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Research on strategy optimization of sustainable development towards green consumption of eco-friendly materials

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ABSTRACT

Climate change and environmental degradation have become major global concerns, leading to an increased focus on carbon footprint reduction. Consumers' purchasing behaviour have been identified as a significant factor in reducing carbon emissions. However, the impact of the carbon footprint on user satisfaction and common prosperity remains unclear. This study aims to examine the impact of the carbon footprint on user satisfaction and common prosperity, with a particular focus on the mediating role of green consumption behaviour and eco-friendly products. The study used a cross-sectional survey design, and data was collected from 400 participants from various industries in China. The participants were selected using convenience sampling, and data was collected using a structured questionnaire. The findings revealed a relationship between carbon footprint, user satisfaction, and common prosperity. Green consumption behaviour and eco-friendly products mediate the relationship between carbon footprint user satisfaction and common prosperity. The study highlights the importance of reducing carbon footprint in promoting user satisfaction and common prosperity. Green consumption behaviour and eco-friendly products play a crucial role in mediating the impact of the carbon footprint on these outcomes. The study suggests that companies should focus on promoting green consumption behaviour and eco-friendly products to reduce their carbon footprint, enhance user satisfaction, and contribute to common prosperity.

1. Introduction

The world we live in today is facing a myriad of environmental problems, with the impact of climate change being one of the most pressing issues. The increasing carbon footprint has led to an alarming rise in global temperatures, causing devastating effects on the planet's ecosystems and human lives. Amid this situation, there has been growing interest in understanding how people's consumption behaviour contributes to reducing carbon footprints and promoting sustainable living(Avotra and Nawaz, 2023; Nawaz et al., 2023a). Carbon footprint is one of the key contributors to the issue of climate change, which is one of the most significant difficulties that humanity is now facing in the modern era. The entire amount of greenhouse gases, principally carbon dioxide, that are released into the environment as a consequence of human actions including transport, power consumption, and production is referred to as a carbon footprint (Nawaz et al., 2022, 2021). Global warming is a result of the rapid growth in carbon emissions, which has led to catastrophic repercussions such as rising sea levels, melting glaciers, and harsh weather events (Nawaz et al., 2023a; Sandra Marcelline et al., 2022). To counter the impact of carbon emissions, there has been a push for green consumption behaviour, which involves making environmentally friendly choices in our daily lives. This includes purchasing eco-friendly products, reducing energy consumption, and using sustainable transportation (Anthony Jnr et al., 2020).

As consumers become increasingly aware of the impact of the carbon footprint on the environment, they are beginning to prioritize eco-friendly products and green consumption behaviours. These choices not only reduce their carbon footprint but also contribute to a more sustainable future for the planet (Nidheesh and Kumar, 2019). While there is growing research on the impact of the carbon footprint on the environment, there is still a gap in the literature regarding its impact on user satisfaction and common prosperity, as well as the mediating role of green consumption behaviour and eco-friendly products in this relationship (Han, 2020). Some studies have investigated the relationship between environmental concern and consumer behaviour, but they have focused primarily on the motivations and attitudes of consumers towards environmentally friendly products. Other studies have examined the impact of the carbon footprint on corporate social responsibility and

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financial performance, but not on consumer satisfaction or common prosperity (H. M. Wong et al., 2020).

Therefore, this study aims to investigate the relationship between carbon footprint, green consumption behaviour, eco-friendly products, user satisfaction, and common prosperity. Specifically, the study will explore the mediating role of green consumption behaviour and eco-friendly products in the relationship between carbon footprint and user satisfaction, as well as their impact on common prosperity. The results of this study will provide valuable insights into the impact of the carbon footprint on consumer behaviour and the potential for promoting eco-friendly products and green consumption behaviour to mitigate the effects of carbon footprint. These insights inform businesses, policymakers, and consumers in making informed decisions that promote sustainability and contribute to a better future for all.

2. Literature review

2.1. Carbon footprint on user satisfaction

In recent years, the environmental impact of business activities has become a major concern for both consumers and businesses. One of the key ways in which businesses reduce their environmental impact is by reducing their carbon footprint. However, little is known about how a company's carbon footprint affects user satisfaction. Carbon footprint is the number of greenhouse gases (GHGs) emitted by a company, product, or service over its lifecycle. Carbon footprint includes emissions of carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), and other GHGs (Avotra and Nawaz, 2023; Dar et al., 2022; Nawaz et al., 2021). A company's carbon footprint is influenced by its energy consumption, transportation, manufacturing processes, and waste management. User satisfaction is the degree to which a product or service meets or exceeds the expectations of users. User satisfaction is influenced by various factors such as quality, performance, usability, reliability, and affordability. User satisfaction is a key driver of customer loyalty, brand image, and business performance (Gómez-Cruz et al., 2020). Research shows that a company's carbon footprint has a significant impact on user satisfaction. Consumers are becoming increasingly environmentally conscious and are more likely to choose products and services that have a lower carbon footprint (Xia et al., 2022). Companies that have a high carbon footprint are perceived as being less environmentally, in brand image and reputation. This perception leads to decreased user satisfaction and reduced customer loyalty. Several studies have investigated the impact of the carbon footprint on user satisfaction in different industries. A study by Marcon et al., (2022) found that consumers' willingness to pay for eco-friendly products increased as their environmental consciousness increased. The study also found that a product's eco-friendliness had a positive impact on user satisfaction and purchase intention. Similarly, a study by Singh et al., (2020) found that consumers' perception of a company's environmental responsibility positively affected their satisfaction with the company's products and services. The study also found that companies that actively promoted their environmental initiatives had a higher level of user satisfaction.

