Analyzing the green marketing approaches and their impact on consumer behavior toward the environment in China: a logistic regression approach

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Abstract

Sustainability has become the top priority for many businesses in the current era, and green marketing strategies are used to encourage the purchase of environmentally friendly goods. The research aims to analyze green marketing strategies and their impact on consumer behavior toward the environment in China. The study uses a logistic regression approach for data analysis. We found that environmental concerns and beliefs (ECB), Eco Labeling (EL), green packaging and branding (GPB), and green product, premium, and pricing (GPPP) have positive associations with consumers' attitudes and behaviors toward the environment. This study concludes that EL, ECB, EL, GBP, and GPPP are significant tools of green marketing strategies that considerably improve customers' environmental attitudes. The firm managers may adopt these green marketing strategies to achieve revenue and sustainable environmental goals. Furthermore, the government may provide incentives such as lower cooperate tax on green products industries, while private and public banks may provide subsidized loans to the green marking industries in the country.

Abbreviations

ECB	Environmental concerns and beliefs
EL	Eco labeling
GPB	Green packaging and branding
GPPP	Green product, premium, and pricing
USD	United States dollars
CO_2	Carbon dioxide emissions
EL	Environmental loyalty
CBTE	Customer attitudes toward the environment
ECB	Environmental beliefs and concerns
UAE	United Arab Emirates
TRA	Theory of reasoned action
TPB	Best predictors of customers' actual behavior

Extended author information available on the last page of the article

GWOM   Green word of mouth
TPB   Theory of planned behavior

1 Introduction

In the current climate, eco-friendly marketing is taking on an ever-increasing amount of importance. Because of its connections to the cause of environmental preservation, "green advertising" (also known as "eco-friendly advertising") is frequently considered to be an efficient technique of marketing goods, services, and business concepts (Shi et al., 2022). In the present economic climate, it is crucial for businesses to satisfy the demand from their customers for environmentally friendly products. New consumer trends that are forming in connection with sustainability may be seen as an opportunity for growth in the global economy, and these trends can be found in the form of opportunities. Academics have shown a significant interest in the study of green marketing and other environmental marketing tactics since the 1980s (Shabbir et al., 2020a, 2020b; Rex and Baumann 2007). Since the early 1990s, green marketing and other concepts connected to it have been gaining popularity. Since the turn of the century, green marketing has seen meteoric expansion, and the general public has begun to view it favorably as a strategy that has both short-term and long-term potential for success. In recent years, the green marketing business has experienced remarkable expansion, and it currently constitutes a market worth USD 250 billion annually. However, in the modern world of business, the idea of "green marketing" has been extensively discussed in the literature. The early research looked at the social components of green marketing, but it did not focus much on environmental assets or the influence that traditional advertising methods had on the environment (Shabbir et al., 2020a, 2020b). There is a global ripple effect of environmental issues and challenges that affects businesses and people everywhere in the world. Consumers' worries about the environment influence their choices. There has been a progressive shift in behavior toward more eco-friendly practices. People's shopping habits have steadily grown because of their concerns for environment. Some people have altered their actions to reflect better their desire to contribute to environmental protection idea. Value creation in one's environment is an essential trait. One counterargument is that anxious consumers may behave in ways that are harmful to the environment even if they express concern. It has been proven empirically that just a tiny fraction of consumers are concerned about pollution, wants to recycle, and are willing to spend extra on environmentally friendly products (Majeed et al., 2021; Lyu et al., 2021).

It is widely known that attracting customers who place a high value on environmental friendliness, communicating environmental responsibility and ethical concerns to the public, and differentiating oneself from competitors by providing distinctive environmental value are all strategic benefits of green branding, especially positioning green brands (Hartmann et al., 2005; Huang et al., 2014). A planned green brand positioning strategy may help firms get an advantage in the competitive business environment by identifying themselves as pioneers in the industry and capitalizing on the current trend toward environmental friendliness (Gong et al., 2020). The purpose of this study was to investigate the impact that using a variety of eco-friendly marketing strategies can have on the level of environmental awareness exhibited by Chinese consumers. Extensive research has been carried out in both the developed economies and the emerging economies. Green marketing and sustainability are two fields that have given China and the environmental effect of consumer behavior relatively little extent

of attention, respectively. The Chinese government intended reform deal global warming and support the growth of a green economy; however, fundamental measures must be done before this can be accomplished, knowledge essential to bring about such as cultural change is the fundamental of environmentally responsible advertising.

The green marking strategies have been investigated in the literature from the different aspects, such as Li et al. (2022), Kumari et al. (2022), and Dahlquist (2021) investigated the green marketing strategies in different factors such as supply chain, green production demand, and marketing strategies and green marketing with adaptation. However, different green marketing strategies in one study still not explore. China is the world's largest emitter of greenhouse gases (GHGs) due to its heavy use of coal for energy and industrial sector. China has over 1.4 billion population and consider a significant contributor in world pollution. The large consumer market provides bias to study the impact of green marketing approaches on consumer behavior for China economy. In addition, major economic transformations such as industrialization, urbanization, and population increase have caused major environmental issues in China. Air, water, and garbage issues have plagued it. Thus, Chinese consumers are becoming more environmentally conscious and more inclined to respond to green marketing. This perspective on consumer behavior can help solve environmental issues and promote sustainability. Understanding consumer behavior in such an extensive market is essential for stakeholder and policymakers on a global scale. Researcher has not analyzed for the case of China. Therefore, to fill this research gap, this study analyzes the green marketing approaches and their impact on consumer behavior toward the environment in China by using logistic approach. This paper contributes to the literature from the following points: firstly, according to best of our knowledge there is no single research which analyzes different strategies in a single study; this paper attempts to use Eco Labeling (EL), green packaging and branding (GPB), and green product, premium, and pricing (GPPP) together in this study, which may provide detail information of the most effective marketing strategy that can affect the consumer behavior. Secondly, we use the case of China by testing the different strategies, which has not analyzed before; furthermore, environmental concern is the main policy objective of Chinese government. Thirdly, we use logistic regression which will provide more robust estimations and better policy recommendations. It has not been determined whether or whether customers are environmentally concerned, and neither their shopping nor consumption patterns have been studied combined. In research in the field of marketing has concentrated on a wide variety of subjects, such as the behavior of consumers and ecologically responsible advertising distinct from one another. As customers have become increasingly worried about the state of the world, there has been an increase in the demand for products that are friendlier to the environment (Farzin et al., 2020). In order to address this gap in the previous study, we decided to concentrate our efforts on consumer attitudes toward the environment and green marketing. This inquiry presents recommendations for incorporating these aspects into the economy, and those recommendations are based on our results. This research will help to eco-labels (EL), GPB and ECB and GPPP for the customer purchasing consumers' attitudes and behaviors toward the environment.

