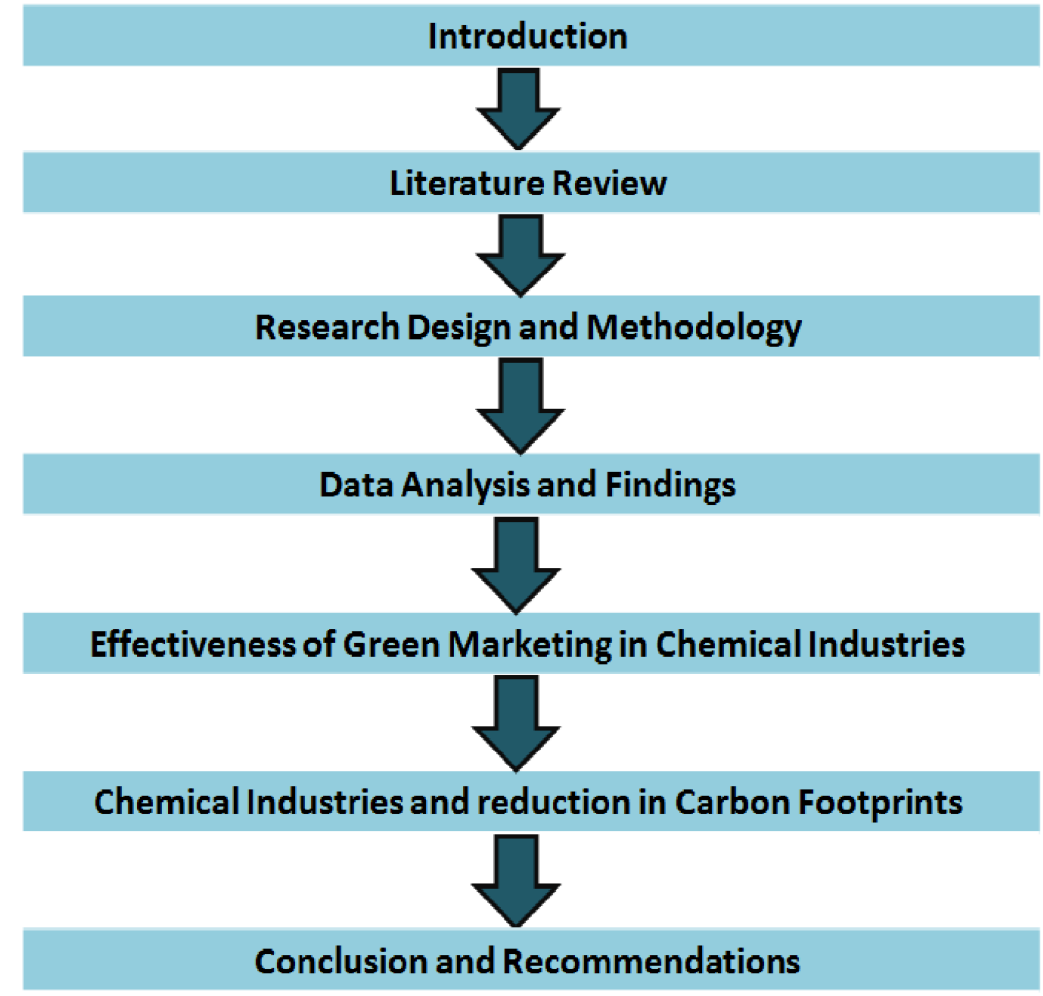


Fig 1.Thesis outline

The introduction provides the reader with topic's background and problem to be solved through this thesis. The literature review presents different works of authors and information of journals and articles are shared in the literature review. Methodology discusses the data collection techniques and the approaches used to perform estimations. Data findings and analysis reveals the analysis of the study to the readers. Further discussions are made in fifth section. The thesis ends with final conclusion derived from all activities from the beginning till discussions. It also provides further researches that will be fruitful if focused.

2. Literature Review

The literature review generally focuses upon green marketing and the behavior of customers who consumes chemicals either in an environment-friendly way or non-eco-friendly way. It further emphasizes upon chemical industries and their ways to manufacture products. How much do they mend ways to protect environment. Various products are manufactured in chemical industries. Chemicals are consumed by people of various societies and hence non eco-friendly chemical products are also used. The literature will discuss the effects of carbon footprints on environment.

2.1. Green Marketing

The harmful effects of products on the atmosphere due to worldwide companies and human activities have urged the companies to manufacture EF products. As a reminder, the Sustainable development is the development, which fulfills the present needs/requirements without reducing the ability of future generations to fulfill their own requirements/needs. This definition of sustainable development was introduced in 1987 in a report also known as "Our Common Future". According to Grant, definition for sustainable development is "the idea that environmental objectives are not incompatible with ongoing economic prosperity" (Grant, 2007). EF products' consumption and dedication of consumers towards these EF products have led the chemical industries to develop strategies that enforce green marketing mix that helps to conserve natural resources and side by side deliver valuable products/services (Datta and Ishaswini, 2011).

Many researchers like Stanton, Futrell, Lozanda, Mintu and Polonsky defined green marketing as a broad sense of marketing which satisfies customers needs and requirements by serving them with valuable goods with least environmental hazards (cited in Ghosh, 2010). Chen in 2010 described that green marketing is the series of activities followed by the companies who are concerned about the environment and its problems and hence by selling EF products which satisfy customers (Chen and Chai, 2010). It is the process of management which is responsible for identification and

anticipation of society in a sustainable way. Green marketing needs to be developed because human needs may become unlimited but natural resources are of some bounds. They are in a limited number. (Kumar, 2011).

Problems of cleanliness of environment and related issues are becoming known globally with the passage of time. Silent Spring, by Rachel, emphasizes upon sustainability and wealthy atmosphere (Mary, 2011). This is important regarding the present concerns as the environment has turned into significant challenge for the leaders of world (Kumar, 2011). The leaders have also realized the importance of environmental security and effects of pollution. Wahid and Rahbar in 2011 explained green marketing as eco-label and environmental advertisement.

2.2. Chemical Industries and Marketing-Mix

The figure below shows the aspect of marketing mix:

Figure 2: Marketing mix

Source:

https://www.google.com/search?q=MARKETING+MIX&source=lnms&tbm=isch&sa=X&ved=0ahUKEwiYwoKvierTAhUFLlAKHUtKDlAQ_AUIBigB&biw=1366&bih=638#imgrc=FPPt-35M_LN69M:

2.2.1. Definition of Marketing Mix

Kotler and Keller, in 2009, defines marketing mix in these words,

"*Mixing and matching marketing activities to maximize their individual and collective efforts. The Mc Carty classification is the most important basis of marketing. This classification is also called marketing mix and is composed of four elements (the Ps): product, price, place, promotion*" (Kotler and Keller, 2009).

Marketing mix and its elements product, place, price and promotion are playing significant role in the production of eco-friendly products. According to Chitra, green marketing mix include product, place, price, promotion and physical distribution (Chitra, 2007). Furthermore he describes that products need to provide healthy consumption, its availability, its awareness, its value, publicity of environment friendly methodology and awareness regarding hazardous pollution. Storage of products especially that of chemicals may harm the atmosphere. People who may be are customers, employees or end users need to have environment-friendly mindset to help them gain ultimate goals of marketing mix.

In 1990, a study had been made by an organization named "Roper". It was based upon marketing mix. The report reveals that green alternatives are less superior to conventional alternatives. The green alternatives are even more expensive. Moreover, the labels on the products showing that respective product is eco-friendly, were not to be believed. Green alternatives were not easy to find (Vernekar and Wadhwa, 2011, p. 68). Hence, the following study will work on changing behaviors of consumers.

2.2.2. Product

Product consists of utilities and advantages gained by consumers in the exchange process (Blackwell et al., 2006). Major features of products mix include its quality, design, functions and packaging. These features are discussed in upcoming topics.

2.2.2.1. Chemicals and Products Quality

The word quality has been defined by Quality Control society as:
"*The totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs*." (Kotler, 2009, p.169).
Quality allows to gain customers satisfaction and fulfill their expectations. As revealed by Ottman in 2002, around 42% disagreed to say that eco-friendly chemical products will work as good as conventional products do. Moreover, in a survey/questionnaire collected from 238 people (largely from students), it was find that 80% respondents said that they are willing to buy eco-friendly chemical products by making compromises over the quality. However, 74% of the respondents were those who were willing to buy chemicals which cause less pollution and least carbon footprints but are good at quality. This research showed that people make less compromise over the quality since they spend money for the chemicals they buy. Consumers mostly prefer products of better quality and make compromise on environment but of minimum level. One reason behind is that atmosphere alone is not enough to convince the customers to buy products of lower quality.

2.2.2.2. Chemical Products and Packaging

While buying any chemical, the first thing consumer comes into contact with is its packaging. The consumers' decision to buy the chemicals are largely based upon its packaging (Solomon, 314-317).

Several brands are making efforts to produce eco-friendly products by investing more capital for example Gamble, L'Oreal and Procter. They do so by reducing their investments on other areas which are unhealthy for environment and increase carbon footprints. For example, toothpastes are no more covered in a cardboard box, rather alone tube is sold. Detergents are made less concentrated to reduce its risks on environment. Similarly, size of packaging is minimized to make it friendlier.

Researchers made by Wannimayaka, Randwela (2008) and Wadhwa (2011), revealed that both the packaging and product itself, are powerful elements that help consumers to decide whether to buy green chemical products or not.

2.2.2.3. Types of eco-friendly chemical products

Consumers of chemicals buy chemicals that are eco-friendlyand have greater impact on atmosphere. In 2010, a study was made by Rhabar and Wahid, on the chemical consumers of Malaysia. The study discussed that those consumers buy green products which are mostly pesticides and cleaning products. As they think both will have great harm on environment if they are not consumed in a safer way. Moreover, a survey was done on 60 consumers of chemical products. There are several types of chemical products like food, cosmetics, furniture and medicines. Out of these, those consumers were fully aware of environment friendly food products. And lesser aware of other environment friendly products of cosmetics, furniture and medicines. Our study will further show research work on green product consumers buy from supermarket like cosmetics, pesticides, medicines and furniture polishers.

In addition to greenness of chemical products, many other characteristics of products are essential that influence customers' attitude towards purchase of products. These characteristics like performance, quality, taste and appearance. Consumers largely give importance to benefits of products it can give to them (Wong et al, 1996, p. 269).

2.2.3. Chemical Products and Price

AMA defines price as following:
"The formal ratio that indicates the quantities of money, goods or services needed to acquire a given quantity of goods or services."

Many customers see price of green marketing chemical products as higher than the conventional chemical products (Chang, 2011, p. 20). The advantages of chemicals being environment friendly from carbon footprints allow consumers to purchase products on higher price. They are willing to pay more for the sake of environment. They say that it is worthy to pay more if it helps to deteriorate earth's prestige.

A huge survey was made in 27 European countries. 1000 respondents per country gave responses. Hence total 27000 responses were collected. Survey revealed that 75% people are willing to pay more for the protection of earth and are ready to purchase expensive green products (Pirani and Secondi, 2011). Another survey, yet a smaller sample of 238 only, done from students showed that 92% students are ready to purchase chemicals at higher price to protect their environment from carbon footprints. Another survey was conducted from Belgian students. Sample was of 808 students. 10% of the total students were ready to pay 27% premium for the protection of environment, on products of chemical industry (De Pelsmacker et al, 2009). It is necessary that when consumers attitude change towards ethical chemical products then their behavior and dedication towards them also change to their action. Means they are ready to purchase products in higher price. Mandese in 1991 revealed explicitly that consumers may love green marketing products but it is not important that they will pay more to buy products which are less likely to increase carbon footprints in atmosphere (Purohit, 2011).Consumers who buy green products of chemicals are even price-sensitive and need lesser expensive chemicals. Hence, willingness here comes for paying more or less for these products which vary from person to person or community to community.

Price is the visual of quality for customers (Kotler and Keller, 2009). This is a persuasive attitude towards price-quality relationship (Solomon, 2010). Price is not a single characteristic of the service or products. It is not necessary that higher the price of the product, better its quality is. Hence it is not the sole attribute, there are several more.

2.2.4. Promotion of Chemical industries' Products

Kotler and Keller (2009, p. 63) defines promotion as:

"Promotion involves sales promotion, advertising, sales force, public relations and direct marketing."

Our study involves around attitudes of people towards purchasing and study of their intention regarding green chemical products. Our study hence focus less on factors like their promotion in market. It basically relies upon intentions of people while buying green chemical products. Hence factors of promotion like sales force or public relations are mainly ignored in the research.

Advertisement is an essential element of promotion in the marketing mix. There are several ways in which it is carried out like television, social sites, and bill boards. It is the promotion of idea behind the service and a paid activity of presentation of the product. Advertisements help to create awareness of products and introduce them to the public. They deliver basic information regarding the service or product in a well-mannered way. Producer interacts with its consumers through the advertisements, highlighting major features of the product that are valuable to them.

