Chapter 2 - Literature Review

2.1 Introduction

The increasing environmental problems such as global warming, pollution, exploitation of natural resources have forced the consumers to change their attitude and behavior towards the environmental problems. Growth of the economy and consumption patterns of the consumers is the main cause of such problems. A change is, therefore, required in the consumers’ attitude and initiatives are needed to preserve the environment and natural resources.

Consumers as well as organizations have social obligation and responsibility to preserve the environment. This effort to protect the environment must be made at an individual as well as at organization level (Chen & Chain, 2010). Green marketing is the marketing of environmental friendly products without harming the natural environment. It must be practiced by the organizations to have new opportunities, cost advantages, competitive advantage and protection to environment along with other important advantages.

Consumer awareness about the environmental issues and solution to resolve the problem is very important in decision making process. Eco literacy is the knowledge of the consumer about the ecosystem, the causes of its degradation and the measures to be taken to resolve this problem. Eco literacy has an influence over the purchase intention of consumers for green products. The level of knowledge about the environmental issues also influences the decision making of the consumer.

Consumer behavior and attitude also have a significant impact over maintenance of quality of environment. Consumers behave in different ways, their behavior must be judged by the marketers and develop the product accordingly. Consumer attitude also influences the consumer choice and their willingness to pay higher for the green products. The current study is focused upon the green marketing of LED lights and this chapter reviews the existing literature related to green marketing, consumer behavior and LED marketing. The basic concepts have already been introduced in the previous chapter and this chapter will focus more on the empirical studies.
2.2 Green Marketing

Businesses need to evaluate constantly the new and changing marketing trends. Marketing trends can be found out through continuous research on consumer behavior. Consumers prefer environment friendly products and services. The reason for this is environment degradation, global warming and increasing pollution. Businesses also have strong reasons for providing green products to the consumers. Through this, they address environmental issues, satisfies consumers and gain competitive edge over others. The American Marketing Association defines Green Marketing as, “The marketing of products that are presumed to be environmentally safe.” (American Marketing Association, 2011). Polanski (1994) has defined Green marketing as “Marketing that consists of all activities designed to generate and facilitate any exchanges intended to satisfy human needs or wants, such that the satisfaction of these needs and wants occurs, with minimal detrimental impact on the natural environment.” Green marketing is also called environmental or ecological marketing. Green marketing includes making variations in the product, production process, advertising, packaging and other things that might impact the environment. There has been increasing awareness among consumers regarding Green products and therefore, marketers are giving importance to green marketing. Businesses need to follow green practices while dealing with its stakeholders (customers, suppliers, dealers and employees). Whereas, general marketing is defined as the communication of value of the product to the potential buyers, Green marketing is also a similar concept extending on the environment friendly concepts. It is the communication of environmental value of the product, which is produced or packaged in an environment friendly way, to the target audience.

2.2.1 Evolution of Green Marketing

The concept of environment sustainability has made its place in corporate strategies, academic researches, consumers and students’ education. The environmental issues prevailing all over the world has led to the increase in green consumerism and this topic has been well researched due its increasing importance. Green consumerism was first researched in 1970s (Henson and Kin near, 1976). Marketing academicians and practitioners have shown their interest in the impact of marketing on environmental
concerns (Chamorro et al., 2009; Bhattacharya, 2011). Green Marketing is a concept that was highlighted in 1980s and early 1990s. During 1980s, various researches were conducted on green marketing. This literature focused upon the shift in consumer interest towards purchase and consumption of green products and services (Cherian&Jacob, 2012). Green marketing was researched from the corporate point of view in 1990s. It was observed that 92 per cent of the MNCs in Europe changed their focus towards environmental products to meet customer demand (Vandermerwe and Olaf, 1990). Green marketing research has come a long way since that 1990s period. Consumers from developed countries like USA and Western Europe are highly conscious about the impact of the products they buy or intend to buy on the environment (Curlo, 1999). Consumers are willing to pay a higher price for green products and are much aware about the impact of non-green products on environment. But little research has been conducted on the impact of green marketing on consumers from developing countries such as India (Bhattacharya, 2011; Parkas, 2002).

American Marketing Association (AMA) held a workshop on ‘Ecological Marketing’ in 1975. Based on this workshop a book was released named Ecological Marketing. Ecological marking was concerned with the environmental pollution created by the industries and measures taken by them to combat these issues. The similar concern for environment was shown by marketing practitioners and academicians in 1990s which came to be known as Green Marketing (Baker, 2003). Green Marketing gained popularity in 1990s. There has been increasing consciousness among consumers regarding green products. Many companies and consumers have formed their opinions in favor of green products (Mendelssohn and Polanski, 1995). Despite of such interest in environment friendly products, demand for such products are not so high. The consumers concern for environmental issues and demand for green products do not have a significant relationship. Various researchers have observed that green marketing helps businesses to achieve their social objectives (Keller, 1987; Shearer, 1990). Businesses have social obligations towards the society to provide them with environmental friendly goods and follow green production processes (Davis, 1992; Freeman and Liedtka, 1991; Keller, 1987; Shearer, 1990). The purpose of the green product or green service is to improve the living environment and meet customers’ expectations.
Green marketing concepts of holism and sustainability are easy to understand but difficult to practice. Practicing green marketing is a difficult and costly affair as it involves innovations and requires R&D efforts on part of the company. Also, it is difficult to attract new customers due to high price of the product and most of the times customers perceive a difference between green products and regular products. There is limited knowledge among consumers and they lack consensus on the concept of green. It makes difficult for the marketers to adapt green marketing.

2.2.2 Importance of Green marketing for businesses

It is important for the marketers to understand the impact of green marketing on businesses and its customers. The company may benefit at various stages if it delivers good eco-performance. Some of the important factors are as follows.

New Opportunities- It provides the companies new opportunities and markets to the businesses. Tourism and financial services have great scope for green marketing.

Differentiation Opportunities- The green product can be differentiated from other products through its features and helps in enhancing the sales of the company.

Cost Advantages- People are willing to pay higher prices for green products and therefore, the company has cost advantages with eco-friendly products.

Niche Opportunities- Green products have succeeded in the market. Consumers are now aware of such products and are ready to pay a premium price for these products. So, the market for eco-friendly products is expanding and demand for such goods is rising.

Green marketing satisfies consumer demand, provides efficiency, fulfills philosophical objectives and becomes a reaction to the competitors’ action (Polanski and Rosenberger, 2001).