2 Literature review

Since the beginning of the twentieth century, a rising body of research has shown that an all-encompassing strategy to environmental sustainability is related with greater business economic performance. This research has been accumulating since the beginning of

the century. Concerns over the current status of the environment in today's society have resulted in higher levels of competitive pressure as well as the emergence of new issues that must be addressed by businesses (Andersén et al., 2020). Because of rising levels of both population and consumption, recent years have witnessed a general deterioration in the living conditions of people all over the world. The way of life and actions of consumers are connected to the deterioration of environmental systems. People have helped establish businesses that support the ecosystem and environmental norms in order to raise awareness about the importance of preserving the environment, to improve environmental preservation efforts, and to prevent the irreversible degradation of the environment by placing limits on trade (Tan et al., 2020). It is currently recommended that businesses do things like paying attention to the relevance of environmentally friendly products and environmentally responsible consumption in order to guarantee long-term sustainable growth. This is one of the many things that may be done. Whether a person is a client or the proprietor of a business, they all have a responsibility to do something about the state of the natural environment. This problem has permeated many aspects of business, including marketing, due to the fact that traditional marketing places a high priority on customer demand while simultaneously neglecting concerns about social welfare and the environment (Majeed et al., 2022). More unexpected climatic shifts such as famine, robust thunderstorms, and rising temperatures are being triggered by the physical and chemical changes in soil, air, and sea brought on by increased greenhouse gas emissions from human industrial activities such as CO_2 (Bilal et al., 2021a, 2021b). Many companies see environmental protection as part of their ethical responsibility as a result of climate change and the growing complexity of handling environmental threats (Bilal et al., 2020; Tan et al., 2022).

The first cause is that people are not willing to own up to their part in environmental destruction and are not voicing their concerns more loudly. Most people also do not realize how their own mindsets and actions add to environmental problems. Second, environmental issues are notoriously difficult to explain to the average person because of their complicated scientific nature. This is especially true for those with only a basic grounding in areas such as mathematics and physics. Third, studies have revealed that people's views on the environment and climate change are shaped by their own sociocultural concepts and values. Consumers are more likely to buy and use ecologically friendly items after being exposed to green marketing (Majeed et al., 2022). The concept of "green marketing" is growing in importance on a global scale. In addition, because of its association with environmental protection, "green" advertising has gained popularity as a means of promoting a wide variety of goods, services, and even company concepts. Increasing numbers of environmentally conscious shoppers provide a promising new avenue for international trade. Academics' interest in green marketing and environmental protection initiatives dates back to the 1980s. Since the early 1990s, green marketing and associated concepts have gained increasing attention. Due to advancements in environmental, scientific, and networking technologies like the internet, as well as increased public awareness and concern with ecological challenges, such as a steadily increasing population and the global temperature change, an understanding of green purchase intention is more important than ever (Majeed et al., 2022). Shabbir et al., (2020a, 2020b) examine the green marketing strategies in UAE and applied ECF method for the data analysis and found that environmental loyalty (EL) and green public–private partnerships (GPPP) had a considerable and favorable influence on customer attitudes toward the environment (CBTE). Besides, beliefs and concerns over the environment (ECB) also have a large and positive impact on consumer behavior, attitudes, and attitudes in the UAE. Kumari et al. (2022) studied systematic literature review on the green marketing adoption and consumer perspective. He identified the primary

elements related to growing demand for environmentally friendly products. They applied PRISMA technique for the data analysis; and conducting the literature study they identify three major themes: behavioral outcomes, antecedents and mediators, and moderators. Dahlquist (2021) investigated green product demands implications for the industrial buyer and seller using marketing dynamic capabilities. They applied social network theory for analysis to estimate the relationship between relational embeddedness, vertical competitive activity, knowledge redundancy and buyers' green product demands and seller's sale green product dynamic capabilities. They found that relational embeddedness and knowledge redundancy are the two main mediators that effect consumer demand for green products. Moreover, findings demonstrate that procurement managers and marketing managers have different views of the valence and magnitude of these relationships.

To summarize most of the past literature investigated different aspects of green marketing, for example, Nath and Siepong (2022) analyzed the green marketing approach toward sustainable development and applied configuration (cluster) approach for data analysis. Shabbir et al. (2020a, 2020b) use environmental loyalty (EL) and green public–private partnerships (GPPP) that had a considerable and favorable influence on customer attitudes toward the environment (CBTE) variables as green marketing strategies in their study to the consumer behavior. Azadnia et al. (2021) examine the green marketing risk assessment by using weighted fuzzy method. Kumari et al. (2022) green marketing adoption and consumer perspective by using PRISMA technique. Most of the research uses only one strategy to analyze the green marketing effect on consumer behaviors. As compared to the past literature, this study contributed the literature by applying various green marketing strategies such as Eco Labeling (EL), green packaging and branding (GPB), and green product, premium, and pricing (GPPP); in this study, it will help to compare the effectiveness of each strategy. In addition, on the contrary to the past literature this study uses logistic regression in order to obtain robust statistical results this study applied logistic regression. In addition, there was no study found related to China, so this study used the case of China to analyze the green marketing strategies and consumer behavior.