Customers of chemical products are very much concerned about the promotion of environment friendly products that cause less carbon footprints to preserve the deterioration of earth (Ann et al. 2012). Many consumers prefer the promotion of chemical products that cause less harm to environment. Green advertising is yet another type of advertisement that claims that the product offered is eco-friendly and helps to conserve natural resources.

Green marketing largely depends upon its advertisement as it plays an important role in marketing. The research to user's perspective is made narrower after which user is influenced to buy the product. Advertisement is a topic of huge range.

Advertisements can help to differentiate between the green marketing chemical products and other conventional chemicals. The green marketing advertisements can be persuasive in several ways. They can be persuasive by rising emotionally feelings in the hearts of

customers for te deterioration of earth. The advertisements may change the way of thinking of consumers in an emotional way so that they buy products of which are environment friendly rather than conventional products. Hence, advertisements have a potential to persuade the customers to buy the eco-friendly chemical products by using the tools of emotions and feeling. This way they play with their psyche too. An argument has also arose for the customers who are involved in green marketing. Such customers are less likely to bother about advertisements. The advertisements of green marketing do not influence them much (Chitra, 2007).

To advertise in a way that it has been shown that specific green product is so safe for the environment, actually influences a lot. More than half of the Americans agreed that advertisements and labels over the packing, revealing that this product is eco-friendly, allow them to purchase the product (Ginsberg and Bloom, 2004).In order to effect the consumer's dedication, it is a good idea to highlight the specification and attributes of the green marketing chemical products.

However, other studies show that many people do not believe on the claim the companies make for their products to be eco-friendly (Chang, 2011. P. 21). In other studies, it was revealed that more than 50% of participants agreed that promotion plays vital role in influencing the purchasing decisions of customers especially while buying chemical products because are a great cause of carbon footprints.

2.2.5. Place and Display of Chemical Industries' Products

The Place is another element of marketing mix. It is helpful when determining an effective outlet through which products can be sold and to get to it in the best way (Blackwell et al, 2006). Place has been described by Kotler ad Keller as coverage, location, channel, assortment. It is also defined as the intermediate process of the delivery of the product from company to the customers. Place ensures that chemicals or simply

products are available and are transported to retailers wholesalers (Patrick, 2010). The term “Point of Purchase” is the point or location where purchase is done (Kotler and Keller, 2010). There are two types of POP. One type is the macro level POP. It includes malls and cities. Other type is micro level of POP. It includes the interior of store. The display of products within the stores are called as POS.

Displays at stores are very important and play significant role in attracting consumers. The displays are important because they affect the buying behavior of customers. Place and displays also become a vital source which provide information to the customers related to the products and services they are displaying. Place and displays also promote unplanned purchasing by customers. A survey of Danish revealed that 9 customers out of ten buy almost 1/3 products at store that are unplanned and are bought due to the displays and place (Solomon, 2010).Many customers buy those chemical products which are not mentioned in their shopping lists. They do so as they are attracted by the displays. Hence display can easily remind a customer, of any product that he or she has forgot to mention the shopping list.

2.3. Chemical Industries Exposures

2.3.1 Plastics and environmental impacts

Plastics have been a part of our society since a century. Plastics have become a product of common use. They act as containers of chemicals and several things. They even helps to store food items and keep them fresh. Furniture, flooring, cloths, pipes and several many kinds of products use great quantity of PVC. However, PVC has harmful effects. PVC creates disorders in the reproductive systems of males. This is because of the substance called phthalates present in PVC. Researches have revealed that children who are continuously exposed to pollution, face disorders in the lives later. This creates reduced labor and poor earnings.

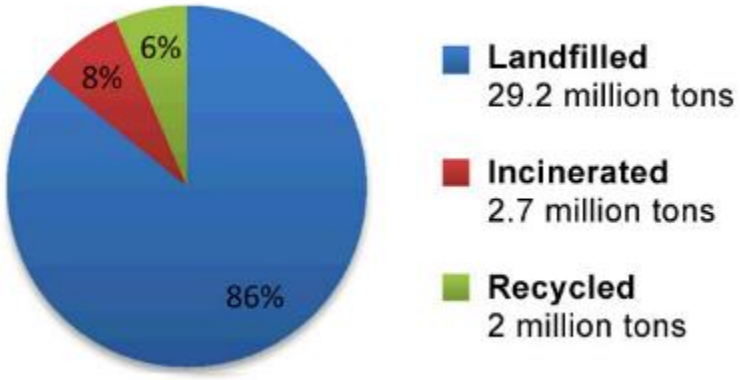
Steps were taken to reduce the plastic pollutants contents from the environment. It was also implemented in many locations of United States. However, it was not utilized. Plastics are not recycled. Rather, they are down cycled. A plastic bag which was once used by someone, can be converted to a plastic tray. It can however not be converted to plastic bag again. Many states have taken steps to ban the plastic bags since they are a cause of huge pollution. This is also a topic of long debates. Plastics are also source of substantial energy which end up burying in the soil. Many plastic remains are sent for further development along with the e-wastes. They are collectively recycled and produce air burning.

A research work was conducted in 2014 named as Plastics and Environmental Health: The Road Ahead.It describes plastic as a cost effective medium for disposable devices. They are also easily manufactured with the utilization of less energy. Plastics are also light in weight and are characterized as biocompatible. Plastics contain chemicals of various types which are harmful for the human beings. The above research work was conducted by the scholars Emily North and Rolf Halden. They summarized their research, comprising of dangers, harmful effects, advantages and future creativity regarding Plastics. This study also took help and guidance from research works of National Institute of Environmental Health Sciences. It is a research body of research body. This research reveals the following points:

- Every year, 300 million tons of plastics are manufactured around the world. Out of this quantity, half of the plastic is produced for the manufacturing of disposable products and packaging.
- 85% of surgical instruments or equipments are made up of plastics.
- Bags and tubes only, contribute around 25% of hospital wastes.
- Hospitals waste material includes 425,000 tons of material on annual basis.
- Annually, 4.6% of petroleum is bee consumed in order to produce plastics. It uses around 331 million barrels in a year.
- Whenever plastics are buried in landfills, there is no energy recovered.
- Only little it of energy is recovered when plastics are incinerated.

- Several logical difficulties are faced during the recycling of plastics and this causes the increase in the cost of processes during its recycle.
- 34 million tons of plastic was as the waste material of US. 86% of this waste plastic was buried as landfills.
- Plastics in the landfills, this is not sustainable process and is wastage of energy. It brings resources of land to an end. Several kinds of air pollutants are produced during incineration like CO2 and other greenhouse gases. Dioxins and PAH are also part of it.

The figure below is the graph showing plastic waste disposal in US during the year of 2008:



Source: Plastics and Environmental Health: The Road Ahead, Review.

2.3.2. Beauty Products and Chemical exposures

For past few years, reproductive problems are faced by many humans especially the males.Data was collected from CDC. It showed that from 1970 to 1993, undescended testicles and hypospadias doubled in males. Chemicals in the environment are a great

cause of it. They are produced by Chemical industries exposures. Researches have shown that cosmetics and beauty products have Phthalates in low concentrations. Cosmetics and health care products also contain development toxicants. It is a question of debate whether these toxicants and their concentrations in cosmetics are enough to cause harm to humans and environment or not.

The campaign for safer cosmetics tool steps to create awareness among consumers of cosmetics regarding coal tar. Coal tar is also a chemical that causes very dangerous diseases like cancer. The image below well describes how they are working to create awareness among people.

Figure 3: Effects of coal tar

Source: https://www.google.com.pk/search?q=chemical+used+in+cosmetics&espv=2&biw=1242&bih=602&source=lnms&tbm=isch&sa=X&ved=0ahUKEwitpPj7xLrSAhUL2RoKHZF0AsAQ_AUIBigB#imgrc=2KRNqUCNwHUU9M:

Research was published by Environment California in 2004. It was named as Growing Up Toxics: Chemical Exposures and Increases in Developmental Diseases. This publish discusses the chemicals present in products that consumers purchase. At the same time, another report was also published. It was published by Environmental Working Group.

Name of the report is Skin Deep: A Safety Assessment of Ingredients in Personal Care Products. This report was also in support to the California Environment's publication.

These relevant reports say that health care products like shampoo, soap, lotions, makeup and nail polishes have several chemical constituents which do not have safety data. Some chemicals are even linked in to animals and their studies. They have effects on genital birth causing defects. These chemicals decrease the number of sperms and effects the pregnancy at various stages. However, it is not evidently said that humans face same effects as animals do. But widespread exposures have been experienced globally.

Phthalates are a key component in many health care products like nail polishes and lotions and plastics. Cosmetics contain dibutyl phthalates. Lotions and perfumes contain diethyl phthalate .Hair sprays contain dimethyl phthalate. Most of the times, their names are not mentioned on the labels on the packaging.

Sujatha Jehangir who is a member of Environmental California and advocate, says about chemicals and environment as following:

"The concerns that are focused around this particular chemical have arisen from a series of tests and studies that have been released recently that point to significant potential health concerns."

In March 2004, research was experienced by CDC. It was done with the help of population study. Test was performed over 2540 people. 95% of them were exposed to phthalates. In 2003, a study was conducted at Harvard School of Health. It described the effects of urinary phthalate metabolite concentration over the DNA destruction of sperm in human beings (males). The CIR panel is a group who conducts researches and is sponsored by Toiletry and cosmetics associations. CIR panel introduced a descriptive literature review that says that use of Phthalates in cosmetics, nail polishes, lotions and

other health care products are safe. Marian Stanley, manager at American Chemistry Council says:

"….*some of these concerns are based on higher-dose of the testing of animals. Exposures in human beings and we have the CDC numbers to back that up-is comparatively low."*

The environmental groups debate that it might be low level of Chronic exposure.

Consumers can not judge a product without reading about the ingredients on the packaging. Due to some reasons, companies follow some tactics and prevent showing full details regarding ingredients on packaging. Similarly, consumers spend less time in studying ingredients and information regarding them. This way, consumers do not make fully informed decisions.

Environmental California and other organization working like it, are working to bring a change in customer's behavior while purchasing products. They tend to create awareness among customers about ingredients and there useful or harmful effects. These organizations prompt the customers to study ingredients before purchasing them.

2.4. Carbon Footprint

2.4.1 Introduction to Carbon Footprints

2.4.1.1. History

Stern Review on the Economics of Climate Change was presented in 2006. It focused on the climate changes globally. It was supported by movie media events like movie "An Inconvenient Truth". Many companies, research groups and organizations showed their keen interest in climate changes, their reasons and effects. They show interest towards

carbon footprints and GHG emissions. NGOs also drove their interest in Carbon Footprints and with the rise in customers' interest, they are initializing steps to create awareness. Concept of Carbon footprints is yet a younger concept whereas climatic impacts of goods are worked upon for many years (Finkbeiner, 2009).

2.4.1.2. Definition

There is no universal definition of Carbon Footprints. Galli defines carbon footprint as:

"*An estimate of the total amount of GHG emitted from a life cycle perspective from the product under study*."(Galli et al, 2012).

We can calculate Carbon Footprint for any service or product. Carbon footprints can also be calculated for different nations, states, institutions and events like Olympic (Pandey et al., 2011). Some metrics it require.

2.4.1.3. Metrics

Carbon Footprint is measured in terms of Global Warming Potential (GWP) of GHG that is released during the life cycle of the products. GWP allows to measure the heat captured (or trapped)by any gas in the atmosphere, relative to the CO2 trapped (IPCC 2007). GWP of certain gas is dependent over wavelength span for which infra-red is absorbed by that gas. It also depends upon span of life of gas in the environment (atmosphere). GWP is written as CO2-e. Total Carbon Footprint is calculated as followed:

Carbon-Footprint=GWP(kg:CO2-e) =

$$= \text{Amount of } CO_2 * 1 + \text{Amount of } CH_4 \cdot GWP_{CH4} + \text{Amount of } N_2O \cdot GWP_{N2O}$$

Where:

GWPCH4 = GWP for Methane CH4;
GWPN2O = GWP for nitrous oxide N2O;

Time interval is considered for GWP of various gases. Mostly, 100 years of interval is considered. Table 1 shows potential of methane and nitrous oxide for different time intervals:

Gas	20 years	100 years	500 years
CH_4	72	25	7.6
N_2O	289	298	153

Table 1: Global Warming Potential of methane CH4 and nitrous oxide (N2O) for different time intervals.
Source: (IPCC, 2007)

According to IPCC (2007) hydrofluorocarbons and per fluorinated compounds also act as strong GHG. GHG emission causes effects on climate indirectly (Shindell et al, 2009).Chemicals product manufacturing may cause climatic change due to reduced Eva transpiration, modifying albedo and last but not least, formation of aerosol. They can have warming effects as well as cooling effects (Hoglund et al., 2013).