Practicing green marketing by the businesses can provide them with a competitive advantage over other companies. It becomes a Unique Selling Point (USP) for the business which differentiates its product from the products of other companies. Companies need to make efforts to make their production process sustainable. Marketing can make a modest effort to promote the product in the target market to
improve company performance, but market is a concept that touches the lives of the common people and helps the organizations to fulfill their social obligations. Green marketing encourages the users of the product to be sensitive towards the environment. It awakens their enthusiasm to protect the environment and support the company in its efforts (Baker, 2003). Green marketing helps organizations to build a strong customer base by meeting customer expectations (Bhatia and Jain, 2013). Consumers’ increasing concern for the environment has forced organizations to become and project themselves as environment friendly. The Public Sector Units (PSUs) have also started concentrating on measures to protect the environment. As per the survey conducted by National Geographic Society and the international polling firm Globes can (2010), consumers in developing countries like India, Brazil, China are more concerned about the environmental issues and possess green attitude, while consumers in industrialized countries were ranked at the bottom. Consumers in India, Russia and United States are highly concerned for the environment sustainability (Howe et al., 2010). Green marketing gives the consumers a sense of satisfaction that they are contributing towards the environment sustainability. Global competition has made it evident for the companies to adopt green marketing as it differentiates the company from its competitors. The practice of green marketing also helps the companies to avoid media and government intervention. From production to marketing the companies must consider environment to satisfy its stakeholders (customers, society, government, suppliers etc.).

2.3 Green Products and Green Consumers

2.3.1 Green Products

A green product refers to a product that is typically nontoxic, originally grown, recycle/reusable, not tested on animals, not polluting the environment and minimally packaged; and contains natural ingredients, recycled content and approved chemicals (Ottoman, 1998; Pavan, 2010). Green products are the products that do not pollute the environment or degrade it and are recyclable (D&B Reports, 1990). Green products can be anything from personal beauty care products to lead free paints, from recyclable paper to LED lights and so on. Environmental issues have increased and therefore, there is demand for new products, new production processes, new
packaging and designing of products that are eco-friendly. Repositioning of products is also a consequence of environmental concern. For example, sun tan lotions were previously meant for beauty purposes but with increasing ultraviolet radiation and risk of skin cancer, the emphasis has shifted to skin protection. The demand for green products is rising due to increasing environmental degradation. Non-toxic plastic bags, metal free electronic equipments, energy star appliances, organic foods, recyclable paper, lead free paints, biodegradable cleaning agents are some examples of green products.

Consumers and manufacturers, these days, are concerned with the environmental impacts of products. Consumers and manufacturers have started focusing on environment friendly products or green products, as they are called, such as energy efficient appliances, organic foods, recyclable paper, lead free paints, and phosphate free detergents. Consumers and marketers globally are very conscious about the products and prefer environment friendly or green products. A change in consumer behavior has been witnessed as consumers have directed their focus towards curbing environmental degradation and negative impacts of products and services are known to them. Some common characteristics of green products are energy efficient, water efficient, low emitting, safe and healthy products, renewable, durable, biodegradable, reusable, recyclable and locally produced.

The concept of Green Marketing is gaining popularity among Indian marketers also. Various green products are being launched by the companies these days. For example, Godrej is using green marketing to advertise its products and gives incentives to consumers for exchanging their old products with new environment friendly green products. Similarly, Philips is marketing is new Compact Fluorescent Light (CFL) which is durable and energy efficient (Bhatia and Jain, 2013). Many other companies are involved in green marketing. Dell has launched a “Go Green with Dell” campaign under which it produces eco-friendly products and packaging is done in a recyclable kit. From designing to packaging they are focusing towards green innovations. Kansai Neola Paints are making lead free paints and have reduced the hazardous substance from their paints to market themselves as green. Since government has banned the use of plastic bags, companies like Titan and Tarnish pack their products in recyclable paper bags. So, companies are focusing their attention towards their obligations towards society and environment which is quite advantageous for the companies too.
Also, global companies like Wall-mart also follow the concept of green marketing and encourage governments of various countries to adopt green products. Companies have perceived green marketing as an opportunity to achieve their objectives (Keller 1987, Shearer 1990).

Rowland's, Scott & Parker (2003) have studied the perceptions of potential consumers about green electricity. Consumers, these days, have a choice for the supplier of electricity. There are various advantages of Green products for consumers as well as organizations.

Green products are cost effective and efficient- Green products helps saving energy and hence money of the consumers. This encourages the consumer to buy the green product. It makes them feel they are contributing towards the environment sustainability.

Green products are Safe and Healthy- Consumers are concerned towards their health and safety. Green products do not contain any harmful substances and have therefore, become the choice of the consumer.

High Performance- Green products deliver better performance than their alternatives. They last longer and therefore, consumers are willing to pay even a premium price for it. For example, LED lights are a little expensive than regular lighting alternatives but last longer and performs better than other lighting products.

Usage of Green product symbolizes status- Using green products confer status to the user as such products are used by celebrities and actors.

Green products are convenient- Green products are comfortable to use and requires less replacement. This makes the use of green products more convenient for the consumer.

2.3.2 Green Consumers

Consumerism is concerned with protection of consumers against unethical practices. Over the time, this concept has widened and protection of environment became the primary concern for consumers (Donor et al, 2010). This concern for environment has
increased and has led to the development of the concept of “Green Consumerism” (Eriksson, 2002).

A green consumer is one who avoids any product which may cause harm or damage to any living organism and/or cause deterioration of the environment during the production process, consume non-renewable energy most of the times and avoid using products that involves unethical testing on animals or human subjects (Ellington, 1994). A green consumer is a person who is involved in practices that are considered eco-friendly by the marketing practitioners and academicians (Maheshwari, 2014). Green consumers adopt environment friendly behavior and prefer green products over regular alternatives. Shamdasani, Chon-Lin, & Richmond (1993) found that green consumers are more internally controlled, socially integrated and open minded with respect to the environmental products. The green consumers spend more time, money and energy in locating and buying green products. Personal factors such as personality and attitude impact the choice of the consumers. Green consumers perceive no difference between green products and standard products (non-green) on the basis of product attributes and price. Businesses have started understanding the concern of consumers towards environmental issues and therefore, have started offering green products as an alternative to regular products. Studies have also found that women are more concerned about environmental issues like global warming, hazardous wastes etc. than males do. Green consumers perceive environment protection as their responsibility. They seek eco-labeling in the green products which would provide product quality information and information about recyclability (Simmer and Wustenhagen, 2006).