2.1 Green marketing: concept and approaches

Green marketing encompasses a wide range of activities and innovations, such as new or revised product designs, production methods, packaging, labeling, and promotional strategies (Podvorica & Ukaj, 2020). Green marketing is defined as the "managerial process concerned with recognizing, anticipating, and serving the needs and wants of customers." The work will be done in the background, alongside more lucrative and long-term strategies. When faced with increasing challenges, businesses must respond quickly to shifting conditions while maintaining their primary focus—the development of risk-free products. When it comes to ensuring the long-term viability of businesses, "green marketing" and related strategies are rapidly emerging as a crucial tool. However, the concept of green marketing has evolved through time alongside the rise of environmental sustainability and client segmentation (Shabbir et al., 2020a, 2020b). The term "green marketing" refers to the process of creating new forms of advertising in the hopes of attracting consumers with a heightened awareness for environmental issues. Considering this, "green customers" will be understood to be the influential clientele who abstain from purchasing products that might be harmful to living things (Podvorica & Ukaj, 2020). However, there is a significant amount of concern over the topic of sustainability among both consumers and businesses. The environmental consciousness of consumers has increased significantly

during the 1990s, and their behaviors are reflective of this trend. Because of actions like these, environmentally friendly advertising strategies and long-lasting products are now readily available to the general public (Shabbir et al., 2020a, 2020b). One of the goals at the national, regional, and governmental levels is to achieve sustainable development and quick growth rates indefinitely (Khan et al., 2022). Growth that is sustainable for the long term is the goal of any nation (economic, social, environmental, political, and technical). Wadded is considered to be a country that strives for sustainable development in accordance with International Monetary Fund (IMF) and United Nations Development Program (UNDP) standards and policies (Alomari & Alomari, 2020).

In order to address the growing environmental concerns, it is essential for marketers to examine the elements that influence customers' views and decisions regarding a company's goods. Considerations such as values, trust/information, needs/inspirations, attitudes, and socioeconomic factors are important. Customers' willingness to pay extra for environmentally friendly products is influenced by a number of mediating variables, such as eco-labels and consumers' reactions. Although most buyers would rather have a greater environmentally friendly product, data show that consumers often aren't willing to pay more for one. Customers with a high tendency for environmental concerns have been reported to be lukewarm on buying green services and products. The quality, price, and availability of green products and services, as well as the firm's dedication to the environment, are all potential customer concerns. In addition, maintaining credibility is now understood to be crucial in green advertising (Majeed et al., 2022). Reducing the perceived risk associated with utilizing green products and services can increase customer confidence and reduce skepticism over time. More than that, many eco-friendly products and services are innovative, which can inspire consumers to alter their habits. Green marketing necessitates stakeholder evaluation in order to develop a meaningful, long-lasting engagement with clients while preserving, restoring, and improving the natural environment. There are five main reasons why businesses use green marketing: (1) to take advantage of green opportunities, (2) to broaden the brand's image, (3) to increase the product's value, (4) to gain a competitive edge, and (5) to hold to environmental innovations. Green pricing, eco-friendly packaging, and environmental advertising were proven to have a significant positive effect on green purchase intentions (Majeed et al., 2022).

The major purpose of green marketing is to differentiate products in the customer's mind in order to boost revenue from existing products. In order for green marketing to be a profitable endeavor, participation from all parties throughout the value chain is required. All parties involved have a responsibility to work together and keep an awareness of environmental issues. Some of the most crucial parts of a green marketing strategy are "market segmentation, green product creation, positioning, price, logistics, suitable residual management, green communication, green relationship building, and having an acceptable marketing mix" (Cui et al., 2020). To be successful in developing a competitive green marketing strategy, a company has to undertake its research and be aware of the goals it wishes to accomplish (Huang et al., 2021). Since a consequence of this, this is something that has to be taken into consideration, as the accomplishment of business objectives demands more than simply turning a profit; it also entails doing what can be done to assist in the preservation of the natural world. A company's marketing strategy needs to take into account a number of important considerations in order for it to fully reap the benefits of green marketing in order for the company to be successful. These considerations include target market segmentation, product sustainability, green positioning and pricing, or the use of a green supply chain, waste management, advertising, partnerships, and market size (Tsai et al., 2020).

The core of any effective green marketing strategy is a firm belief in social responsibility and a willingness to tailor marketing efforts to the needs of all relevant parties. Both current contenders and those who might be in the running in future. Sustainable marketing practices lead to corporate-wide, long-term sustainability efforts (Majeed et al., 2022). For a business to implement a green marketing strategy, the relationship between the firm and its customers must shift. Businesses need to focus on both the product's functionality and its emotional appeal if they want to attract eco-conscious customers. Individuals have different priorities when it comes to environmental protection, which is a well-known marketing tactic that contributes to many environmental issues. For the corporation, green marketing is a preventative measure and a means to an end (Szabo & Webster, 2021). Green marketing's primary goal is to differentiate items in the minds of consumers in order to increase sales. Green marketing objectives can only be met with widespread buy-in from all links in the value chain. Those involved need to work together and be environmentally sensitive for this to succeed. Important aspects of a green marketing strategy include market segmentation; green product creation; positioning; pricing; logistics; suitable residual management; green communication; and green alliances (Cui et al., 2020; Liao et al., 2020). Businesses that want to stay ahead of the competition should do their homework before developing their green marketing plan (Tsai et al., 2020). Since reaching company goals requires more than just making a profit, this is a key consideration to make. To reap the full rewards of green marketing, a company's marketing strategy needs to take into account a number of important considerations, such as target market segmentation, product sustainability, green positioning, green pricing, or the use of a green supply chain, waste management, advertising, partnerships, treatment, and disposal (Huang et al., 2021). Empirical data reveal that marketers of environmentally friendly products are aware of the discrepancy between environmental concern and customer action (Farzin et al., 2020). Concerns raised by individuals concerning the deterioration of the natural environment are not without merit in relation to the function of business in society. According to the findings of a different research, the duty of corporations for the environment is relevant to all fields of endeavor (Shabbir et al., 2020a, 2020b).