2.4.2. Carbon Capture and Storage (CCS)Technology

Mega Watts of energy is produced in chemical stations. CO2 emissions are experienced. CCS technology is been used to minimize CO2 emissions from stream generating processes. CCS stages includes the separation followed by capturing/trapping the carbon contents mainly CO2 from the flu gases and syngas. The processes of CCS are as followed:

- Capturing CO2
- Compress and transportation of CO2 been captured

- Underground injection.

The underground injection is actually the geological sequestration of carbon dioxide. It is injected deep into rocks formation. The length of these formations are sometimes a mile and comprises of porous rocks. Porous rocks hold the carbon dioxide. The layer of porous rocks are above the porous layer that holds down the carbon dioxide and do not let it to go upwards. Figure below shows depth at which CO2 is typically injected geologically:

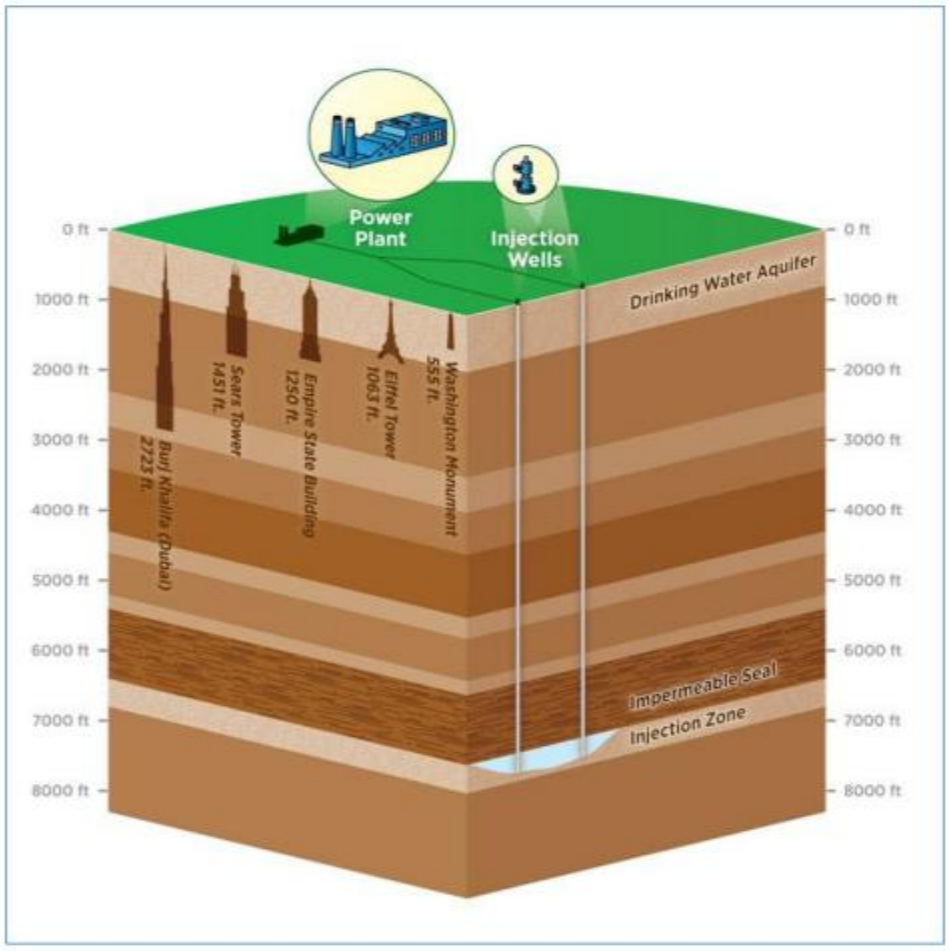


Figure 4: CCS Schematics. Source: (EPA, 2013)

The figure above highlights the injection zone located beneath the surface. It is at the depth of around 7000 ft. Above it is present impermeable seal zone which holds the CO2 down and not let it to migrate above the porous zone.

3. Research Design and Methodology

The related aspects of research design and methodology will be discussed, beginning from philosophical assumptions. The methods of data and information collection will be highlighted in the methodology. Strategies of quality criteria have been discussed too. Ethical considerations been taken throughout the research activities have also been mentioned in this section. It has been taken special care to avoid plagiarism to utmost. The figure below shows activities of research methodology presented by Paul in 2001:

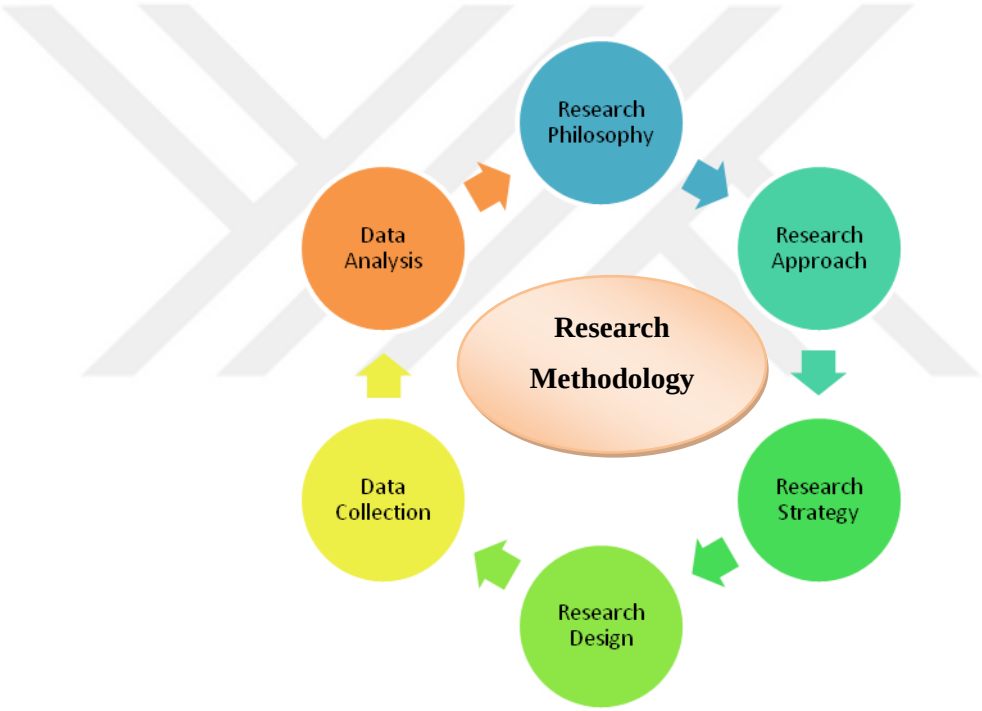


Fig 5: Research methodology (Paul, 2001).

3.1. Philosophical Assumptions

Research have been analyzed from philosophical view to get the idea of it. Epistemology and Ontology are connected to this study and hence discussed in the following section.

3.1.1. Epistemological consideration

It refers to how valid researchers consider to the knowledge they perceive within the boundaries of their study or research (Bryman and Bell, 2011). It describes how assumptions are acquired. The stakeholders involved in research can go through articles, journals and books thoroughly to get into the depth of knowledge (Saunders et al., 2009).

Interpretivism is opposite to positivism. According to the beliefs of the researchers, collection of data is being formulated so that it may suit the research. Data is collected through convenient sample as access to respondents is available, which is then put into SPSS software. This helps to know whether it suits the research. Research philosophy described by Magilvy and Thomas in 2009 is shown in figure below:

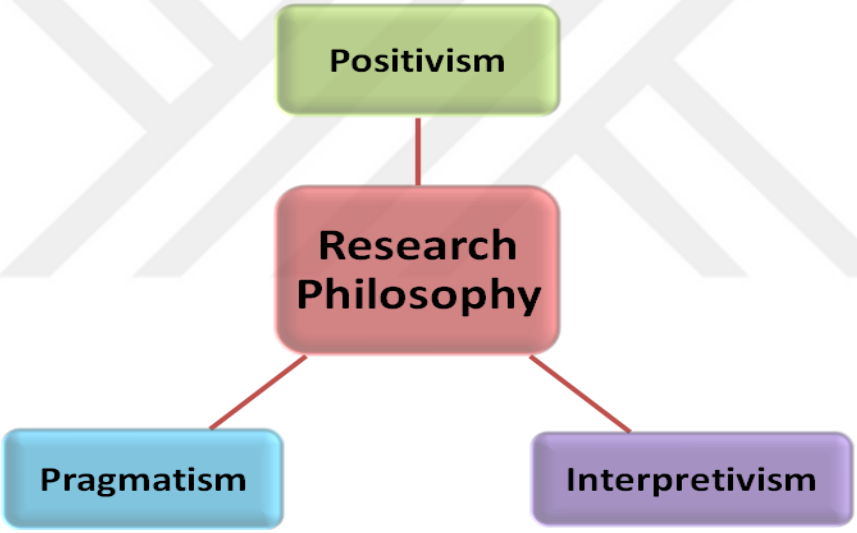


Fig 06:Research Philosophy (Magilvy and Thomas, 2009).

3.1.2. Ontological consideration

Ontological consideration refers to the point of view of researchers who study out the social entities of the company or organization and carry further discussions (Bryman and Bell, 2011). Ontological considerations were focused upon while analyzing the answers of respondents regarding their purchasing power of environment friendly products. We

went through several articles and books that best explains chemical industries' influence on purchasing power of their consumers. In objectivism, there exist some or much independence among actors. In objectivism, we do not have control over the factors affecting opinions of consumers and we don't have control over those factors which influence their purchasing power of green products. We have designed a questionnaire but we did not had opportunity to temper the answers. In constructivism, social actors influence, control and review the social entities (Bryman and bell, 2011). According to Bryman, it also allows the researchers to identify, explore and understand social world. This study focuses upon presence of carbon footprints in atmosphere and its influence over chemical industries who have changed their behavior and started working in more green way through green marketing.

Consequently, we used the objectivism approach since our factors have been linked to the attitudes of consumers of chemical products. Process of administration of questionnaire has been followed and later analyzed in section of discussion. We analyzed the answers and determined whether factors affect attitude of consumers while buying green marketing chemical products. Objectivism was the choice since the collected data was not tempered by external activities.

3.2. Research Approach

3.2.1. Deductive Approach

There are basically two research approaches namely inductive approach and deductive approach (Saunders et al, 2009).

Fig 7**:** Types ofResearch Approach.

In inductive approach, a general theory of data analyzing has been followed by the researchers (Brayman and Bell, 2009). Researchers then build up the theory or theories which are merged with the findings (Saunders, 2009). In deductive approach, researches continue their work on already done researches and built theories so that they may be able to make hypothesis (Bryman and Bell, 2011).

This research uses deductive approach since a lot of data is available regarding our topic many famous researches have worked upon green marketing and environmental friendly products. Similarly, many works are done in the field of carbon footprints in our atmosphere. This topic is even dealt with the perspective of science. The topic is the global issue. Hence, it is suitable to use deductive approach.

3.2.2. Quantitative Research

In quantitative research, data is collected from huge sample of respondents and calculations of results (Wiid and Diggines, 2009). The research will go through more general to more reasoning followed by deductive approach. This study definitely has advantages of using quantitative approach. The quality of thesis depends upon validity,

accuracy, reliability and availability of data which this thesis fulfills. Qualitative approach is economical as well as less time consuming.

3.2.3. Research Design

There exist five types of research design: experimental, longitudinal, cross-sectional, case study and comparative designs (Bryman, 2008). Cross-sectional research design is one of the most popular research designs among other research design and which is also known as social survey design as well (Bryman, 2008). Experimental design research design is very often used for business researches (Bryman, 2008). There was shortage of time and some resources the longitudinal design has not been followed since in his type, data is collected from two separate occasions of samples (Bryman and Bell, 2011). Comparative design illustrates the comparison between two different things or theories (Bryman and Bell, 2011). Finally, case study research type is left. Researches are made on any given case. In this thesis we are adopting case study research design for the given case that is Green marketing and carbon footprints in chemical industries.

3.2.4. Research Type

Our research design is connected to research type we followed that is descriptive and explanatory research type. By using descriptive research we used scientific methods to gather the raw data and build up the data structures that best explains the characteristics of the target population. Our emphasis was on descriptive type of research. We collected primary data with the help of questionnaire related to green marketing and eco-friendly chemical products. Our thesis will follow the descriptive and explanatory approaches. They are most suitable for the purposes of our thesis and design as we are using a quantitative approach to complete our research. This approach has ultimate influence on our work and study since we are understanding behavior, attitude, concerns and emotions of consumers of green marketing chemical products.