Ryan (2006) stated that International Institute for Sustainable Development (IISD) has described the common characteristics of green consumers. These are:

- Green consumers are committed to eco-friendly lifestyles
- Consider the impact of their practices on the environment
- Look for green products
- Green consumers are eager to learn about the environment issues and measures to prevent them.
- Green consumers want environmental protection to be an easy task and want companies and individuals to take measures to curb environmental problems.
In the past decades, rapid economic growth has been witnessed due to increasing consumerism. This haphazard use of natural resources has resulted in the deterioration of environment. Global warming, depletion of ozone layer, air and water pollution etc. are the consequences of over-utilization of natural resources to satisfy consumer wants (Ramlogan, 1997). Consumer activities of private households are the cause of 40% of the environmental degradation (Grunter, 1993). The developing countries have awakened to the green movement that has been initiated to control environmental degradation. The concept of green marketing was popularized in 1980s and the change was witnessed in the consumer buying behavior. In the 1990s, the environmental problems became the major concern of the public but the demand for green products was not up to the expectations of the marketers. Marketers experienced a backlash with respect to green marketing during this period. The consumers were skeptic about such products and their claims which reduced the demand for green products. In the mid 1990s, the consumers started becoming aware of the environmental issues and their concern for the environment aroused. Green consumerism started to become popular and consumers also started expecting from the companies to be socially responsible (Maheshwari, 2003). Seeing the concern of people towards the environment and rising preference for green products, marketers are strategizing their plans in accordance to the consumer preference to ensure sustainability. Sachem et al (2011) revealed that consumers in urban areas are even willing to pay a higher price for green products. Green Packaging is considered the most important element of green product. Environment activists and researchers feel consumers can contribute towards preservation of environment by buying environment friendly or recyclable products (Abdul-Mulheim, 2007). Personal norm and attitude of the consumers persuade them to buy green products. The consumers’ moral obligations persuade them to act responsible towards the environment and preserve the limited resources on Earth. Government plays an important role in creating awareness among the consumers about environmental problems. Consumers’ awareness guides them to take purchase decisions about green products. Marketers have made efforts to communicate the value of green products to alter the perceptions of the consumer and therefore, the consumers have inclined towards the green products.
Consumers belonging to medium or high income groups are more educated and socially responsible and are likely to act in an environment friendly way (Henson, 1972). There are various factors affecting consumers’ choice of green products such as eco literacy (knowledge about green products), age, gender, income and level of education of the consumers, values, attitude and behavior of the consumer. Cheri an and Jacob (2012) discussed that consumers do not have adequate awareness of green products and hence, the companies are not focusing on producing green products.

2.4 Consumer Awareness about Environment Friendly Products

2.4.1 Price Awareness

Due to increasing awareness about the environmental issues, it becomes a moral obligation for the consumers to consider green products while making a purchase decision. But the characteristics of green and regular (non green products) which makes it difficult for the consumer to choose from. There are various constraints that make it difficult for the consumer to choose green products over non-green ones. Price is one such constraint for consumers. Price is an important attribute of any product. The consumer may experience a bad conscience if he does not purchase a green product. Purchase decisions are affected by the pricing of the product and green products are generally priced high due to high manufacturing cost. But there is a small community of green consumers that is willing to pay a premium price for green products because they are highly sensitive towards the need of the environment. For green products also, price plays an important role in consumers’ buying decision. Most of the times, consumers do not buy a green product if it is priced high (Blend and van Ravenswaay, 1999; D'Souza et al, 2006). But environmentally conscious consumers, that is, more than 80 per cent of Thai, Korean and Malaysian consumers, do not hesitate in buying eco-friendly products even if they are priced high (Dunlap and Scarce, 1991; Lung, 2010). It is suggested that companies must offer environmentally safe products and there should not be any compromise with the quality or price of the product (D'Souza et al, 2006). Consumers, these days, are aware that it is costly to produce an environment friendly product and therefore these are expensive (Bang, 2000). Green consumers prefer only green products and are willing to purchase green products even at a premium price. Consumers are ready to
pay a premium price for the green and recyclable products which are satisfying the customers with regard to the environment while some customers avoid buying green products due to its high price (Chan, 2013). Companies also try to manufacture green products at low prices to gain a larger market share (Manjunath, 2013). Consumers pay more prices for green energy which is a better alternative for electricity generated through non green ways (Rowland's, 2002). Hotels with green label also attract more prices from the customers. People who are highly concerned for the environment and understand that contribution of green products towards the environment are the ones who are ready to pay extra for the green products.

2.4.2 Brand Awareness

Brand is a symbol, sign, logo, color or any other thing that differentiates a product from the other (Lane killer, 2012). It is suggested that consumers have interest in the brand image while taking a purchase decision for a green product. Brand awareness is important to build a brand image. Therefore, customers must be aware of the brand to build a perception of the brand (Adkins, 2004). Brand awareness is the degree to which a consumer knows or recognizes a brand. They develop a positive attitude towards the product which is known to them or they can recognize due to past use. The consumer will buy the product only if he/she can associate with the product or relate emotionally with it (Asker, 1996). A green consumer will relate to the product only if it exhibits green characteristics.

Brand image is another important factor that influences the buying decision of the consumer. A consumer while taking a buying decision considers the perceived brand image of the product. Consumers’ perception about the product which is decided through labels or images affects the purchase decision of the consumer. The green labels and images on the green products decide the consumption of the good. Companies can produce and improve their products with the knowledge of brand image perceived by the consumer (Marwick and Fill, 1997). Consumers buy the products for which the brand is known to them and they do not prefer unknown brands (Gregg et al, 2005). Brand image is built by advertising green and eco friendly features of the product. Consumers prefers brand that are associated with the environment. Companies relate their promotional activities with the concept of green environment to create a positive brand image in the minds of the consumers (Adkins,
2004; Varadarajan and Menno, 1988). Eco-label is significant to make the choice for environmental friendly products. It helps the customers to differentiate between green and non-green products. It is the symbol on eco-friendly products which helps customers to identify green products (Wahid et al., 2011). Products that have eco-label are preferred by the green consumers. There are a variety of eco-labeled products available in the market to choose from and choice is dependent on the preference of brand by the consumer. Green marketing enhances the brand equity of companies offering green products. Chen (2009) has studied the four aspects of brand with respect to the green products. These are green satisfaction, green trust, green brand image and green brand equity. He discussed that green satisfaction, green trust and green brand image drive brand equity of green products. Green brand image is the perception of the consumer regarding how whether the green product is associated with his environmental concerns. Green satisfaction is the perception of the consumer about whether the product satisfies his needs related to environmental concern he has or whether the products helps him fulfilling his environmental responsibilities. Green trust is the belief of the consumer that the product is environmentally credible and the consumer can depend upon it. Lastly, green brand awareness is the ability of the consumer to be aware of the environmental features of the product. Companies can use the ideas of green brand equity to build an image of the company and to satisfy its customers. (Moored et al, 2012).