2.2 Eco-labeling

Studies have offered more evidence that eco-labeling is an essential component that will impact the decisions that customers make (Shabbir et al., 2020a, 2020b). The information that eco-labeling provides regarding environmental problems and product attributes influences consumer choices (Okanović et al., 2021). Which is why it is important for businesses. It does this by providing information about environmentally friendly products that are suitable for both personal and commercial use. Putting a "green" label on goods and services not only helps consumers become more aware of the worth of those items, but it also encourages more people to purchase those items. In addition to this, it is compatible with the relevant framework as well as the multi-stakeholder policy (Hayat et al., 2020). The practice of eco-labeling has introduced uncertainty, making it more difficult to evaluate the impact a product has on the environment. When establishing a product's credibility, one of the most important factors to look at is the effect it has on the surrounding ecosystem over the course of its lifetime. Consumers are now able to determine, with the help of eco-labels, which goods and services have the least adverse effect on the environment throughout the course of their lifetime. The procedure starts with the procurement of primary resources and concludes with the final disposal of those resources. This study

synthesis examines a wide variety of corporate eco-labeling methods and aims, covering both labeled and unlabeled products in its scope of coverage. The competitiveness of products that have been given eco-labels has also been evaluated. In addition, eco-labeling has been a topic of discussion in studies that have recently been made public on the funding of ecologically beneficial technologies. Academics have, for instance, investigated the relationship between eco-labeling and investment, behavior regarding environmental quality, and price competitiveness. It has been demonstrated that companies that offer things of low-quality face significant competition, and eco-labeling has been acknowledged as an important instrument for discouraging investment in products of this kind. Because of environmental labeling, these companies have the ability to produce more (Majeed et al., 2022). Because of the aforementioned reasons, eco-labels are seen as a useful tool for encouraging sustainable consumption, particularly when it comes to products or services whose use can have a negative impact on the environment. This is especially true in the case of products or services whose consumption can have an impact on climate change. Eco-labels provide consumers a more environmentally friendly alternative in order to contribute to the achievement of national, regional, and international goals (such as lowering airborne CO_2 levels and boosting energy efficiency) (Okanović et al., 2021).

2.3 Green packaging and branding (GPB)

The term "sustainable packaging," which is also known as "green packaging" or "eco-friendly packaging," refers to packaging that is constructed entirely of renewable resources, that can be recycled or reused after it has been used at least once, that gradually degrades over time, and that contributes to the conservation of the natural environment at each and every stage of the product's life cycle. Green packaging is not only harmless to people and other creatures, but it also has a positive impact on the surrounding environment (Majeed et al., 2022). As people become more concerned about the environment, environmentally conscious packaging and branding have become an increasingly essential consideration for consumers. Because a robust environmental stance demands a distinctive marketing proposition and an easily recognizable brand name, consumers' perceptions of eco-friendly products are heavily influenced by the names of the brands that produce them. Recent studies have revealed that items that lack green attributes and traits have a bad performance in the market (Gong et al., 2020). Customers will recognize a business as a "sustainable brand" if the company is able to effectively communicate the one-of-a-kind ecological value it offers through the products it sells that are kind to the environment. According to the findings of recent studies conducted in the scientific community (Zameer et al., 2020), "green positioning" is an essential component to the success of "green branding" initiatives. Previous research on green products and environmentally conscious behavior reveals a correlation between product greenness and environmental consciousness in the form of a greener inclination to buy. This correlation takes the shape of a greener propensity to buy greener products. According to a different survey, consumers in Europe are showing a greater interest in purchasing products with environmental certifications (Majeed et al., 2022).

2.4 Green products, premium, and pricing

Green pricing is a concept that encourages consumers to purchase energy sources that are renewable. Customers are willing to pay a premium for products in a variety of categories, which indicates that premium pricing strategies are effective (Fan et al., 2022; Ullah et al.,

2019). Products that are priced at a premium because they are environmentally friendly have been found to be of higher quality. According to the findings of study, the vast majority of consumers are also willing to pay a premium for environmentally friendly products that are currently available on the market. It is anticipated that the use of green energy sources will boost customer engagement in green pricing systems when these sources provide a greater number of employments, have less adverse side effects, and offer monetary incentives such as tax credits. Thanks to pricing systems that take environmental requirements into account, businesses have the opportunity to improve their bottom lines while also contributing to environmental protection. An approach to pricing that is more sustainable for the environment can help a firm be more successful (Majeed et al., 2022). The strategies of production and pricing that a company uses have a direct bearing on how profitable the company is able to be. The price of green is determined by a variety of various factors. Consumer participation can be greatly increased through the use of green pricing and other related measures (Liu et al., 2021). There have been found to be positive relationships between the inclination to acquire ecologically friendly products and the attitude toward doing so (Liu et al., 2020).

2.5 Environmental concerns and beliefs (ECB)

People and companies all throughout the world are impacted by issues and concerns relating to the environment. It has been shown that customers have a significant concern for environmental concerns and have altered their behaviors in order to aid in the preservation of the globe. The persistent growth of the problem has resulted in the development of a new market for products that are less harmful to the environment, and the enthusiasm shown by consumers has only contributed to raise the profile of the industry. The idea that enlisting the assistance of customers may contribute to the preservation of the natural world is what drives this line of thinking. Helping the environment is undoubtedly one of the most vital things that you are capable of doing. However, consumers who are more concerned about the environment might not necessarily choose the products that are the least harmful to the environment. There are data to imply that only a minority of customers are worried about environmental damage, are driven to recycle, and are ready to pay extra for environmentally friendly items (Shabbir et al., 2020a, 2020b). Researchers that have investigated the influence of green branding tactics on the attitudes and behaviors of consumers have shown that people in general have a favorable image of green enterprises and are eager to support them. According to the theory of reasoned action (TRA) and the theory of planned behavior, attitude and behavioral intention are the best predictors of customers' actual behavior because they reflect consumers' comprehensive mental evaluations of a brand. This makes attitude and behavioral intention the best predictors of customers' actual behavior (TPB). In addition, TRA and TPB have been put to considerable use in order to better understand why consumers purchase environmentally friendly products and services as well as how they feel about environmentally friendly businesses. A consumer's predisposition to buy things that are designed with the objective of decreasing their influence on the environment and protecting its natural resources is referred to as their "green purchasing intention," and the phrase "green purchasing intention" is used to characterize this inclination. Both a person's attitude toward businesses that are environmentally conscious and their willingness to make environmentally conscious purchases can serve as indicators of a person's pro-environmental behavior and responsiveness to green marketing methods (Gong et al., 2020).