3.3. Data Collection Method

3.3.1. Sampling

- Selection of non-profitable sample

  Sampling method is an essential approach in a research paper based on survey (Bryman and Bell, 2011). There are two types of methods of sampling, they are either probability sampling or non-probability sample. Probability sampling method is more advanced and appropriate, gives good results since responses are collected randomly from different areas. However, due to shortage of time and lack of resources, our survey is conducted on the basis of non-probability sample.

- Population

  Sample in the group of unit is known as population (Bell, 2011). Our survey were randomly conducted from people of different areas and also through social websites where people participated to share their views about chemical industries, green marketing and carbo footprints.

- Convenience Sample

  Non-probability sample is further divided into three main types: snowball sample, quota sample and convenience sample (Bryman and Bell, 2011). In snowball, researchers contact few people, in quota sampling, researchers select proportionate number of people for survey.

  Convenience sampling is an approach that allows the researchers to draw sample according to their convenience (Shiu et al., 2009). Hence the convenience sampling is the approach used for sample. Responses were collected largely from social websites, staff members and students of university. Further, survey paper also consists a “demographic section” which demonstrates some differences among responders. Their age, sex, status has been asked in the survey so that it becomes easy to differentiate among the mind sets of people of different age

groups, sex and status. This way sample and the responses have been made more representative and generative.

- Sample Size and Composition of Sample

  The survey results become more error-free and representative with the increase in the sample size (Bryman and Bell, 2011, p 187). Due to less resources available, we gathered 120 responses. They were conducted from people of various demographics. So that results are more generalized.

3.3.2. Limitations

Greater number of respondents of survey was the students and random people using social sites. They know much about green marketing and carbon footprints based on their experiences. This group of respondents is not the actually representing general population. It does not completely reveal the response of targeted market. It does not exactly reflects the attitude of our targeted audience. Moreover, a convenient sample was used in our study. This method is not guaranteed even for the representation of general population.

3.3.3. Choice of survey method

- Self-completion questionnaire

Bryman and Bell in 2011 states that in a questionnaire, the respondents answer without the aid of interviewer. Questionnaire allows them to share their views freely without any facial or emotional impact of interviewer's expressions. This way the answers collected are more objective and effective.

- Design of questionnaire

Questionnaire designed contains a set of formal frameworks of questions along with the scale or strength of choices. The self-completion questionnaire is been designed as a convenient approach to gain social views regarding green marketing, chemical

industries and carbon footprints. Questions are separated in sections according to the type of questions asked.

Survey questionnaire is divided into 5 sections. First section is regarding the lifestyle measure of respondent. Questions are based upon consumption of chemical products in daily routine. Next is section second section. This section asks questions regarding the perception about green marketing and chemical products' consumption. Third section identifies the attitude of respondents. How much does respondents appreciate green marketing and how much are they willing to make compromises to preserve the planet. Section fourth asks the respondents why they would prefer to purchase green marketing chemical products. Several questions are mentioned in this section and options are mentioned from strongly disagree to strongly agree. The last section that is section fifth asks questions regarding demographics like asking gender, age, status etc. This section reveals identification requirements of respondents.

- Types of questions

A questionnaire is fulfilling the requirements of the study and study reveals a sufficient expression. The clear and appropriate questionnaire helps to obtain the relevant data. Questions are closed. Closed questions have quality of being easily compared and analyzed. Such questions are also helpful in saving time of respondents as well as the interviewers.

In order to measure the attitude of a respondent, Likert scale is the best choice to apply. Five scale point descriptors have been applied on questions. This helped us to analyze and calculate the positive and negative attitudes of respondents.

- Pretest

Questions' relevance has also been evaluated. The survey questions were also checked by our supervisors. Their experience and knowledge helped to verify the conciseness, completeness, correctness and consistency of questionnaire. Difficult and less often used words were also replaced by easy words so that audience would understand the questions clearly and give their responses accordingly. Some

questions were eliminated too since they were destructing the conciseness and correctness of our questionnaire. Irrelevant questions were also eliminated. Further new questions were generated that ultimately led to the completeness of the questionnaire. At the top of the survey paper, the objective and idea behind the survey has been clearly mentioned and respondents are asked to give some time to this questionnaire in an ethical and polite manner.

3.4. Factor Analysis

Our findings were composed of 120 responses that were considered as valid. The property of rating factors by the respondents of questionnaire was of great importance for us. Like respondents were asked to rate the perception of attitude/behavior towards the green marketing products.

3.5. Quality Criteria

3.5.1. Generalization

We focused on the consideration of the audience who are consumers of chemical products, especially the consumers of green marketing chemical products. We aimed to get their generalized view on purchase of eco-friendly chemical products. Our sample did not went to all towns and cities to collect responses as mentioned before. Therefore, it was quite hard for our team to collect generalized responses.

3.5.2 Reliability

Bryman and Bell says about reliability that it represents the consistency of the concept. It is also connected to the data stability. Emphasis is made to make our works more reliable. Cronbach's alpha, a statistical method, has also been applied to check the reliability of our work. The aim behind the verification of reliability under quality criteria is to come up with the correct research, to come up with the quality, to come up with the valid tasks and also to achieve most accurate results of our research. The research is not effective and appropriate until or unless it is reliable. In order to maintain the reliability of my thesis, I went through several many articles, journals, documentaries and previous valid researches done in this context. They assisted us during our research and gave us confidence that our thesis is reliable enough.

3.5.3. Validity

As stated in 2011, "Validity is the measure of concept really measures that concept." (Bryman and Bell, 2011)

In order to ensure reliability, our survey and findings needed to be valid. Hence, reliability of thesis largely depends upon its validity. There is simultaneous relationship between both reliability and validity. The thesis discusses information from journals, articles and other resources which are valid. Invalid resources (invalid journals, articles, documentaries, researches) were not made the part of our thesis.

3.6. Ethical consideration

Diener and Grandall stated four ethical considerations of collecting responses in 1978.These ethical considerations are:

- Any sort of harm made to the participants
- Insufficient information provided to the participants
- Invasion of privacy
- Invasion of deception

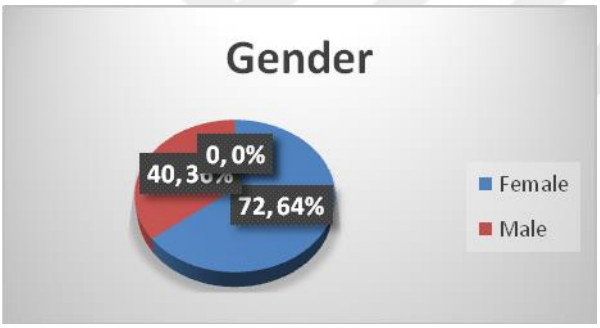
First ethical consideration is harm to participants. This does not only refers to the physical torture to the respondents. Rather, any kind of mental harm is also against the laws of ethical considerations. For example, questions should not point out any religion or cast, culture or custom. Secondly, sufficient information has been added in the questionnaire so that respondents don't have to make effort to know meanings of ambiguous words and statements. During the research, all principles of ethics and behaviors have been given importance. Special care is taken not to hurt anyone's emotions and prestige during the activities of thesis. Focus was laid on providing all the information to the survey respondents so that we can achieve potential answers of the people.

4. Data Analysis and Findings

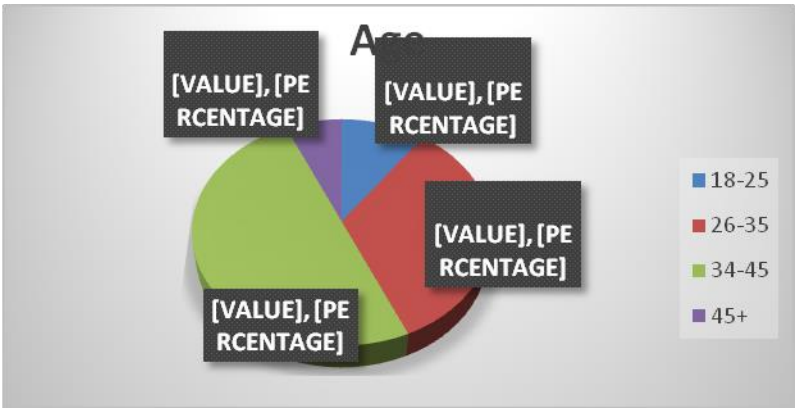
This section reveals the findings and data analysis performed over the survey questionnaire. Questionnaire has been an essential tool for our thesis. It provided us the book compiling views of public and consumers of different status, gender and age. Hence, data analysis performed throughout the research has been shown in the following section.

4.1. Demographic Analysis

120 valid responses have been collected upon which analysis is performed. Number of females participated in questionnaire is greater than those of males. Survey was filled in by 64% females and 36% males as shown in figure below:

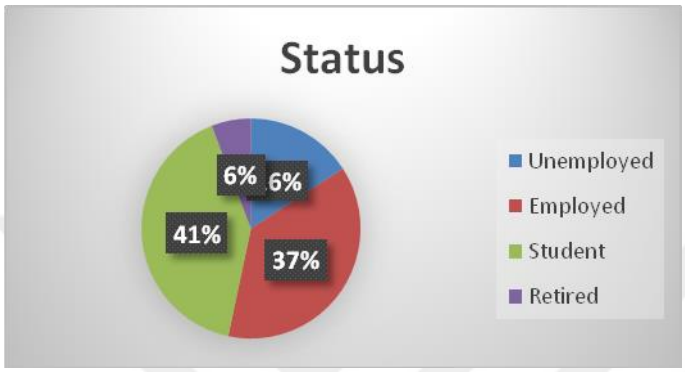


Second demographic question was age of respondents. People of age 26-35 and 36-45 tend to participate more than the people of other age groups. Restriction was applied that people of age less than 18 were not permitted to fill in the questionnaire. The graph below shows the trends of answers of this question:



As shown in the figure above, 10% of the respondents were of age 18-25. 33% of the respondents were of age 26-35. 50% of the respondents were of age 34-45. 7% of respondents were of age 45 plus.

Third question was regarding the status of respondents. Results are shown in diagram below:



The results show that 6% of the respondents were Unemployed. 37% of the respondents were employed. 41% of the respondents were students. 6% of the respondents were retired.

4.2. Analysis on Lifestyle Measure

The section 1 of the questionnaire demonstrates the lifestyle of the public as a whole. How often do they buy products and what kind of chemical products they buy is discussed in this section.

Question 1: How many times (or how often) have you bought chemical products in last 4 months?

As shown in the figure above, 66% of the respondents buy chemical products at least once a week. 34% of the respondents buy chemical products at least once a month.

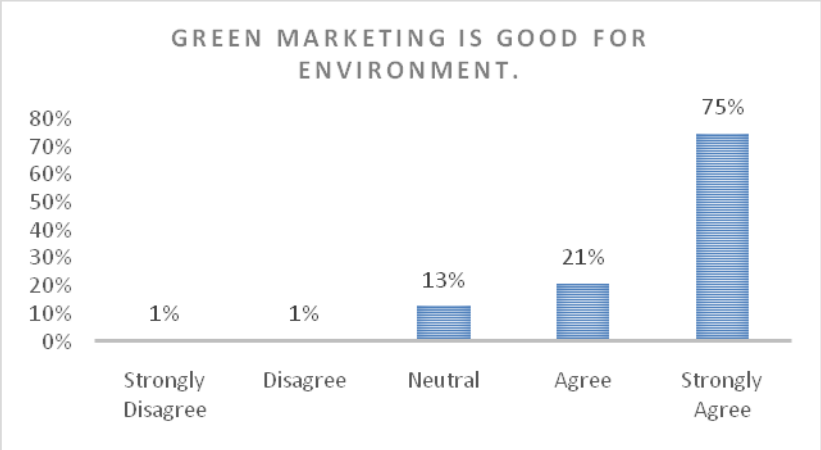
Question 2: There are several types of eco-friendly chemical products which you might have bought in last 4 months. According to scale from 1 to 5, mark to what extent you purchased eco-friendly chemical products in last 4 months?

The graph shows the trends how excessively the consumers buy chemical products. Cosmetics, toilet cleaners, domestic use chemical products and raw chemicals are all used on daily basis by a number of people.