2.5 Consumer Awareness about the Environmental Issues

2.5.1 Eco-literacy

Knowledge about environmental conditions and green products plays an important role in the decision making by consumers. Knowledge is concerned with how consumers gather and get organized (Alba and Hutchinson, 1987), how much information is important for decision making (Bricks, 1985), and on what basis consumer assess products and services (Murray and Schlacter, 1990). Veining &Ebro (1990) and Chan (1999) pointed out that knowledge about environmental issues is the reason for environmental friendly attitude and growing concern of people towards the environment. Amyxetal (1994) also emphasized that knowledgeable consumers are willing to pay even higher for the green products. Larocheetal (1996) developed the
concept of eco literacy which measures the consumers’ ability to identify the symbols and concepts related to the environment. The concept of Environmental literacy was first introduced in an issue of Massachusetts Audubon by Roth (1968) about 45 years ago. This concept came in the limelight since then and may researchers have extensively studied it (Roth, 1992; Simmons, 1995; Moron et al, 2001; Weiser, 2001; North American Association for Environmental Education (NAAEE), 2004; O’Brien, 2007). The environmental literacy is associated with awareness of environmental issues, concern for environment, working towards solving the current problems and preventing the new ones to occur (NAAEE 2004).

The term Eco-literacy was promoted by Riser (1986) some 27 years ago. Through his Address of the Past President to the Ecological Society of America, he requested ecologists to popularize and publicize the concepts of ecological literacy among the public (Charest 1989). The term Eco-literacy was published by Capra (1997), 16 years ago, who also initiated a not-for-profit organization for the education of sustainable lifestyle (Center for Ecoliteracy, 2013). Capra (1997) has defined Eco-literacy as an understanding of the principles of the organization of ecosystems and the application of those principles for creating sustainable human communities and societies.

NAAEE’s Guidelines for Learning (NAAEE 2000/ 2004) has stated seven components of Eco-literacy. These include affect, ecological knowledge, and socio-political knowledge, knowledge of environmental issues, cognitive skills, environmentally responsible behavior (ERB) and additional determinants of ERB. Eco literacy involves using resources in a manner that they are preserved for the future generations. Orr (1992) described Eco-literacy as the understanding of how people interact with each other and how to do this sustainably.

Capra (1997) discussed four levels of Eco-literacy. These are head/cognitive, heart/emotional, hands/active and spirits/ connectional. The Head/ cognitive approach involves understanding of basic environmental principles, that is, networks, nested systems, cycles, flows, development and dynamic balance, think analytically, evaluate impacts of human behavior and the consequences of decisions of humans. Heart/Emotional approach involves empathy and concern for the environment and living beings, believes in equity and justice for all and prevents exploitation in any manner. Hands/ active approach involve turning convictions into action to preserve the environment using tools and procedures to attain sustainability, manage use of
natural resources. Spirit/connectional is concerned with the attachment and strong bond with the environment, a deep connection with the nature is experienced and living beings. It involves a feeling of awe for the environment among the people.

![Consumer Awareness Diagram](image)

*Figure 1: Consumer Awareness Model (Source: Larches, Bergeron & Barbaro-Forleo, 2001)*

Capra (1999) stated the components of eco literacy. One is acquisition of knowledge of basic components ecology, have fundamental understanding of the ecology, and experience the nature. Second is incorporation of values and insights among people for development of a relationship with the environment. Implementation of knowledge and sharing of the knowledge with the community is the third component. Finally, integration of the curriculum to facilitate better learning is the end of the process.

Environmental knowledge has a positive relationship with environmental behavior (Arbuthnot & Ling, 1975; Hines et al., 1986/87; Grub, 1995; Maloney & Ward, 1973). Knowledge has been described as of two types-factual and action related knowledge. Factual knowledge is the knowledge about the concept, causes and consequences of the environmental problems whereas action related knowledge is the knowledge of human actions that are responsible for the environmental problems. It has been observed that action related knowledge is more likely to affect environmental behavior rather than factual knowledge (Shahn and Holder, 1990).

An understanding and examination of the environmental problems is the initiation of the development of the attitude of concern for the environment. This knowledge will
eventually lead to the development of new measures and ways to control environmental degradation and ensure environmental protection (McBride, 2013). Understanding of these principles and their implementation is highly important to build a sustainable world for the future generation.

2.5.2 Consumers’ Attitude and Behavior towards the Environment

According to Schultz and Zelezny (2000), “attitudes of environmental concern are rooted in a person’s concept of self and the degree to which an individual perceives him or herself to be an integral part of the natural environment”. Consumers’ decisions are influenced by their environmental attitudes (Ireland, 1993; Schweppes and Cornwell, 1991). It is believed that through practices like buying green products, practicing recycling, and disposing of non-biodegradable waste, consumers can contribute towards preserving the environment (Abdul-Mulheim, 2007). Consumers’ attitudes, values and behavior have a significant impact on the maintenance of the quality of environment (Mandalay and Abijoye, 1998).

The consumer attitude towards the environment has been studied with respect to two aspects, that is, importance and convenience. Amyxetal (1994) has described importance as the extent of concern of people towards the environmental issues. It is the perception of people about how important environmental friendly behavior is for the society and for them. Convenience is the degree to which the person feels comfortable to behave in an environmental friendly manner. For example, a person has knowledge about the benefits of recycling but still not practice it because of the inconvenience. Another example may be that consumers have information about the ill-effect of packaged foods and juices but still uses it because he or she feels it is convenient. The more consumers perceive environment friendly practices inconvenient, the more they will be neglecting it. So, there is a relationship between perception of consumers about the convenience of environmental friendly practices and consumer behavior and actions towards the environment (McCarty and Shum, 1994). Also, severity of the environmental problems is another factor that determines consumer behavior and attitude.