2.6 Impact of green marketing on consumer behavior toward the environment

The environmental consciousness of consumers is an important aspect in studies of sustainability and the environment since it provides insight into people's underlying ways of thinking as well as their care or compassion for issues pertaining to the environment. It has a strong correlation with green responses such as the will to recycle, green purchase decisions, and emotional investment from customers. In spite of the fact that previous research has demonstrated the significance of environmental consciousness in terms of its ability to affect the purchasing decisions of consumers, relatively little attention has been paid to the distinctions between the various types of environmental consciousness or the fundamentals of environmental consciousness. To this point, it has not been made clear how the numerous environmental awareness constructions are connected to one another. According to the physiological theories that have been put out to explain emotional state, the amount of emotional arousal served as a value, attitude, and action hierarchy model. It is possible for a person's altruistic viewpoint to either increase or decrease their commitment to environmental ethics. This is because a person's present emotional state impacts how they feel about the environment before they establish an outlook on it. One's own unique and concentrated point of view Therefore, it should come as no surprise that eco-awareness and eco-worry were essential components of how people thought. A strong sensation of affection is one example of an intense emotion. The final result of a person taking in information from their environment and responding to what they observe there (Geng & Maimaituerxun, 2022). Sun et al. (2022) found that investigated the mechanism of social media marketing's impact on consumers' green product purchasing behavior in the post-pandemic era. Their finding suggests that social media marketing, product knowledge, and crisis awareness have a positive effect on purchasing intentions post-pandemic era. Prieto-Sandoval et al. (2022) examine the impact of non-compulsory university courses on sustainability and circular economy (SCE) toward the attitudes and actions of university students. The results of this study confirm that the courses had a significant impact on students' propensity to consume allocated to sustainability.

In contrast to other forms of consumer behavior, green buying is considered as a socially conscious one that may yield direct personal benefit and happiness. Investing in products and services that are good for the environment usually pays off in the long run and benefits society as a whole. Developing environmentally friendly habits takes both individual and social interests into account. Based on the findings of an earlier study, there are two broad types of environmentally responsible purchasing policies. While it benefits the public environment for individuals to purchase energy-efficient appliances and recycled paper goods, actions such as purchasing organic food and environmentally friendly construction materials are typically more intimately connected to people's own spheres of influence (Liu et al., 2020).

3 Research methods

3.1 Model

The paper uses the following model:

$$CS = \alpha + \beta_1 ECB + \beta_2 EL + \beta_3 GPB + \beta_4 GPPP + \varepsilon_i$$

where Cs is the consumer behavior toward the environment, ECB environmental concerns and beliefs, EL Eco Labeling, GPB green packaging and branding, GPPP green product,

premium, and pricing (GPPP), α intercept term of the model, βi coefficients of the relevant variables, and ε_i err term of the model which shows the other factors which is covered by the model.

3.2 Hypothesis

This paper aims to analyze the green marketing approach green marketing approaches and their impact on consumer behavior toward the environment in China. The paper environmental concerns and beliefs, Eco Labeling, green packaging and branding, and green product, premium, and pricing are the independent variables, while Cs is the consumer behavior toward the environment which is a dependent variable. The following hypothesis will be tested for the analysis.

H0 The approach green marketing approaches (environmental concerns and beliefs (ECB); Eco Labeling; green packaging and branding; and green product, premium, and pricing) is likely to have a positive effect.

H1 The approach green marketing approaches (environmental concerns and beliefs (ECB); Eco Labeling; green packaging and branding; and green product, premium, and pricing) is likely to have an effect.

3.3 Methods and procedures

This research study adopted the logit modeling to empirically analyze the research data. The data extracted by questionnaire response by collecting online and 210 observations were collected. The estimation technique logistic regression for empirical analysis is preferred to use over the conventional regression method because of data nature, since the data of this research for all variables are categorical values and conventional regression may not provide accurate findings. Linear regression models were used for the data having a continuous numeric value; on contrast, the logistic regression models were applied for variables with binary values. In general, linear regression employs the sum of squared errors, whereas logistic regression applies maximum (log) likelihood. Due to the categorical nature of data, the logistic reassign is providing robust method ad better statistical inferences. This methodology is used when the response variable is binary or dichotomous in nature. For instance, in predictive analytic, it can be used to determine the probability of an event occurring such as "pass or fail." Since the response variable is dichotomous, it is bound between 0 and 1. Sperandei (2013) argues for the benefit accrued with the use of logit modeling in that it eliminates contradiction among variables being evaluated at that time.

Where the dependent variables are categorical, the empirical model may be expressed

$$k_i = V'_i \gamma + \mu_i \tag{1}$$

where $V'_i = \left[1, v_{i1}, v_{i2,........,}v_{ik}\right], \gamma = [\gamma_{0,}\gamma_{1,}\gamma_{2,...............,}\gamma_k]$ k_i is the target variable and can only take two possible values "pass or fail," "yes or no" or any other binary value.

It is assumed that the dependent variable follows a Bernoulli random variable with the probability function:

$$k_i = 1, Q(k_i = 1) = \pi_i$$

$$k_i = 0, Q(k_i = 0) = 1 - \pi_i$$

Assuming that E $(\mu_i) = 0$, then the averaged value of the depended variable will be

$$E(k_i) = V_i'\gamma = 1(\pi_i) + 0(1 - \pi_i) = \pi_i \tag{2}$$

From the above understanding, it means that $E(k_i) = V_i'\gamma$, the mean of the response variable, the probability that the independent assume value 1 which is the desired outcome of the study.

The challenge lies in the error term of the logit model where it can only take two variable answers that is either 1 or 0 to represent success and failure, respectively.

$$\mu_i = \begin{cases} 1 - V_i'\gamma \ when \ k = 1 \\ -V_i'\gamma \ when \ k = 0 \end{cases}$$

The are two other problems of the logit model including heteroscedasticity of residuals and failure of the error term to meet normality assumption.

$$\begin{aligned} \sigma^2 &= E[k_i - E(k_i)]^2 \\ &= (1 - \pi_i)^2 \pi_i + (0 - \pi_i)^2 (1 - \pi_i) \\ &= \pi_i(1 - \pi_i) = E(k_i)[1 - E(k_i)] \end{aligned} \tag{3}$$

This shows that the variance of disturbance term is dependent of the expected value of the response variable which eventually creates a restriction on target function.

$$0 \leq E(k_i) = \pi_i \leq 1$$

From the knowledge and understanding of the linear regression and its assumption, there is a likelihood that some target variable's values lie outside the interval [0,1]. Interpreting probability of such values is not possible.