4.3. Measure of Perception about Green Marketing and Consumption of Chemical Products

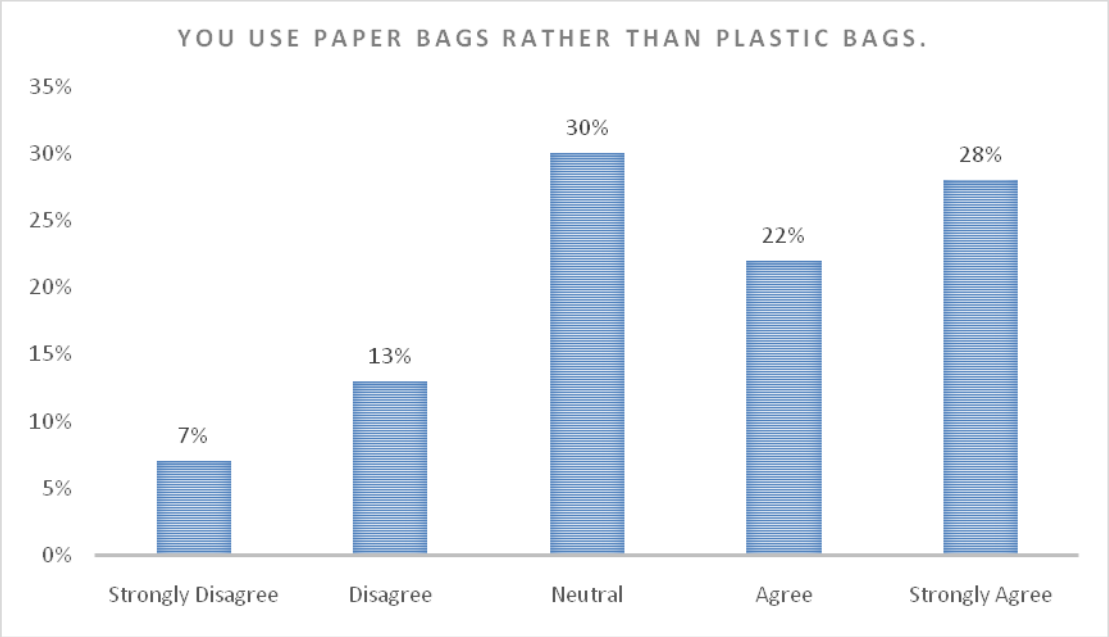
Section 2 of the survey questionnaire demonstrated the perception of the people regarding green marketing and their consumption of chemical products side by side with green marketing. Answers are marked by the respondents according to the extent to which they agree or disagree to the statements being questioned from them. Give below are the questions and analysis performed on them.

Question 1: Green marketing is good for environment.



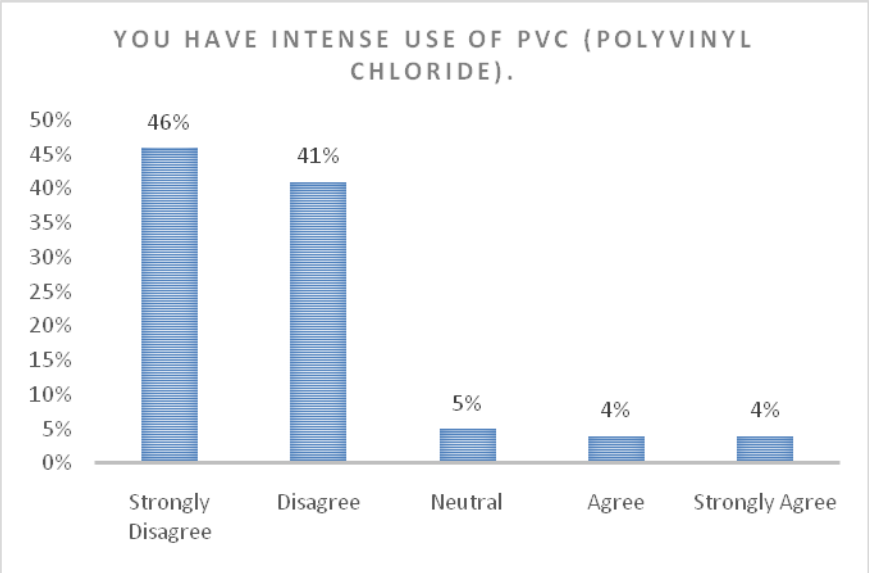
Green marketing is good for environment. 1% strongly disagree, 1% disagree, 13% neutral, 21% agree and 79% strongly agree.

Question 2: You use paper bags rather than plastic bags.



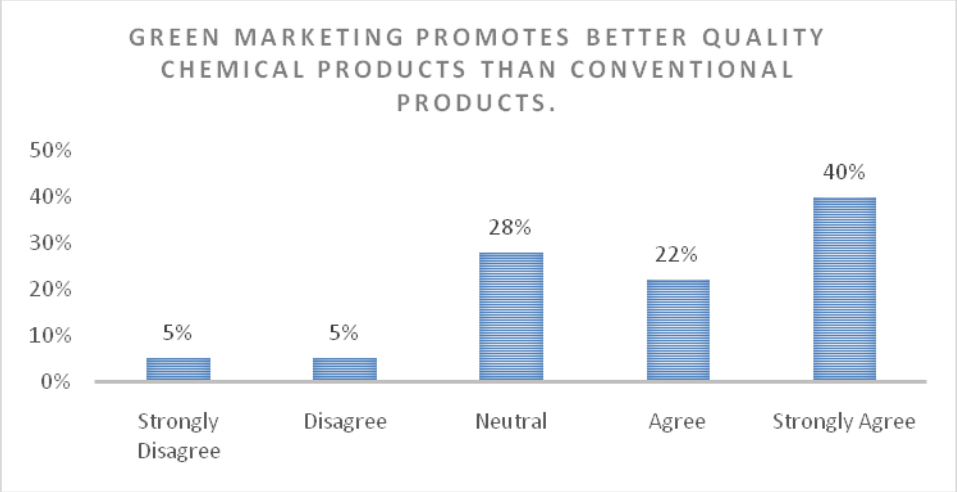
Respondents use paper bags rather than plastic bags 7% strongly disagree, 13% disagree, 40% neutral, 22% agree and 28% strongly agree.

Question 3: You have intense use of PVC (Polyvinyl Chloride).



Respondents have intense use of PVC 46% strongly disagree, 41% disagree, 5% neutral, 4% agree and 4% strongly agree.

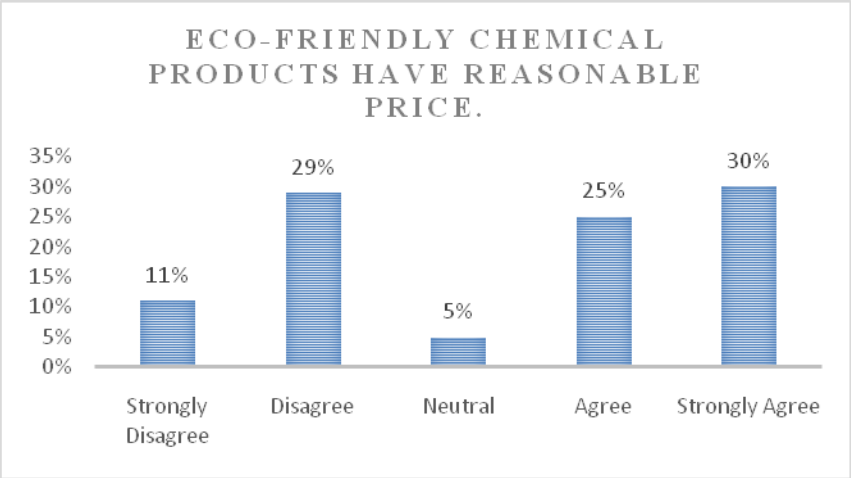
Question 4: Green Marketing promotes better quality chemical products than conventional products.



Green Marketing promotes better quality chemical products than conventional products

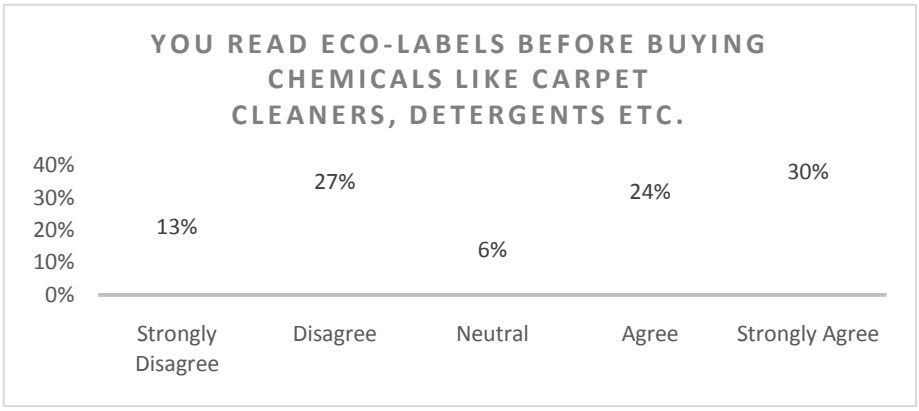
5% strongly disagree, 5% disagree, 28% neutral, 22% agree, 50% strongly agree.

Question 5: Eco-friendly chemical products have reasonable price.



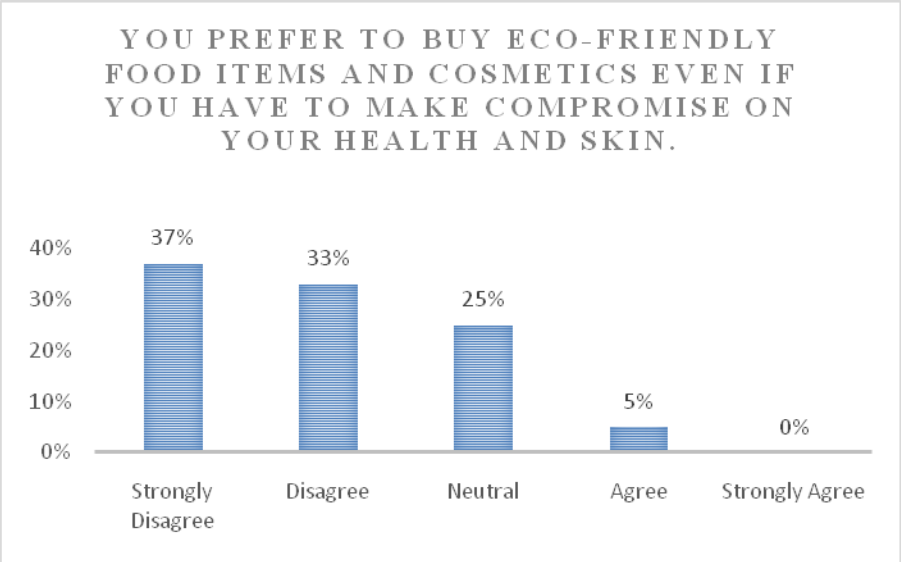
Eco-friendly chemical products have reasonable price 11% strongly disagree, 29% disagree, 5% neutral, 25% agree, 30% strongly agree.

Question 6: You read eco-labels before buying chemicals like carpet cleaners, detergents etc.



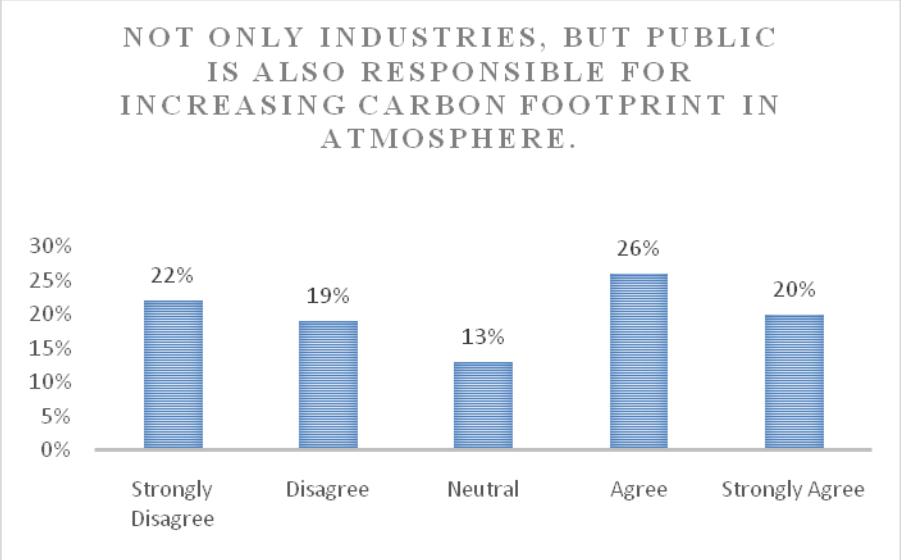
You read eco-labels before buying chemicals like carpet cleaners, detergents etc: 13% strongly disagree, 27% agree, 6% neutral, 24% agree, 30% strongly disagree.

Question 7: You prefer to buy eco-friendly food items and cosmetics even if you have to make compromise on your health and skin.



You prefer to buy eco-friendly food items and cosmetics even if you have to make compromise on your health and skin: 37% of the respondents strongly disagree, 33% disagree, 25% neutral, 5% agree and 0% of the respondents strongly agree.

Question 8: Not only industries, but public is also responsible for increasing carbon footprint in atmosphere.