Bannered and McCabe (1994) determined that consumers are aware of the environmental problems persisting but do not take any step towards it because they
feel that these problems will resolve themselves. They are not informed about the severity of the environmental issues and hence do not engage in environmental friendly behavior. The severity of the environmental problems is associated with the consumers’ willingness to support actions that resolve environmental problems and to pay a premium price for the eco friendly products. The socially conscious consumer considers his / her behavior and its impact on the environment (Webster, 1975). Perception of Self involvement is another important factor that determines the willingness of consumers to contribute towards the environment and to pay more for the green products. Some consumers, although are aware about the environmental problems and their severity, believe that the protection of environment is not their responsibility and must be pursued by the government or other organizations. This can determine the willingness of consumers to purchase eco friendly product at a premium price. Consumers’ attitude can influence the consumers’ decision to but green products and their willingness to pay a higher price for it (Chong et al., 2006). The perception of consumers is based on the situational variables and social reference groups and influences consumer behavior towards the environment (Pickett, 2008). Consumer behavior can be influenced by the marketers through adding a green feature in a regular product or by making it cost effective. Consumer attitude can also be modified through communication of the benefits of green products.

Consumer behavior is associated with their willingness to buy products at a higher price. Consumers behave differently when trying to protect the environment (Euchar and Polanski, 1991). Marketers must understand the different ways in which the consumers behave. For example, the consumer who recycles paper might not purchase recycled paper from the market (Pickett et al., 1993).

Consumer behavior is rooted in cognitive psychology (Bergh, 2002). People are involved in information processing while choosing products or making a purchase decision (Chicken, 1980; Petty, Cacioppo& Schumann, 1983). This information processing leads to formation of consumer attitude and this attitude may affect the purchase decisions. Also, behavior is linked to the perceptions of the consumer about the environment (James, 1890; Lots, 1852).

Consumer behavior and attitude determines the willingness of consumers to buy environment friendly products and that too at a high price. The perceived convenience
of buying and using eco-friendly products has an influence on the consumer behavior towards the environment. Therefore, green products must be made convenient to acquire and use and if they are already easily available in the market and easy to use, the perceptions of the consumers about the convenience must be altered through advertisements and they must be convinced that green products are also convenient. Theory of Planned Behavior states that beliefs (environmental) form attitudes towards behavior which in turn develops into intention of behavior (Janzen’s, 1991).

![Diagram](image)

**Figure 2: Consumer attitude and Behavior towards the Environmental problems (Source: Larches, Bergeron & Barbaro-Forleo, 2001)**

Consumer behavior is the ways consumers behave when they are concerned for the environmental issues and as a result prefers only green products. The consumer behavior, therefore, impacts the purchase intention of the consumers. Consumers develop an eco friendly attitude when they realize the severity of the environmental problem and realize that green products are easy to acquire and use. The severity of the environmental problem and convenience of buying green products determines the preference of consumers for green products. This attitude of consumers also influences the purchase decision of the consumers.

2.5.3 Consumers’ shift towards environment friendly products
Rising awareness among consumers about the environmental issues has made them change their lifestyles and adopt green lifestyle. People with the aim to reduce their impact on the environment have started consuming green products. The consumers are trying to restore the ecological balance by increasingly using eco-friendly products (Doyle, 1992; Vandermerwe and Olaf, 1990). Government and environmental groups have been encouraging individuals as well as organizations to behave in an eco responsible manner and engage in sustainable marketing plans. Legislations and environmental groups have made genuine efforts to draw consumers’ attention towards environmental issues (Polanski and Rosenberger, 2001).

Various schemes and regulations have been introduced at national and international levels that make the customers, institutions, employees and organizations aware about the environmental issues and as a result they have become responsible towards the environment. The increasing awareness about environmental issues, availability of information regarding environmental sustainability, rising concern for environment, green promotional activities by organizations, increasing popularity of green products among consumers are the reasons for the shift towards environmental friendly products (Cheri an and Jacob, 2012). Energy security and sustainability of environment has gathered a lot of attention over the past few years. Consumers’ awareness about the environmental issues has an impact over their purchase decision and the marketing activities of the organizations. Initially, consumers doubted the performance of green products and did not buy the products due to their perceived inferiority (Ottoman et al., 2006), but today they are confident about green products and are even willing to pay a premium price for it (Maheshwari, 2014). As a shift in consumer buying behavior towards eco-friendly products is witnessed, corporate must focus upon this segment of consumers who are willing to buy green products in order to gain a competitive advantage over others.

2.6 Light Emitting Diode (LED)

2.6.1 Features of LED

The consumer perception of value of LED lights plays an important role in the marketing activities of organizations. If the consumer perceives that the product provides more benefits than any other product or the company has innovate the
product to differentiate it from other products, the consumer is likely to buy it. The success of the product is dependent on its perceived value. Products with high perceived value have more chances to be adopted by the consumers than the products with low perceived value.

Cost
Moniteau and Lefebvre (2000) revealed that the CFL have high initial cost which poses a problem in their adoption. CFL and LED lights adoption has a barrier of cost. LEDs cost even higher than CFLs. High initial cost of the LED lights makes customers shift their preference to less costly alternatives. Therefore, the price of the LEDs has a negative relationship with the purchase intention of consumers. LEDs consume little energy which makes it more economical even if the initial cost of LEDs is higher than other sources. As low power consumption leads to low operating costs, LEDs are quite efficient as compared to other lighting alternatives.

Compactness
According to Basho & Shimizu (2012), a reflector is used to adjust the flux distribution of light which is emitted by the various sources of lights. Incandescent and fluorescent lights have a large light emitting area and therefore, a large reflector is required to direct the light at the desired area. On the other hand, LEDs have a small light emitting area which requires little adjustment of the luminous flux.

Efficiency
LEDs are semi-conductors and are resistant of mechanical stress which the conventional lights are not. For the LED lights to operate efficiently, the working temperature of LED semiconductor chips must be adjusted and kept below 100 degrees Celsius. Design, material used, heat release conditions and other factors decide the operational life and efficiency of LED lights.

Quality (Eco-friendly)
Quality is another aspect on which the consumers judge the performance of the product. LED lights get dimmer over time and does not burn out as incandescent bulbs do. LED lights have various quality advantages most importantly they do not emit UV or infrared rays. Other advantages include that they are resistant to shock and
vibration, produce very little heat and contains no mercury. LEDs are environment friendly as they reduce harmful emissions to flow into the environment and also do not create pollution at the time when they are disposed off. LEDs contain no toxic material as other lighting systems do. The LED lights are 100% recyclable and can save the material and production of 25 incandescent bulbs.

**Reduced Heat Radiation**

Regular light bulbs convert only 20% of electricity into light, rest 80% is emitted as heat. The LEDs are quite efficacious as compared to other sources of lighting. Most of the electricity is converted into light and only a little amount heat is emitted which is better for the place where it is being used. Using LEDs can help ACs function well and consume lesser energy.