In the situation where the target variables are binary or dichotomous, then results can be interpreted that variables nonlinear. In cases like this, the logit model is useful in describing the relationship between the response and explanatory variables. When drawn in the curve, it will for an S-shaped curve.

$$E(z) = \pi = \frac{e^{h(v)}}{1 + e^{h(v)}} = \frac{1}{1 + e^{-h(v)}} \tag{4}$$

where $h(V) = V_i'\gamma$. And the element $h(v)$ shows the linearity nature in the above model. We can replace these values in function (4) to get:

$$h(v) = ln\frac{\pi}{1 - \pi} \tag{5}$$

Since the values of parameters (v) are unknown, we have to estimate them. The maximum likelihood estimator (MLE) is used to estimate the parameters (v) by utilizing the general function below.

$$f_i(k_i) = \pi_i^{z_i}(1 - \pi_i)^{1-k_i} \, for \, i = 1, 2, \ldots, n \quad (6)$$

In the case where samples are independent, the likelihood function is used.

$$L(k_1, k_2, \ldots, k_n, \gamma) = \prod_{i=1}^{n} f_i(k_i) = \prod_{i=1}^{n} \pi_i^{k_i}(1 - \pi_i)^{1-k_i} \quad (7)$$

Equation (7) can then be linearized by taking log:

$$lnL(k_1, k_2, \ldots, k_n, \gamma) = \sum_{i=1}^{n}[k_i ln(\frac{\pi_i}{1 - \pi_i})] + \sum_{i=1}^{n} ln(1 - \pi_i) \quad (8)$$

Software can be used to maximize the log-likelihood function using iteratively re-weighted least squares method to estimate the parameters.

$$\widehat{h}(V) = V'\gamma \quad (10)$$

Therefore, the estimated value of logit model function is given as

$$\widehat{k} = \frac{1}{1 + exp(-V'\gamma)} = \widehat{\pi} \quad (11)$$

4 Results and discussion

4.1 Baseline results

This section provides the results and discussion of the study. Table 1 presents the logistic regression, taking consumer behavior toward the environment as a dependent variable, while Eco Labeling (EL), green packaging and branding (GPB), green product, premium, and pricing (GPPP), and environmental concerns and beliefs (ECB) as independent variables. The results show the ECB has a positive and significantly effect on the consumer behavior toward the environment; similarly, EL, GPB, and GPPP have a positive and significant effect on consumer behavior toward the environment. Eco-labeling and green product, premium, and pricing affect consumers' propensity to make ethical purchases. Eco-labeling, green product, premium, and price, and green packaging and branding were found to significantly and positively affect consumers' intentions to make green purchases. Furthermore, there was an impact of green brand image and consumer perspectives on the environment as a mediator between various marketing strategies and green purchasing intentions. The importance of eco-labeling, green packaging and branding, and green product, premium, and pricing was emphasized and proposed in this research. It is recommended that organizations take into account the results of this study while formulating environmentally friendly strategies, as well as the impact these strategies will have on the value, they create in today's competitive business climate. The study aided decision makers by providing them with new data and useful guidance. Politicians are accountable for enacting and implementing regulations pertaining to the marketing industry (Table 2).

The transition toward a greener industrial sector in the country is being anchored by the green production movement. Given the state of the market today, it is quite evident that customers desire environmentally responsible products more than they have in the

Table 1 Dependent variable: CS

Variable		Coefficient	
C		− 3.3075 (0.0020)	
ECB		3.524779 (0.0040)	
EL		3.518591 (0.0001)	
GPB		2.087246 (0.0032)	
GPPP		2.160783 (0.0078)	
McFadden R-squared	0.684463	LR statistic	156.1770
Akaike info criterion	0.390465		
Schwarz criterion	0.470158	Log likelihood	− 35.99878
Prob(LR statistic)	0.000000	Restr. log likelihood	− 114.0873

past. In a similar vein, the global demand for environmentally friendly products as well as increased knowledge of such items is on the rise, giving new potential for more environmentally friendly production. Our investigation has led us to a conclusion on where the phenomenon in question originated. According to the findings, the eco-friendly brand reaps significant benefits from cutting-edge production techniques that reduce their negative effects on the surrounding environment, because the use of environmentally friendly technology opens up new opportunities for businesses. In addition, the findings of this study illustrate the considerable influence that green creativity has on green production, indicating how green creativity is bringing forth fresh ideas for a more sustainable environment and cleaner industry. With cleaner production, everyone wins, including the firm and the client. According to the findings of the study, businesses have a chance to get positive attention from customers if they provide cutting-edge items that are also kind to the environment. Utilizing environmentally friendly technology results in a production process that is both more effective and generates less waste than traditional methods, giving the company an advantage in the market. If a business wants to be successful in the modern economy, it needs to find a method to differentiate itself from its rivals in a way that is attractive to customers. Only then can it hope to remain in operation. The same is true for environmentally friendly techniques of production, which give a competitive advantage to businesses who choose to use them. In order to protect the planet we live on, it is necessary to put up a fight against the deterioration of the natural environment and take a defensive stance (Zameer et al., 2020).