Not only industries, but public is also responsible for increasing carbon footprint in atmosphere: 22% of the respondents strongly disagree, 19% disagree, 13% neutral, 26% agree and 20% of the respondents strongly agree.

4.4. Analysis on Attitude

Section 3 of the survey is named as Attitude Measure. This section helps to demonstrate the attitude and behavior of consumers of chemical products regarding green marketing. This section further show concerns of our respondents towards the carbon footprint, eco-friendly chemicals and their advertisements. Detail is given below.

First of all, respondents were asked whether they appreciate green marketing or not. All the respondents i.e. 120 (100%) respondents gave answer into "YES", they appreciate green marketing. None (0%) of the respondents gave answer of "NO".

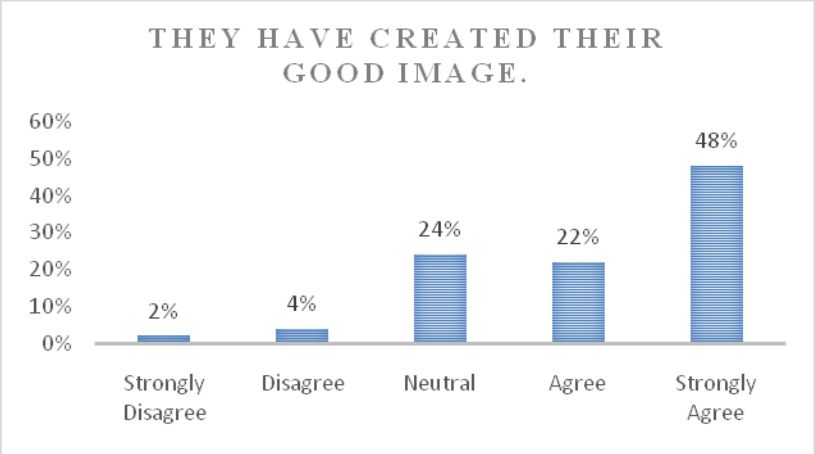
In a similar way, respondents were asked would they be ready to pay a premium price (for example +10%) for green marketing products. Responses were collected. 72% respondents gave answer into "YES" while 28% respondents gave answer into "NO".

Last question of this section was whether the respondent was very much concern about the carbon footprints in environment. 89% of the respondents gave answer into "YES" while 11% of the respondents gave answer into "NO".

4.5. Analysis for Reasons of Purchase

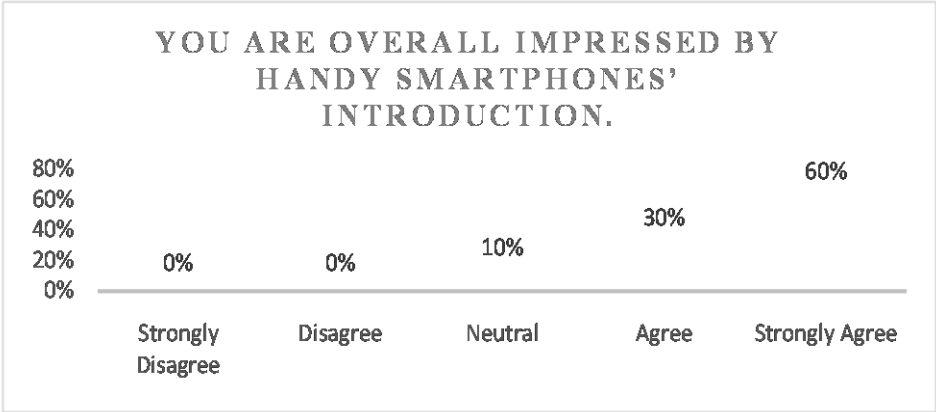
In the section 4 of the questionnaire, respondents were collectively asked that why would they prefer to purchase green marketing chemical products. The options set were strongly disagree, disagree, neutral, agree and strongly so as to check the strength of each reason of purchase of green products.

Reason 1: They have created their good image.



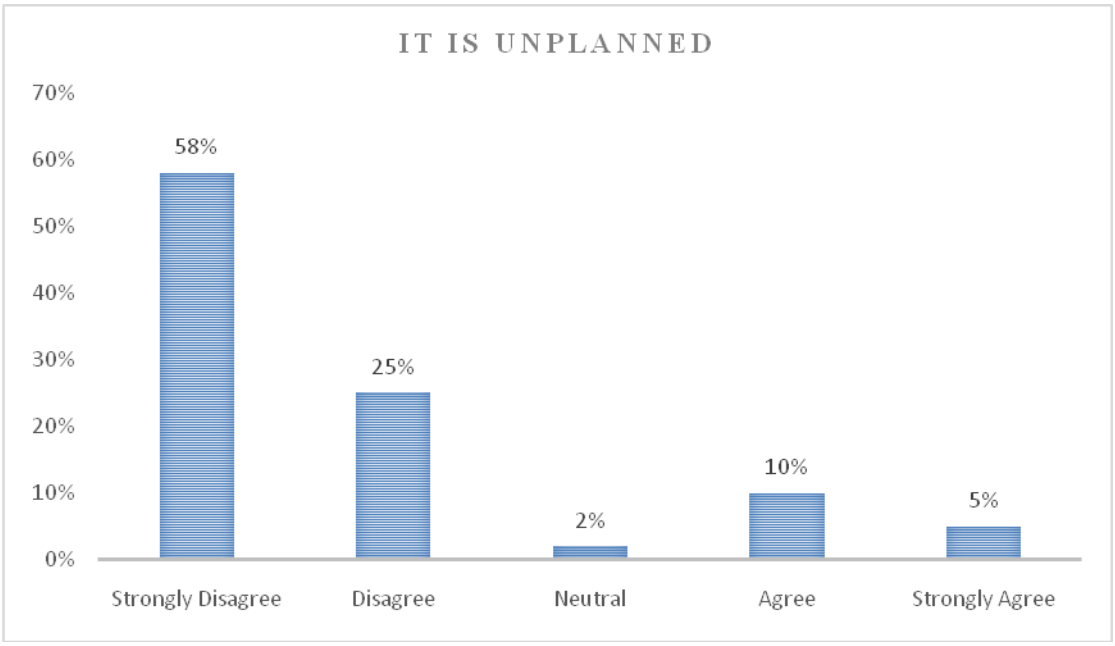
Green marketing chemical products have created their good image: 2% of the respondents strongly disagree, 4% disagree, 24% neutral, 22% agree and 48% strongly disagree.

Reason 2: I think chemicals are a HUGE cause of carbon footprints in atmosphere and I want the planet to be preserved.



Respondents think chemicals are a huge cause of carbon footprints in atmosphere and they want the planet to be preserved: 0% strongly disagree, 0% disagree, 10% neutral, 30% agree, 60% strongly agree.

Reason 3: It is unplanned.



It is unplanned: 58% of the respondents strongly disagree, 25% disagree, 2% neutral, 10% agree and 5% strongly agree.

The results for last 2 conclusive questions are estimated and shown below:

Variable	Mean	St.Dev	Variance	Sum	Minimum	Maximum	Mode
Rate (out of 10) how successful you find green marketing of chemicals in fulfilling your desired requirements.	7.84	2.12	4.48	927	2	10	7
Rate (out of 10) to what extent you find green marketing chemical products successful in preserving environment.	8.4	1.69	2.87	913	1	10	6,8

Table 2: Results of two conclusive questions.

5. Effectiveness of Green Marketing in Chemical Industries

Now, many chemical industries have understood their responsibility of preventing environment from such harms. As a result, the production and manufacturing have become more clean in companies like Dow Chemicals, Sinopec, SABIC, DuPont, LyondellBasell, BASF, Bayer and Air Liquide. Chemical production is becoming greener. They are doing so since they have realized that they can make profits along with producing green products (Hart, 1997, p.67). Green marketing is giving great opportunities to chemical industries to make difference and at the same time, be successful (Grant, 2007).

Chemical industries have caused many problems to the societies and they still do. So it is importantly known that business plays vital role in overall upbringing of sustainable society ecologically. Multinational chemical industries like BASF, Sinopec and other companies affects the economy of world. They do have the resources which they can put together to bring ecological solutions into practice (Tjarnemo, 2001).

Chemical industries for example INEOS, Royal Dutch and Bayer are responsible for developments in their institutes to the increasing sustainability. They are adopting the strategies of becoming greener. The objective behind is to build up a market for more eco-friendly products and services and influence the consumers to change their behavior (Hart, 1997). Cost saving along with market opportunity potential are the two aims that these industries gain after selling more environment friendly products. These chemical industries like AzkoNobel and Solvay reduce their capital spend for raw materials and minimize the utilization of energy for manufacturing. By offering more environment friendly chemicals, these industries may increase their shares in market and more importantly, they may be able to improve their image (Tjarnemo, 2001).

5.1. Green Consumer

Peattie, in 2001, defined Green Consumer as:

"…someone who voluntarily engages in consumer practices that are regarded as environmentally friendly by marketing academics and practitioners." (Peattie, 2001)

Eco-friendly activities are energy-efficient processes. They are controllers for pollution and allows recycling of materials (Armstrong and Kotler, 2007, p. 509).

5.2. Eco-labels on Chemical Products

Eco-labels act as an essential tool in green marketing which have an ultimate effects on the behavioral activities of the chemical industries. This is a significant step taken by the chemical industries to highlight the eco-labels on their chemical products. Eco labels show all preferences regarding the environment along with the range of the products. Hence, eco-labels are defined over the products which claim that they have been designed to ensure the safety of our environment. Certain standards have been followed by the company to ensure environmental security. Eco-labels are very important for chemical products like cosmetics, medicines, detergents and pesticides. Following image shows som eco-labels present on the chemical products like cleaners, detergents, domestic chemicals, raw chemicals to ensure that they create less harm to environment and cause minimal carbon footprints in the environment.

Fig 8: Eco-friendly labels

Fig 9: Eco-friendly label on carpet cleaner.

This is the basic successful strategy that helps chemical industries to increase their market share along with maintaining their good better in front of the consumers. These industries print eco-labels that have mainly three components:

- Certification standards
- Independent accreditation body
- Independent certification bodies.

Third-party certifications are usually demanded by schemes of eco-labels. The certification is about the product who has achieved the predefined standards and also ensured strict compliance with the procedural standards. As a result, correctness of eco-labels is said to be true and the claim of eco-label is accepted globally (European Commission Homepage).

5.3. Eco-brand

Brand is represented as a name, symbol, design and collection of all these that help to recognize the goods and services of an organization and further it distinguishes one organization from the other. Same is the case with eco-brands. Eco-brands are the brands that serve in a way, that do not harm the environment. Their products and services are eco-friendly. Application of the eco-brands may distinguish green company from non-green company (Delafroz, Taleghani and Nouri, 2014). Consumers will go for environment friendly products and relevant choices. They have high level of impact on the environment sustainability. Customers consider carpet cleaners, glass based and other house hold cleaners as harmful substances for the environment (Rahbar and Wahid, 2011). This could be the reason that people show positive attitude towards the purchase eco-brands' products. Researches have been made in western countries regarding eco-brands. They showed that customers at Germany and USA have positive behavior towards the purchasing decisions of eco-brands' products like green energy (Wustenhagen and Bilharz, 2006). Eco-labels should play vital role in building up good impression that consumers may interpret positively. Typical marketers and researchers lay down great emphasis on the impact of brand names and symbols on the buying decisions of the customers. This is even taken as brand equity. Awareness of brands somehow influence the reactions of customers and views of consumers. This is called as brand equity. Green brands should deliver a message to the consumers that their products and services work in a same way as non-eco-friendly services and products do. In addition to this, these products and services provide guarantee for the safety of environment which results in safety of planet from excessive carbon footprints. This way brands shall be able to satisfy customers and they will go for the purchasing of eco-brands' products with confidence. Consumers who feel that humans are much responsible for changes in climate, tend to buy more the services of eco-brands. They are connected to them through emotions that they want to save earth from carbon emulsions and pollution (Rahbar and Wahid, 2011).

5.4. Green marketing and Eco-Management in Chemical Companies

Eco-Management is the collection of crucial eco-activities taking place within the management levels of the companies. Eco marketing cannot be known as sustainable in an ecological or economical way if it lacks in eco-management. So it is how important an eco-marketing is. The positive image of a company may easily face a problematic decline if it takes risk of inappropriate, inconsistent, false and inaccurate green marketing management. Hence, eco-marketing and management largely depends on each other and shows the link between company and its products, especially in the case of chemical companies.

5.5. Industrialization

Earth's ecosystem is facing great pressure due large consumption of the people and huge levels of production every single day. Present conditions of environment has been worsened too much that it will not only require technical solutions to become stable, rather behaviors of citizens also needed to be changed for this purpose. There is a need to change behavior of the companies, societies, policy makers and consumers. Before 1980s, focus was limited to local environment only. However, it has been expanded to huge gates and now focus is made over environment globally, through a huge spectrum of communication. Such issues to be focused are like global warming, emphasized in social, economic, technical and legal way (Tjarnemo, 2001).