**Energy Savings**

LEDs are helpful in saving energy and are better than incandescent or halogen lights with respect to energy savings. LEDs save energy for about 2 or 3 times than their CFL counterparts. The LEDs are an energy efficient alternative as they emit more light as compared to the usage of energy. Products that emit highest amount of light and consume least amount of energy are considered the best option. Leelakulthanit (2014) determined that LEDs produce 90 to 112 lumens per watt, CFLs produce 40 to 70 lumens per watt and incandescent bulb produces only 10 to 17 lumens per watt. The LEDs save 50% to 70% energy as compared to conventional technologies such as compact fluorescents (CFLs), incandescent and halogens. Also, using LEDs reduces carbon emissions.
Controllability

LEDs have better control over light colors, intensity, and direction. It has various social co-benefits. The problem of light pollution can be reduced through LEDs and use of LEDs in outdoors improves visibility for pedestrians and traffic. Indoor LEDs are proved to improve students’ performance. Lighting levels can be altered through smart controls according to conditions which can save energy up to 80%. LEDs come with advantages of subjective visibility and public safety.

2.6.2 Advantages of LED

LEDs have numerous advantages which enhances its scope and applications. Durability, advanced performance, efficiency, energy saving and controllability are
some of the advantages of LEDs which make it more preferable than CFL and other lighting alternatives.

**Lumen Depreciation**

Lumen Depreciation is a feature of conventional lighting system, that is, their quality of lighting is diminished over time. Their useful lives get shorten when they are dimmed. This is not the case in LEDs and because of it they are suited for smart controls. They have potential for energy efficiency. LEDs consume far less power than CFL and incandescent lights. The LED lights get instantly switched on and do not warm up easily and therefore, provide safety and security for outdoors. LEDs can be switched on and off frequently and this feature allows it to be used in traffic signals and other places where it can instantly light up without affecting the LEDs operational life and light emission.

**Long Operating Life**

Number of operating hours depicts the durability of the lights. LEDs are expected to have a useful life of 30000 to 50000 hours much higher than CFLs which have a life of 8000 to 10000 hours. In comparison to this, incandescent lights have a useful life of merely 1000 hours. The life of LEDs can be further extended by using smart controls. The longer the life of the light, the better it is for the customer. Also, the material used in LEDs is quite stable. The customer pays a high initial price for the LED lights so the longer useful life would compensate this price. Commercial as well as household consumers prefer a reliable and long lasting lighting fixture. The high cost of changing bulbs frequently and maintenance is not preferred by the consumers. LEDs have an outstanding operating life of up to 100000 hours. This means that an average LED light lasts for 11 years if it is used continuously.

**Durability**

LEDs are resistant to vibration and other mechanical stress such as breakage, therefore, can be used in bridges and elevated highways. The durability of the lights is positively related to the purchase intention of the consumer and the perceived value. That is, the consumer is likely to buy a particular type of light if it is durable. LEDs
perform better in cold environments, therefore, must be used in outdoors and in refrigerators. LEDs are resistant to shocks and can withstand rough and rugged conditions (Daniel, 2012).

**Trustworthiness of Performance of LED**

The LEDs are not widely adopted by people and therefore, do not have much experience with it. Because of this lack of experience by the customer or his family and friends, people have little information about the performance of LEDs. The only source of information is the advertisements by the company that manufactures or sells LEDs. It was revealed that people do not trust the claims that the product is green and this makes people avoid LEDs (Mustafa, 2009). Therefore, trustworthiness of LEDs performance has a positive relationship with the intention to buy.

**Design Flexibility**

The design of LEDs is flexible and can take any shape to produce efficient illumination. LEDs can be dimmed; the color and distribution can also be changed. The illumination system of LEDs is well designed, soothing for eyes and lifts the mood. LEDs are used in airplanes, classrooms, hotels etc. with various adjustments of design (Daniel, 2012). LEDs allow for dimming, multicolor displays and color temperature controls which are useful for displaying advertising. LED is portable lighting system which operates on low voltage and is best suited for outdoor environment?

**Operational in extremely cold or hot Temperatures**

LEDs have a capability of working in even extreme conditions, that is, extreme heat and extreme cold outdoor environments. Fluorescent lamps do not work properly in low temperatures but LED work quite efficiently in cold outdoor environments, refrigerators, freezers etc (Daniel, 2012).

**Lack of Harm to Objects**
Previously, illumination of lights used to degrade the objects such as paintings hung close to lights were discolored due to UV radiations that the lights used to emit. LEDs do not emit UV radiations and hence do not harm objects like paintings and other cultural heritage. It is also beneficial to be used in fresh produce departments and refrigerators which prevent the foodstuff to degrade as it emit very little heat as compared to traditional sources of light (Basho & Shimizu, 2012).

**Low Insect Attraction**

Insects are attracted towards lights, especially by invisible lights in the range of blue to ultraviolet light. LEDs do not emit UV rays; therefore, insects are not attracted towards it as compared to traditional lights. Since LEDs emit wavelength of light which is suitable only for plant growth, it prevents the development of harmful micro-organisms such as mold. It is easier to maintain hygiene through LEDs as insects are less attracted towards it and hence do not contaminate the LED lamps (Basho & Shimizu, 2012).

2.6.3 **Barriers of LEDs**

There are limitations to the use of LED, apart from it being a very advanced technology. Its high initial cost and lack of awareness about the technology makes the biggest disadvantages for the use of LEDs. There is no national standard set for LEDs in India and LEDs that are imported are of low quality.

**High Cost**

LEDs are advantageous in many conditions. They are suitable for outdoor environments where energy savings or maintenance costs are high. But the up-front cost of LEDs is a real disadvantage. Although LEDs cost high but advantages of LEDs such as social benefits and performance benefits outweigh its cost. For increasing adoption of LEDs, its cost will go down by 15% to 20%.
Little Awareness

Awareness about the appropriate use of LEDs is limited. Major governments and corporations have been active with the use of LEDs. They have recognized the issue of high energy consumption are aware of current state of LED technology and are trying to understand the appropriate use of LED solutions. The governments and organizations need to be updated as the technology is changing over time.

Blue Hazard

Blue and cool white LED lights emit blue light than traditional lights such as high pressure sodium lamps which are used outdoors. LEDs cause more light pollution than conventional light sources. The International Dark-Sky association has set a limit of the use of white light sources with correlated color temperature which should not exceed 3000K (Song, 2012).