When building a targeted advertising campaign, it is vital to take into consideration the client's view of the relevance of the environment as well as the client's image of how the environment is seen by the client. These findings come from the study that was conducted. It was also shown that consumers' perceptions and intentions to purchase environmentally friendly items differed based on the type of product and the degree to which they valued it. This was proven through research. The findings provided support for the eco-friendly marketing approach that was founded on signaling theory. In the course of this investigation,

Table 2 Wald test

Test statistic	Value	Probability
t-statistic	5.571559	0.0000
F-statistic	31.04227	0.0000
Chi-square	31.04227	0.0000

the signaling theory was utilized to demonstrate how eco-friendly marketing may assist in making customers feel more at ease. The concept proposes that items that are green convey a sense of growth and vitality. Consumers are easier to persuade to fork out more funds for environmentally friendly products when they are offered this benefit, which can more than make up for the premium price of such items (Berger, 2019). It is crucial to have marketing efforts that center on the environment because these initiatives have the potential to generate powerful sentiments in customers and drive them to make purchases that are beneficial to the world. Previous studies on customer intentions to purchase environmentally friendly items have, for the most part, neglected the significance of word-of-mouth communication that does not include the use of written language. Because of this, green word of mouth (GWOM) has the potential to propagate positive word-of-mouth about a customer's positive experience through negative word-of-mouth, which increases the possibility that a satisfied customer would refer your environmentally friendly goods to their friends and family. According to the findings of this study, consumers who engage in ecologically sound behavior to transmit their status aspirations, which is supported by a significant degree of pleasant glow, self-expressive benefit, and natural experience, are more likely to make purchases of green products than consumers who do not engage in such behavior. This is because consumers who engage in such behavior are backed by a strong degree of pleasant glow, self-expressive benefit, and natural experience (Liao et al., 2020). The Wald test result is significant at 1 percent level, which suggests that all variables such Eco Labeling (EL), green packaging and branding (GPB), green product, premium, and pricing (GPPP), and environmental concerns and beliefs (ECB) have a joint effect on consumer behavior toward the environment. The measure of the predictions of the model is made using the binary specification, which is shown in Tables 3 and 4. The main purpose of binary specific in Table 3 provides the goodness-of-fit value, which measures the best possible binary value that best fit for the estimations of the coefficient value. The best possible binary value can provide efficient and accurate coefficient estimations, which enable researcher for better inferences. But Table 4 specifies expectation–prediction evaluation for binary specification, which is mainly used to predict specific binary value which provides accurate predictions. The test is performed by using mean and standard deviations and tested for both a lower (0) and an upper (1) number. The findings demonstrate that while forecasts based on the upper value's probability value (95.77) produce accurate results, those based on the probability value of the lower value (0) produce more accurate information and results, since it displays 100% accuracy. Due to the little variation, the model has successfully predicted consumer satisfaction on either 0 or 1.

4.2 Robustness tests of regression results

Due to China's long-standing reputation as a nation with a collectivist culture, a number of studies contend that social issues play a more significant role than environmental ones in influencing the purchasing decisions of Chinese customers who are interested in green products. The second factor that influences green purchasing decisions made by Chinese customers is the presence of ethical concerns. The findings indicated that an individual's own standards of acceptability had both a direct and an indirect impact on their inclination to buy environmentally friendly products and that this influence was exerted through the influence of moral principles. However, the results of this research indicated that a consumer's moral beliefs had an effect on the likelihood that they will purchase environmentally friendly items in a collectivist society. Based on these findings, it appears that the

Table 3 Goodness-of-fit evaluation for binary specification

	Quantile of risk			Dep=0		Dep=1	Total	H–L
	Low	High	Actual	Expect	Actual	Expect	Obs	Value
1.	0.0010	0.0010	21	20.9795	0	0.02052	21	0.02054
2.	0.0084	0.5283	19	17.8663	2	3.13368	21	0.48207
3.	0.6978	0.9003	6	5.93406	15	15.0659	21	0.00102
4.	0.9003	0.9067	0	2.06787	21	18.9321	21	2.29374
5.	0.9067	0.9874	1	0.82936	20	20.1706	21	0.03655
6.	0.9874	0.9874	0	0.26458	21	20.7354	21	0.26796
7.	0.9874	0.9874	1	0.26458	20	20.7354	21	2.07022
8.	0.9874	0.9874	1	0.26458	20	20.7354	21	2.07022
9.	0.9874	0.9874	0	0.26458	21	20.7354	21	0.26796
10.	0.9874	0.9874	0	0.26458	21	20.7354	21	0.26796
		Total	49	49.0000	161	161.000	210	7.77822
H–L statistic			7.7782		Prob. Chi-Sq(8)		0.4554	
Andrews statistic			115.7801		Prob. Chi-Sq(10)		0.0000	

Table 4 Expectation–prediction evaluation for binary specification

	Estimated equation			Constant probability		
	Dep=0	Dep=1	Total	Dep=0	Dep=1	Total
P(Dep=1)<=C	37	2	39	0	0	0
P(Dep=1)>C	12	159	171	49	161	210
Total	49	161	210	49	161	210
Correct	37	159	196	0	161	161
% Correct	75.51	98.76	93.33	0.00	100.00	76.67
% Incorrect	24.49	1.24	6.67	100.00	0.00	23.33
Total gain*	75.51	−1.24	16.67			
Percent gain**	75.51	NA	71.43			
E(# of Dep=0)	39.14	9.86	49.00	11.43	37.57	49.00
E(# of Dep=1)	9.86	151.14	161.00	37.57	123.43	161.00
Total	49.00	161.00	210.00	49.00	161.00	210.00
Correct	39.14	151.14	190.28	11.43	123.43	134.87
% Correct	79.88	93.88	90.61	23.33	76.67	64.22
% Incorrect	20.12	6.12	9.39	76.67	23.33	35.78
Total gain*	56.55	17.21	26.39			
Percent gain**	73.75	73.75	73.75			

*Change in "% Correct" from default (constant probability) specification

**Percent of incorrect (default) prediction corrected by equation

desire to purchase environmentally friendly items in the setting of China is driven more by an internalized moral imperative to "do what feels right" than by a desire to maintain societal norms as they currently exist (Liu et al., 2020). Studies have offered more evidence that eco-labeling is an essential component that will impact the decisions that customers

make. Since the 1980s, at the very least, there has been a serious reason for worry over the general public's lack of faith in ecologically friendly products. In the meanwhile, environmentally concerned customers are doing their part to aid the world. Recent studies reveal that customers do not place their faith in the numerous environmental labels that may be found on items. Recent research has also highlighted the significance of environmentally friendly branding and packaging in terms of its ability to influence customer decision making. Therefore, the cost of environmentally friendly products has a role in the decisions of consumers. Over the past several years, there has been an increase in the amount of information that is being disseminated concerning customer perceptions of environmentally friendly products. As a result, it is essential to disseminate information about environmentally friendly products in a style that can be understood by a wide variety of customers (Shabbir et al., 2020a, 2020b).