5.6. Green Product Development in Chemical Industries

Development of green marketing chemical products is not about manufacturing products that are eco-friendly. Rather it is a drastic change in the thinking structure of society; the producers, the consumers, the developers, the market, the governments, the nations and

general commercial structures. These actors will pursue the green development after they search the meaning of greening in wide and deep way.

Sustainable development is a vision at macro-level. It show guidance to more sustainable society in future, focusing largely on green marketing (Tjarnemo, 2001). Industries follow the policies of eco-sustainability to achieve a sustained atmosphere and increase profits. Development of green chemical products globally is a great challenge and as well as an opportunity. Chemical Industry can avoid pollution by removing its wastes before the product is manufactured. Industries that have prevented these wastes before production have basically done green environment development. Such chemical industries do preventions by recycling, biodegradable packages and energy efficient processes (Armstrong and Kotler, 2007).

Nestle works to minimize the utilization of such things that are not safer for environment by increasing the use of water and energy so that natural resources may be preserved (Nestle, 1999). Furthermore, chemical industries can take steps to reduce impacts on environment through the life cycle of production of products and decrease costs. Several chemical industries are following designs of eco practices. This includes such designs of products that are easily recycled, so that atmosphere is sustained. Moreover, chemical industries bring innovative technologies to broader up their sustainability vision which would function like a guidance for the future (Armstrong and Kotler, 2007).

Green developments been made are a consequence of awareness created into the minds of people after experiencing the degradation of environmental resources in the world (Bridges, 2008). Green development is modifying the manner in which industries carry out activities by integration of rest of all activities and principles that whole industry must follow. Hence in green development, decisions made not only depend upon business profits, rather they also depend upon environment safety measures (Grant, 2001).

5.7. Greening in chemical departments

Green chemical are manufactured by utilizing environment friendly resources which are sustainable. Product's life span is taken into account along with the consideration of preservation of planet. Eco-friendly productions requires eco-friendly resources at all stages of production; from management to obtaining raw materials, producing chemical products, designing and packaging and distribution to the market.

5.8. Environmental advertisement by Chemical industries

Awareness of green movements in essential. It should be made globally and public attention shall be raised by chemical industries. Chemical organizations mainly choose to make green movements through newspaper ad media. They are the tools to promote green marketing. Green advertisements allow the chemical industries to put an impact on the purchasing power of the consumers to purchase environment friendly chemical goods. Green advertisement at the same time shows to the consumers that their purchasing decisions are so much beneficial for the atmosphere since chemicals are the great cause for the hazards in environment (Delafrooz, Taleghani and Nouri, 2014).

There are three elements of environmental advertisements. The chemical organizations begin a statement related to the atmosphere. At second step, chemical industries' management demonstrates the concerns related to safety of environment that is expected to be achieved after green advertisement (Rahbar and Wahid, 2011).

6. Chemical Industries and reduction in Carbon Footprints

Chemicals are important for the modernization and healthy living standards. At the same time they are essential to deliver less carbon economy. Industries are constantly reducing their GHG emissions. At the same time these industries help out others to reduce carbon emissions from their functions. Many solutions have been produced till now.

The chemical products allow the living standards to get modernized. These products include huge range of goods, starting from computers to fuels, detergents, cleaners, cars, clothes, bulbs, raw materials and construction materials. Global chemical industry has already been found to choose a good track to minimize the GHG emissions from its sector. In addition to this, it is working to bring more improvements in this department. Chemical energy efficiency has been reported to have a decrease of around 30% in last 20 years' time period. Further researches shows that some known chemical industries usually save 2 tons of GHG emissions for every ton of GHG emitted. If these savings were not made, then world could have faced 11% more greenhouse gas emissions during 2005.

6.1. Chemicals involved in carbon saving

There are some chemical products that allows to save carbon. Some examples of such products are as under:

- ✓ Fertilizers
- ✓ Building insulation
- ✓ Low detergents
- ✓ Biofuels
- ✓ Chemical components for turbines
- ✓ Chemical components for cars

Future utilization of these chemical resources would lead to greening the economy and initialize another percentage of decrease in carbon footprints. According to researches, if global framework policies will be followed, then there will be increase in GHG emission saving. This increase will be around 4 tons for each ton of emission from the chemical industry.

Cars' and planes' chemical components save up to 230 million tones of GHG. The carbon footprint can further be minimized by this sector if they start using lighter weight components of plastics. The car's weight will be decreased and greening effect will be produced. The large router blades on the turbines are ultimate product of chemical industries. They are more efficient device that act as solar panels. These components are valuable since they become a source for production of renewable industries. In addition to this, they save up to 100 million tons of GHG emissions. Insulator foams are yet another product of chemical industries that allow to reduce carbon emissions from the buildings. They help to save up to 2300 million tons of carbon emissions. This is a huge amount to be considered. Fluorescents lamps are excessively in use today. They have replaced past technological bulbs and lamps and have proven themselves as more efficient. Fluorescents bulbs save up to 700 million tons to carbon emissions. Fertilizers, in a similar way, help to reduce devastations of crops. They increase fertility of the land. They save up to 1600 tons of carbon emissions. These values are represented in the able below:

Chemical Industries' Products	GHG emission savings (million)
Chemical components for vehicles	230
Rotor blades for wind turbines	100
Insulation foams for buildings	2400
Fluorescents lamps	700
Chemical Fertilizers	1600

Table 3: Chemical industries products and GHG emissions savings

It is predicted that by 2030, the demand for chemical products will be increased globally. If global agreements are not made, then tremendous carbon emissions will be faced by the world. The carbon emissions will be doubled. The carbon emissions are ultimately

not reduced but are leaked somewhere else. This is carbon leakage. The carbon emissions are relocated. There are improvements made in the sector of chemical industries. All economies are taking measures to minimize carbon footprints. This even cost them too much. Such expensive processes are carbon capture and storage and many more. If carbon emissions saving components of chemical industries are used in wider range, then the organization will achieve to save 4.7 tons of GHG for 1 ton of their own industry's carbon emissions.

6.2. Policy Recommendations

Several recommendations can be made in this regard. Government should made some policies that prove to be successful in achieving sustainability. Policies shall be designed in following ways:

- ✓ A framework shall be designed that covers all the carbon sectors.
- ✓ Such opportunities shall be emphasized, that result in most effective methods of carbon footprints reduction. Those methods shall also be costing less.
- ✓ New innovative technologies shall be developed and implemented.
- ✓ Attractive incentives shall be provided to the chemical industries that reward the companies who work to the utmost to reduce carbon footprints and preserve Earth from emissions and climate changes.
- ✓ Give directions to the companies so that they may be able to use feedstock and energy. This will lead to sustainability.
- ✓ Waste policies shall be made. These policies shall set some necessary rules to dispose off waste materials. They shall also include recovery and recycling of waste materials so that they may cause less pollution.

6.3. Estimation of Carbon Footprint of Global Chemical Industry

With the passage of time, there is increase in the carbon footprints worldwide. Gas emissions is increasing. Researchers have worked hard to explore all possible solutions to reduce the carbon footprints. Many global environmental organizations focus on the chemical industries because they are a great cause of environmental hazards. Several approaches are available that allow reducing carbon emissions. However, exact amount is still unknown by which reductions can be made.

SRIC has estimated the carbon footprints amount through the chemical industries. 95% of the emissions of chemical industries has been caused due to 71 products. World Petrochemical Programs perform functions to demonstrate the carbon footprints for different products.

6.4. Industrial Biotechnology

Industrial biotechnology is considered as an effective solution for changes occurring in environment. After the excessive industrial revolution, there has been growth in negative impacts over the environment. Emerging technology breaks down the potential of resource consumption. This is a great challenge that motivate people to re think over traditional methods. In such circumstances, industrial biotechnology provides choices for performances of chemical industries. They could improve their economy and at the same time save energy and decrease production of waste. Carbon dioxide can be reduced its emissions can be reduced, and energy could be saved through biotechnology. Several studies have been conducted in regard of impacts of industrial biotechnology over the chemical industries to help stabilize the climatic changes. For example the OECD report and EuropaBio report of year 2009. They demonstrate the impact of biotechnology on the

climatic changes and sustainability. Industrial biotechnology helps to prevent 33 million tonnes carbon dioxide every year with the help of different kinds of applications.

6.5. Industrial Biotechnology and Biobased economy

Industrial biotechnology is also termed as white biotechnology. Enzymes and microbes are used to produce biobased products. These biobased products are diverse in a similar way like chemicals, detergents. Effluents, agricultural products and organic waste materials are transferred into other materials. Similarly, crude oil is an essential raw material for the manufacturing of chemicals.

Heavy manufacturing processes in chemical industries use fossil fuels in huge amounts. This consumption releases extensive amounts of carbon emissions. In contrast to it, in bio based production, use of fossil fuels is minimized. Hence, in other words, biotechnology makes promise of preventing fossil fuel resources as raw materials. However, in some situations, it competes with edible feedstock. In order to give a solution to this problem, second generation biofuels have been introduced. Non-edible biomass has been used for the this purpose. It acts as a feedstock. In addition to this, various intermediate products come across the chains. They consequently increases the complexity during the process of examination of biotechnological products.

6.6. Progress in biotechnology and Greening the economy

The production of biofuels, biochemical, food and detergents has been using industrial biotechnology for many decades. There has been an increase in the production of bioethanol for the purpose of biofuels. Its annual rate of growth is 11%. From 2008 onwards, Brazil is considered as the peak producer of bioethanol. Brazil has a desire to achieve independent energy. Furthermore, biopolymers are gaining power of production.

It is not sufficient to produce products using biotechnology. Besides this production, products' quality and capacity, quantity and market share, all have to be improved and innovations are needed to be made always. Sugar resources often result in building blocks of chemicals. These platforms are illustrated in the figure below:

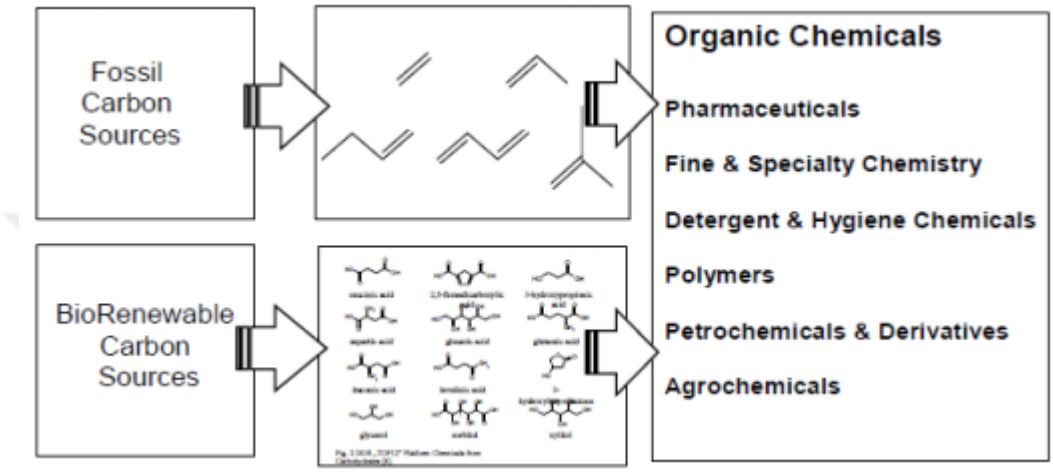


Fig 10: Biological intermediates substituting building blocks of petroleum, (M. Kircher, OECD Workshop on "Outlook on Industrial Biotechnology", 2010).

It is expected that in future, polymers and polyesters can be synthesized. This can be made possible by using fumaric acid, malic acid and other such substances. When biotechnology applications increase their sustainability, the relevant biotechnology also changes itself. The combinations of biology and chemistry applications creates the grounds that develop further new applications of this field. As an example, suppose that a certain area is a field of biopolymers. It is expected that sugar consumption is increasing. Hence, there will be a leading competition between bio-chemicals and biofuel industry. It is better for biotechnology not to compete with biomass for manufacturing of food.

6.7. Importance of converging technologies in chemical sectors

Policy makers have illustrated the significance of approach of converging technologies. Increasing modernization and advancement of convergent technology is capable of

making improvements in performances and production. This can lead to obtain efficiency, better health care approaches, sustainability and stable climate changes. Clean technology and expressions of consumers, has stimulated the development of green technology. Although it has taken the time, but result is more effective and more sustainable.

6.8. Biotechnology putting impact over the climatic changes and carbon footprints

Climate changes can put dangerous impacts on the weather conditions all over the world. Landscapes could be ruined. There could be extreme disorders in the processes of agriculture all around the world. Moreover, climatic changes can increase the scarcity of valuable resources like fresh drinking water.