Temperature Dependence

LEDs performance depends on the temperature of the environment. High temperature can cause overheating of the LED package which leads to the failure of the device. Its application is difficult and requires concern in the fields of medical, military and automobile sector where the device requires high temperature and low rate of failure (Song, 2012). LEDs operate in only ambient temperature. LEDs operating in extreme high temperatures may result in overheating and the device may fail. To maintain a long life of LEDs the temperature must be appropriate.

Voltage Sensitivity

Song (2012) studied that through series resistors, it is important to manage voltage supplied to LEDs. It must not exceed threshold and current should be below the rating.

Quality of Light
Cool-white LEDs have spectra which is different from any black body radiator (for example- sun or incandescent light). A difference in color is perceived by the user while using cool LED lights and incandescent or sun light. Red color is rendered badly through cool-LED lights, in some cases people are not able to differentiate between blue and black color when using LED lights (Song, 2012).

**LEDs can Harm Eyes**

Although LEDs do not emit ultraviolet or infra red rays, but it emit blue ray which can prove harmful for the eyes. If LEDs are viewed for longer duration they can have a negative effect on the eyes of the viewer. Some high powered LEDs have a bad effect on the vision. The manufacturers must consider the appropriate power of the LEDs; it should not be too dim, too bright or too blue. They must diffuse optics to soften light outputs. They must also provide shields to prevent direct viewing of the LEDs. They should also warmer color temperatures in order to reduce blue light emissions. Also, children must be taught to avoid direct viewing LEDs (Eco Design notes, 2013).

**Thermal Management Requirements**

Thermal management is the heat issue that affects the lifetime of the LEDs, their output and color. High temperature reduces the luminary's lifetime, decreases output of LEDs and affects the color of the lights. When the thermal pad temperature is 80%, the output of light is declined by 10% (Curran, 2015).

**Color Variations**

The white light in LEDs is the result of the combination of blue LED die and yellow phosphor. These two colors must be in proper proportion so that the outcome is white light. Any change in this proportion may change the final color of the light. If, for example, excess heat decreases the performance of phosphor, the ratio of yellow and blue light will be altered and blue light will be emitted in excess which could harm
eyes. This non-uniform color distribution results in unsatisfactory performance of the LED lights (Curran, 2015).

**Dimming Problem**

People are likely to dim the lights according to their mood. The driver of LED, and not the device, creates problem when the lights are dimmed. Driver must be designed systematically and loading must be done properly for effective dimming of the lights (Curran, 2015).

**Binning**

Binning is a process used when LEDs are produced in a large number. LED production is a batch process that involves chemical reactors and high temperature. The LED manufacturer needs to test the output of the light, forward voltage and colors. The manufacturer needs to test each light on these three parameters. This would be expensive to discard lights on the basis of any of these three parameters, so the manufacturer bin these lights and classifies on the basis of color, output and forward voltage. Color inconsistency and variation is the frequent complaint of the consumers (Curran, 2015).

**2.7 Marketing Factors**

**2.7.1 Brand**

A brand is a characteristic of a product which differentiates it from other products. It can be a sign, a symbol, logo or color which is associated with the brand and the brand is identified through it. There are various aspects of brand such as brand awareness, brand name, brand association etc. When a new technology is introduced brand awareness is crucial to popularize the product in the market. The brand must be introduced to the consumers and its features must be promoted in the market. Brand awareness impacts the choice of the consumer. Brand association is another important aspect that affects the purchase intention of the consumer. Consumers buy the product that they can associate to or are familiar with (Jacoby, Sizable, & Busato-Schach,
In case of LEDs, a minimum level of brand awareness is necessary to make a choice. There is a positive relationship of a known brand with the intention to purchase LED lights (Bellman & Park, 1980).

### 2.7.2 Product Availability

The availability of the product in the market and the convenience to buy and use the product affects the purchase decision of the consumer. The availability of green products poses a problem in its purchase as they are not easily available in the market. Vermeer and Verb eke (2006) pointed out that consumers are motivated to buy the green products but the low availability affects the purchase decision of consumers. The inadequate availability and marketing of eco-friendly products is responsible for the decrease of consumers’ environmental consciousness. Therefore, product availability is positively related to the intention to buy green products.

### 2.7.3 Promotion

Promotion is necessary to communicate the features of the product to the buyer and to stimulate the purchase intention of consumers. Promotional activities include discounts, free gifts, contests, offers, etc. Marketers use various combinations of promotional tools to attract buyers and to increase repurchase. Promotional activities attract new buyers those who intend to buy the product but not have tried in the past. This results in increase of market share of the product (Aliabad, Gerenuk, and Nelson, 1999). Promotional activities are positively related to the purchase intention of LED lights.

### 2.7.4 Corporate Social Responsibility

Corporate social responsibility (CSR) is the social obligation of the company which satisfies the stakeholders (customers, suppliers, investors, government etc.) and improves company’s reputation (Babington et al, 2008). Increased reputation results in enhanced brand value which is essential for the company’s success (Fibrin, 1996). People trust the company that is environmentally responsible and produce products that are eco-friendly. In other words, corporate social responsibility enhances brand
trust and therefore, improves sales. There is a positive relationship between CSR and consumers’ intention to buy LED lights.

2.8 Demographic Characteristics

Socio-demographic variables have a relationship with intention to purchase green products. Socio-demographic variables such as education, income, lifestyle, age, gender etc. are related to buying of environmental friendly products (Tang et al, 2011). Berkowitz and Letterman (1968) discussed that females, pre middle aged people, highly educated and households with high socio economic status are more conscious towards the environment.

2.8.1 Age

Adoption of new and innovative technology is affected by the age group. Younger people tend to prefer more updated and energy efficient technology than older people do. Also, young consumers have better knowledge of technology (Linden et al., 2006) and are more concerned towards the environment. Carlson and Johansson-Steinman (2000) believe that older consumers are less concerned about the environmental issues and are therefore, are less willing to pay for environmental friendly products. They believe that their remaining life is not too long so they would not be benefitted by the environment as much as the younger consumer would. Howell and Laski (1992) also found that younger people in U.S have more concern for the environment than older people. Toggle and García-Valiñas (2007) found that age is negatively related to the intention to buy LED lights.