As a response to the growing public concern over global warming and the intensifying pressure from environmental pollution, many businesses are attempting to enhance their reputation in the public eye by manufacturing products that are more environmentally friendly. Increasing amounts of attention are being paid to the environmental management practices of small- and medium-sized organizations. In recent years, the concept of "green consumer behavior" has emerged as a new paradigm in academic circles as well as the marketing world. Green marketing is a relatively new concept, and it has just arisen as a tool for companies to separate themselves from their competitors and win over customers. As a result, businesses are putting in significantly greater effort to design recyclable items that can be maintained with a reduced amount of potentially harmful chemicals. Today's most prevalent academic pursuits include gaining an understanding of customers and devising environmentally responsible techniques for penetrating specialized markets. People's activities in fields of ecological significance are significantly influenced by people's awareness and concern for the environment. As a result, businesses are facing growing pressure to address concerns about the environment and create products that are beneficial to the environment. In prior research, the theory of planned behavior (TPB) has been utilized, for the most part, as the primary research tool to explore the elements that impact environmentally conscious purchasing. A consumer's level of commitment to protecting the environment is another important component that plays a role in forming their viewpoints and strategies for green purchasing (Liao et al., 2020). The results of this study are in line with past studies such as Shabbir et al. (2020a, 2020b), Majerova (2015), Kumari et al. (2022), and Dahlquist (2021). In the past studies, researchers applied different green marketing approaches and found that green marketing approaches has a positive effect on the consumer behavior.

4.3 Implications of the study results

The study results can help us understand the consumers perception about the environment and effective green marketing strategies to protect the environment. This knowledge can be applied to different countries, which helps businesses and policymakers to develop strategies and promote environmentally friendly consumer behavior in world. In addition, understanding the effect of green marketing strategies on consumer behavior can reveal significant market opportunities for international businesses. By employing effective green marketing strategies, businesses can capitalize on the global demand for sustainable products and services, thereby increasing their market share and enhancing their competitiveness. The study can help policymakers in other nations devise and implement regulations that encourage green marketing practices and sustainable consumer behavior. The findings

of this study can be used to develop policies that motivate businesses to adopt environmentally friendly strategies and educate consumers about the environmental impact of their decisions. The study's results could lead businesses, non-governmental organizations (NGOs), and other groups outside of China to start sustainability programs and campaigns which attempt influence consumers behavior. By applying different green marketing strategies, companies can make targeted plans to educate consumers and make positive changes for the environment.

5 Conclusion

It is claimed that green marketing initiatives may considerably impact both the attitudes and behavior of customers toward the environment. This study aims to investigate the relationship between consumer behavior toward the environment, Eco Labeling, green packaging and branding, green product, premium, and pricing, and environmental concerns and beliefs in China. We applied logistic regression for the analysis and found that ECB, EL, GPB, and GPPP has a positive and significant effect on consumer behavior toward the environment. We also observed that firms can archive both sale and revenue target by green marking strategies; in addition, these tools will lead to clean environment. To be more specific, we suggest that businesses consider the outcomes while establishing environmentally friendly strategies, as well as how the implementation of such strategies could influence value creation in the contemporary global business environment. The outcomes of this study can also be useful for policymakers who are responsible for developing marketing strategies. According to the findings of prior study, the literature on green marketing strategies and the influence these strategies have on customer behavior has a great deal of questions that have not been resolved. Because they have fewer resources and are subject to less pressure from the outside, small businesses tend to be less concerned about the environment than their bigger counterparts. A significant number of smaller businesses, particularly in the industrial sector, provide goods and services to bigger firms in the form of suppliers. Due to the growing prevalence of outsourcing in the operations of multinational corporations, there is an increasing amount of pressure on these corporations to take on greater levels of environmental responsibility. As a direct response to this pressure, there has been an increase in the development of "green supply chains" by these corporations in an effort to appear environmentally conscious. It is not a simple effort to create a supply chain that is environmentally friendly from the raw ingredients to the completed items. Globalization plays a part due to the fact that today's supply chains include suppliers located in a wide variety of geographic locations; nevertheless, outsourcing is also a significant component. The increase in the number of suppliers that are a part of supply chains can be attributed to the fact that many modern global manufacturing enterprises do nothing more than assemble the items they produce. Because of this, multinational corporations cannot only focus their attention on their primary suppliers if they want to guarantee the continuity of their supply chain; rather, they need to do the same for their secondary and tertiary suppliers as well. According to findings from focused study on green branding, customers favor and are more likely to purchase ecologically friendly items. As per the theory of reasoned action (TRA) and the theory of planned behavior (TPB), attitudes and behavioral intentions, which are representations of consumers' comprehensive mental evaluations of a brand, are held to be the best predictors of customers' actual behavior. This is because TRA and TPB hold that attitudes and behavioral intentions are the best

predictors of customers' actual behavior. In addition, TRA and TPB have been utilized rather extensively in order to elucidate the reasons why individuals purchase environmentally friendly products and how they feel about environmentally friendly businesses. It is feasible to evaluate an individual's reaction to green marketing methods by determining how they feel about environmentally friendly businesses and whether or not they intend to make any purchases from such enterprises. The current study, like many others before it, includes flaws that might be fixed in future research. Initially, we are focusing our research efforts on the Chinese-speaking population. Second, we provided no evidence that firms with green marketing strategies or products fitting those strategies were considered. Third, further research on the effectiveness of green marketing and related tactics is needed to bolster our results. As there is a wide variety of eco-friendly products on the market, it can be difficult to foresee how green marketing methods can influence customers' decisions to buy certain green products. The concept of environmental sustainability may be included in future research, and quantitative methods should be used to evaluate the effects of green marketing, especially on business results. To fully explore the concept of green marketing and its impact on consumer green purchase intention, more research in this area is needed. This research should focus on a variety of topics, such as how the green marketing concept can motivate people to take part in environmental protection by reducing the disposal of plastic waste and protecting natural resources. In future, firms may focus on developing environmentally friendly products as a means of reducing waste and pollution, and scientists may examine this possibility. Focus group interviews and other quantitative research methodologies may be used in future.

Data availability The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Conflict of interest The authors declare that there is no conflict of interest.

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