In has been proven that biotechnology is vital for decrease in carbon footprints.Novozymes, whether they are branded or not, are a cause of carbon footprints, emitting 1 million tones of carbon dioxide during the functions of production.But at the same time, it helps to save 28 million tones of emissions. Hence, very huge emissions have been saved with the help of enzymes during the functions and activities of manufacturing. Consequently, a good, positive balance sheet of environment and climate can be obtained with the passage of time. According to some studies, it has been revealed that biotechnologies holds potential to reduce carbon footprints up to 1 million tones annually. Many products that were manufactured under the influence of biotechnology, are in excessive use today. They are fulfilling our requirements in an effective and sustainable way. Whether the products are fabrics, detergents or chemicals or any other domestic chemical product, the compromises on future are not made using these products if biotechnology has been used. The enhancements in bio-fuels ensures the safety of environment in future, free of carbon footprints. However, efforts and resources, time and capacity is required to develop products under biotechnology. Lesser carbon fuels address the problem of environmental instability. The topic of major sectors of chemical industries are capable of reducing cost and avoid greenhouse effects, is still indisputable.

Steam energy is usually used to carry out the processes of synthesizing chemicals. Processes of fermentation require electrical energy. As compared to the chemical processes, electrical energy using processes are more sustainable and saves energy on fossil fuels and non renewable resources. This way volatile organic compounds are also used in less amounts. There are some examples of chemical products whose manufacturing can help avoid pollution and carbon emissions. They are as under:

- Detergents

  Detergents used nowadays are very effectively using enzymes as a tool to remove strains and dirt from the fabric. With the help of enzymes, strains can be removed using cold water. Hence, energy bills are cut down in this way. 10 degree washing temperature can cause 100gms of carbon emissions. Therefore, each was can save 100gms of carbon emissions if these biotechnological detergents are used. The toxicity of detergents is also minimized during their production. Therefore, the waste water obtained after washing the clothes, is more eco-friendly than the traditional detergents.
- Cotton Fibers

  The dyeing of cotton fibers utilizes the chemicals. Those chemicals are now substituted with the enzymes. This saves water and energy collectively. In addition to this, cotton gains more strength with the substitution of enzymes because they are less harsh for the fiber.
- Paper Manufacturing

  During the production of pulp (for paper production), chlorine dioxide is used for the purpose of bleaching. Chlorine dioxide is not eco-friendly. It is replaced by enzymes. The process has become more eco-friendly. It also reduces the amount of energy required for bleaching. Consequently, lower carbon emissions are experienced.
- Pharmaceuticals

  Vitamin B2 is manufactured using enzymes rather than extreme chemical reactions. Hence, biotechnology is an environment friendly technique.
- Bioplastics

NatureWorks manufactures biotechnological plastics. They are used for packaging. Packaging is applied over clothes, goods, cosmetics and electronics etc. Disposable cups and plates are manufactured using biotechnology. They eliminate carbon emissions and GHG. Bio-based plastics do not decrease use of fossil fuels. Less energy is consumed.

7. Conclusion and Recommendations

This section will give answers to several questions this thesis was based upon. This section will ultimately conclude various aspects of study. Moreover, implications on the part of management has been suggested. Future discussions are highlighted so as to provide better approaches for new innovations. Lastly, green environment promotes desired environmental action that were the ultimate target of green advertisement.

7.1. Practical Implications

Management working for marketing of products should have concern for the increasing value of environment-friendly products. To repeat or increase the purchases, consumers focus upon the end value of the chemical products of industries. Customer's satisfaction have an impact over their purchasing decisions. Therefore, management should work to identify customers' needs and requirements and accordingly make strategies for their businesses. This way they may produce environment friendly products. Brand loyalty, market sales and shares are achieved after fulfilling the customer's satisfaction. According to various studies, consumers of products are, to much extent, concerned about the safety of the environment (Leonidos et al. 2010, p1337).

It is surprising to say that characteristics of products and items are less influential on the purchasing power of the green products. This might be true because many customers purchase green products in order to save and preserve the planet (Solomon et al., 2010, p. 208). Besides all this, compromise should not be made over the quality of the products. This is essential because quality and price are inter related in the view of consumers (Kotler and Keller, 2009, p. 421), while making the decisions of buying chemicals. Consumers not only demand for green products but also the quality of chemicals. Some green products have comparatively low quality than the conventional products. Consumers often don't make so much compromises on quality for the sake of preservation of environment.

7.2. Managerial Implication

Our activities throughout the thesis reveal that past satisfactions and advertisements influence the purchasing behavior of the consumers of chemical products. Consumers having certain income, tend to buy on unplanned basis. Hence, supermarkets should be displayed with more greening displays so consumers may be attracted and make unplanned purchase. Young people are more likely to pay attention towards green marketing hence strategies should be made to bring their attention towards green chemicals' products (Kotler and Keller, 2009). Managers should examine the feedback of customers and performance of the chemical products. This will help managers to build new innovated strategies for production and marketing of chemical products. People who have more knowledge about the green marketing, they tend more to buy green chemical products. Therefore, managers should be able to make effective packages because the more the consumes understand the marketing, the more they know that green marketing chemical products are good for safety of environment. Moreover, managers should not neglect the place and product quality. Special emphasis should be made on place. Managers should make innovations on the sight of displays so that larger number of consumers are attracted to the sight of green chemicals.

7.3. Attitudes and Purchase Intention

Survey analysis reveals that functional theory of the attitudes is not influential in the intention of purchase of green chemical products. Further we explored that people do not buy products to gain others intention towards them. In addition, survey revealed that it is not even unplanned. Rather, they buy green marketing chemical products in order to make an effort to preserve the planet they live on.

In addition to this, our survey explored that quality plays an essential role during the purchase of products. As analysis of survey explains, consumers want to make less compromise over the quality for the sake of preservation of the Earth. Especially, lesser compromise is made on the quality of food items and cosmetics since they are directly connected to the biological factors of the consumers. Hence, minimum compromise is

made over the quality of food and cosmetics. However, compromises over the quality of the chemicals of domestic use (like detergents, toilet cleaners and carpet cleaners) are acceptable sometimes for the sake of the preservation of the planet. However, our analysis shows that green marketing chemical products are also good in quality. Consumers are satisfied with the quality of the green marketing chemical products. We suppose that consumers buy green marketing chemical products for other major reasons rather than the quality. They buy mainly because they are safe for the atmosphere and result in less carbon footprints in environment. This shows that consumers have more unselfish intention and lesser selfish intention (Kotler and Keller, 2009).

Analysis revealed that Information on green packaging and green claims have an impact on the consumers. People face tremendous hazards of increasing carbon footprints. These experiences led them to make effort to save Earth. They do this by buying green marketing products especially the chemical products because they tend to cause greater harm to the environment.

7.4. Recommendations and Future Plans to Reduce Carbon Footprints

Researches have been made and researchers have come up with various ideas for reduction of carbon emulsion from chemical industries. Industrial Biotechnology, as discussed in above section, is influential to have control over the increasing emulsions of carbon from industries. Biotechnology can help to save Earth from 2.5 billion tons of carbon dioxide. According to WWF, it can help to build up a sustainable future. People around the world continuously debate on decreasing carbon dioxide dangerous emissions. In doing so, people around the world are willing to make global agreements that may help to keep the planet away from dangerous effects of carbon dioxide.

Report has been published recently in Denmark by WWF. Accordingly, by 2030, potential has been identified to be 1 billion to 2.5 billion per year. It is more than the value suggested in the report of Germany in 1990.

Industrial biotechnology has already been in wide and excessive use today. Biogas can be extracted from waste materials and waste stream waters. This could help in reduction of carbon footprints. In future, these technologies are expected to be used even one step further and this will result in closed loop system in chemical industries. Bio refineries shall be increased in number so that the bio based waste materials can be transformed and stored at one place. This can be helpful to produce other various bio based objects. Such processes can decrease carbon footprints up to 633 million tons.

There are four dimensions of biotechnology industrially. They are as under:

- Increased efficiency
- Fossil fuels' substitution
- Oil based materials' substitution
- Creation of closed loop systems

Conclusively, politicians of different nations should set rules and policies for green economy. They should bring attention of their people towards the safety of earth. However, solution is not that much easy. If followed, then this procedure will require sufficient time and cost. But ultimately, results will be beneficial for all (John Kornerup Band, 2009).

European Union's chemical industries face additional pressures of preservation of planet from carbon footprints. European Commission even gives the prescribed outline of trading period for chemical industries. The prescribed outline encourages sustainable environment. Increased number of sectors has been set up in order to decrease the carbon leakage. More than 90% of the emissions will stay within those systems which were built for carbon leakage.

In addition to this, government should keep on funding EU member states to renew energy resources like solar energy. If solar energy will be renewed, then chemical industries will ultimately utilize solar energy and avoid using fossil fuels. Consequently, there will be decrease in carbon footprints. Government should set up overall goals for reduction of carbon footprints from atmosphere.

In order to purify future from carbon footprints, it is important to implement solutions like mentioned above. If not done, then with the passage of time, chemical industries may start losing their customers' support and satisfaction. Chemical industries shall invest in the development of sustainable environment. This will allow them to seek customers' support.

7.5. Conclusion

The study has gone through many aspects of green marketing and its connection with reduction of carbon footprints in chemical industries. Chemical industries manufactures different products like toilet cleaners, carpet cleaners, cosmetics, detergents and raw materials for other products. Sustainability of Earth is a great topic under discussion globally. To promote sustainability, green marketing is essential. It is playing significant role in promoting sustainability of Earth. Various types of chemicals have various uses. Survey questionnaire revealed that consumers purchase chemical products on regular basis. They are also very much concerned about the preservation of planet and normalization of Earth. This is the reason why they purchase green marketing chemical products.

Analysis show how much people influenced from advertisements, displays and marketing of green chemicals. All these factors help them to formulate their purchasing decisions. Therefore, managers of chemical departments should focus on these areas and bring innovations in strategies of marketing and promotion of green marketing chemical products.

Increase in carbon footprints has remained the matter of concern. Hence, chemical industries should follow such strategies, that promote sustainability and decrease carbon emulsions which occur on daily basis due to these industries. This way they will achieve their customers' satisfaction and support.

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Appendix A

Survey Questionnaire

Regarding: Green Marketing and Carbon Footprints in Chemical Industries.

Thank you for your time. It will hardly take 5 minutes to fill in this questionnaire based upon your consumption of chemical products especially that are eco-friendly.

Section 1: Lifestyle Measure

Questions are based upon your consumption of chemical products in routine.

1) How many times (or how often) have you bought chemical products in last 4 months?
    - At least once a week
    - At least once a month

2) There are several types of eco-friendly chemical products which you might have bought in last 4 months. According to scale from 1 to 5, mark to what extent you purchased eco-friendly chemical products in last 4 months?

	Lesser purchased			more purchased
	1	2	3	4	5
Cosmetics					
Toilet Cleaners					
Other domestic use chemicals					
Raw chemicals for new products					

Section 2: Measure of your perception about green marketing and consumption of chemical products

Mark according to the extent to which you agree or disagree to the following statements regarding green marketing.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Green marketing is good for environment.	1	2	3	4	5
You use paper bags rather than plastic bags.	1	2	3	4	5
You have intense use of PVC (Polyvinyl Chloride).	1	2	3	4	5
Green Marketing promotes better quality chemical products than conventional products.	1	2	3	4	5
Eco-friendly chemical products have reasonable price.	1	2	3	4	5
You read eco-labels before buying chemicals like carpet cleaners, detergents etc.	1	2	3	4	5
You prefer to buy eco-friendly food items and cosmetics even if you have to make compromise on your health and skin.	1	2	3	4	5
Not only industries, but public is also responsible for increasing carbon footprint in atmosphere.	1	2	3	4	5

Section 3: Attitude Measure

1) I appreciate green marketing.

- Yes
- No

2) I am ready to pay a premium price (for example +10%) for green marketing product.
   - Yes
   - No
3) I am very much concern about carbon footprints in environment.
   - Yes
   - No

Section 4: Why would you prefer to purchase green marketing chemical products?

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
They have created their good image.	1	2	3	4	5
I think chemicals are a HUGE cause of carbon footprints in atmosphere and I want the planet to be preserved.	1	2	3	4	5
It is unplanned.	1	2	3	4	5

Rate (out of 10) how successful you find green marketing of chemicals in fulfilling your desired requirements.	Rate (out of 10) to what extent you find green marketing chemical products successful in preserving environment.

Section 5: Demographics:

1) Select gender:
   - Male
   - Female
2) Select age:

- 18-25
- 26-35
- 35-45
- Greater than 45

3) Select status
   - Unemployed
   - Employed
   - Student
   - Retired

Thank you!