2.8.2 Education

Education helps in acquisition of knowledge regarding new technology or environmental issues. Educated people are more concerned for the environment and are more involved in energy saving activities. There is a positive correlation between education and energy saving activities. Consumers with higher education are much aware of the benefits of green products such as it is healthy, nutritious, chemical-free and environment friendly (Tang et al, 2011).
Education also reduces the cost of acquiring knowledge about the environment. Education also has a positive impact over social status and lifestyle of a person (Lutzenhiser, 1993; Weber & Petrels, 2000). Toggle and García-Valiñas (2007) also believed that education is positively related to the environmental concern people show. Therefore, it can be said that education and intention to buy LED lights is positively correlated.

![Figure 2.4 Demographic factors affecting purchase intention of LED](Source: Leelakulthanit, 2014)

### 2.8.3 Household Income

Household income is another factor that predicts use of energy by people (Held, 1983). Households with higher income invest more in conservation of environment (Long, 1993). It is also believed that people with lower income consume lesser energy which itself is a step towards environmental conservation because of which households with lesser income do not respond to the request of conservation of environment (Kabulis et al., 1981). Since green products are 10 to 50 percent more costly than conventional products, so higher income households are much more capable of purchasing green products. Higher income households are much more capable of purchasing advance technologies that would help conserve energy than households with low income. Berkowitz and Lutterman’s (1968) also suggested that consumers with high or medium income are more likely to behave in an environment friendly manner than consumers with low income. Therefore, household income is
positively related to the intention to purchase LED lights. Green products marketers must target the middle and high income groups as they can buy the goods at the stipulated price (Tang et al, 2011).

2.8.4 Gender

Since women are responsible for purchasing 80% of the household goods, they are more likely to decide the lighting system to be used at home (Barletta, 2003; Griffin, 2006). Also, many researchers have found that women are more considerate for environmental issues than men are (Lee, 2009; Tikka et al, 2000; Zeleznay et al, 2000). This forms the basis of their preference for eco-friendly lights. Women are responsible for household and children care, so they are likely to show a caring attitude towards the environment also. On the other hand, Reizenstein et al. (1974) and Balderjahn (1988) discussed that men are much more willing than women to pay higher for control of air pollution and use non-polluting products.

The demographic factors such as age, gender, education and household income have a relationship with consumers’ intention to buy green products. Age is negatively related to the purchase intention of LEDs, that is, younger consumers are more environmentally conscious than the old generation. Education and household income are positively related to the purchase intention. The more educated a person is, the more he/she is involved in energy saving activities. Similarly, higher income households are more involved in eco-friendly activities as they have more resources to contribute towards the environment. Since green products are generally costlier than regular products, higher income households are more likely to purchase such goods. Many researchers have studied the impact of gender on purchase intention of green products but no concrete results have been found. Some researchers argue that women are more environmentally conscious, others believe that men are actively involved in environmental friendly activities. So, demographic factors have a significant impact on the purchase intention of green products.

There are various factors that determine the purchase intention of LED lights. With reference to the study by Larches, Bergeron & Barbaro-Forleo (2001), this study has discussed some of the factors such as consumer awareness (Eco literacy, level of awareness), consumer behavior (concern for environmental issues, preference for
green products), consumer attitude (severity of the problem, convenience of buying eco-friendly products such as LED lights, features of LED lights and demographic factors that have an impact on the willingness to purchase LED lights and to pay a premium price of such products, that is, purchase intention of consumers in buying LED lights.

The overall research framework as derived from the literature for the study is shown in Figure 2.5.

Figure 4: Conceptual framework showing factors impacting the purchase decision of LED lights
As per the derived framework, the Purchase intention of a Consumer towards eco-friendly products like LED should be studied with respect to Consumer Awareness, Consumer Behavior and Consumer Attitude in coherence with Green Marketing concepts. In addition to this, attributes of LED and various demographic factors should be taken care off as suggested by various researchers in the past. This framework will be able to contribute significantly towards the Green Marketing of LED products, as the literature shows various gaps in the past which are discussed in next section.

2.9 Research Gap

The current study focuses upon consumer perspective of green marketing of LED lights. The concept of LED lights is new and not much research has been conducted on this so far. Very few studies have been found in the literature with respect to LEDs. As per the best of the research knowledge, no study has been conducted to analyze consumer behavior towards LED lighting products. The impact of consumer attitude and behavior on purchase intention of LEDs has also not been studied. Similarly, Green marketing for LED has not been discussed extensively in past studies. Also, little efforts have been made to promote the lighting products which consume lesser amount of energy such as LED lights. Consumers must be made aware of the green features of LED lights and their behavior and attitudes towards LED products must be judged.

The current study has extensively discussed the impact of consumer behavior, consumer attitude, attributes of LED lights and demographic factors on the purchase intention of LED lights which will be helpful for various researchers and practitioners from the industry.

2.10 Conclusion

Green marketing is a concept that has become a way of doing business these days. Organizations have realized the value of going green and incorporated this concept in their marketing program. They are also making efforts to communicate this idea to the consumers. Consumers, on the other hand, are also showing their concern towards the
environmental issues and are trying to contribute towards the preservation of environment through buying green products. One such effort is buying LED lights to conserve energy and reduce emissions. But these green features also cost more than regular lighting products. Some environmentally conscious people prefer LEDs but some are still reluctant to buy these lights because of their high costs.

There are other factors that impact the purchase decision of the consumers regarding LED lights. These are awareness about environmental issues (eco literacy and level of awareness), consumer attitude and behavior (severity of the problem, convenience in buying eco friendly products like LEDs, preference for green products and concern for environmental issues), features of LED lights (durability, quality, controllability, design flexibility, operational life, energy savings and efficiency) and demographic variables such as age, gender, education and household income.

Consumers should show their concern towards the environment by buying green products and preferring them over regular non-green products. Marketers should practice green marketing in order to address environmental issues, satisfy consumers and to have a competitive advantage. They must communicate the value of green products to the consumers and convince them about the advantages of green products so that they do not hesitate in paying even a higher price for such goods. It is imperative for all the individuals and organizations to join the green movement and show concern towards the environmental issues.

The perceived benefits of LEDs must be communicated well to the consumers to persuade them to buy the product over other lighting products that do not offer such green features. Also, young educated consumers who belong to households with higher incomes must be targeted by the LED manufacturers as they are the best people to approach for selling LEDs.

Environmentally conscious people who understand the severity of the environmental problem and are concerned about the environment are the ones who are inclined towards the green products. They must be approached by marketers of LED and other consumers are also made aware of the benefits of LED lights so that they switch from conventional lighting products to LEDs and contribute towards the environment and conservation of energy and other natural resources.

The next chapter will discuss the methodology for conducting this research and will present a blueprint of the process involved in whole research.