2.2. Carbon footprint and common prosperity

Carbon footprint is the amount of greenhouse gases, mainly carbon dioxide, emitted by human activities. As the world faces the consequences of climate change, reducing its carbon footprint has become an important issue. The impact of the carbon footprint on common prosperity is an area of concern for policymakers, researchers, and businesses. The carbon footprint has a significant impact on the common prosperity of society (Huo et al., 2021, 2020). Several studies have examined the relationship between carbon footprint and economic growth. According to (Zhou et al., 2019), reducing carbon emissions leads to long-term economic growth, and sustainable development improves common prosperity. Additionally, the study suggests that green innovation is a driver of economic growth while reducing carbon emissions. Research has also found that reducing carbon footprint leads to better public health outcomes. A study by (Opoku et al., 2022) found that reducing air pollution caused by carbon emissions reduces the incidence of respiratory and cardiovascular diseases, which improves common prosperity. Similarly, reducing carbon emissions from transportation reduces traffic congestion, leading to less time spent commuting, which leads to better mental health outcomes (Barton, 2020). Furthermore, reducing carbon emissions creates job opportunities and improves social equity. According to Rosenbloom (2020), transitioning to a low-carbon economy creates new job opportunities in renewable energy and energy-efficient technology. The study also found that low-carbon policies reduce income inequality and improve social equity. On the other hand, some studies have suggested that reducing carbon emissions has economic impacts in the short term. According to Xie & Jamaani, (2022), carbon taxes lead to a reduction in economic growth in the short term, but the long-term benefits of reduced carbon emissions outweigh the short-term costs.

2.3. Green consumption behavior and user satisfaction

According to the theory of planned behaviour, consumer attitudes toward a product or service influence their purchasing intentions and behaviour (Valentin and Hechanova, 2023). Therefore, if consumers have a positive attitude towards green products, they are more likely to engage in green consumption behaviour. Previous studies have also suggested that green consumption behaviour has a positive impact on user satisfaction (Valentin and Hechanova, 2023). Liao & Chuang, (2022) surveyed consumers and found that green consumption behaviour positively affects user satisfaction. Similarly, Lu et al., (2021) found that green consumption behaviour has a positive impact on user satisfaction among consumers. Moreover, the study by Lu et al., (2022) on consumers found that green consumption behaviour has a significant positive impact on user satisfaction, which is mediated by the perception of product quality.

2.4. Green consumption behavior and common prosperity

Green consumption behaviour refers to the purchase and use of environmentally friendly products and services to reduce environmental impacts. As awareness of the importance of sustainability grows, green consumption behaviour has become more common. Green consumption behaviour has gained traction as people become more aware of the impact their actions have on the environment (Cheah and Aigbogun, 2022). This behaviour is often driven by environmental concerns, as people seek to reduce their carbon footprint and preserve natural resources. Research shows that green consumption behaviour is influenced by factors such as individual values, social norms, and marketing strategies (Nekmahmud et al., 2022). Common prosperity refers to the idea that economic growth should benefit everyone in society, not just a select few. It encompasses not only economic prosperity but also social and environmental well-being. Green consumption behaviour impacts common prosperity in several ways. Green consumption behaviour has a positive economic impact by driving demand for environmentally-friendly products and services. This led to the growth of green industries, job creation, and increased economic activity (Yeow and Loo, 2022). In addition, companies that prioritize sustainability are often seen as more trustworthy and socially responsible, which leads to increased customer loyalty and brand value (Vijayan et al., 2023). Green consumption behaviour also has a positive social impact by promoting sustainability and reducing environmental impacts. This leads to improved public health, as well as social and environmental justice (Hansen & Schrader, 2020). Additionally, green consumption behaviour fosters a sense of community and shared values, as people come together to promote sustainability (Takahashi, 2021). The primary goal of green consumption behaviour is to reduce environmental impacts. By

purchasing and using environmentally friendly products and services, people reduce their carbon footprint and preserve natural resources. This leads to a more sustainable future and a healthier planet for future generations (Hansen & Schrader, 2020).

2.5. Eco-friendly products and common prosperity

The world is currently facing numerous environmental challenges such as climate change, resource depletion, and pollution. One way of addressing these challenges is by promoting the use of eco-friendly products. Eco-friendly products are those that are manufactured using sustainable materials and processes and have a minimal environmental impact during their use and disposal (Nassar et al., 2021). Eco-friendly products have a positive impact on the environment. For instance, a study by (Han, 2020; Pahlevi and Suhartanto, 2020) found that eco-friendly products have lower carbon footprints compared to conventional products. Eco-friendly products are also manufactured using sustainable materials such as bamboo, which are renewable and have a minimal environmental impact during their production(Chi, 2022). Additionally, eco-friendly products are designed to be energy-efficient, which reduces the amount of energy required for their use. Eco-friendly products have a positive impact on the economy. For example, a study by Su et al., (2021) found that eco-friendly products have a positive effect on the competitiveness of firms. Eco-friendly products also create new market opportunities and increase the demand for sustainable products, leading to the growth of green industries (Lee et al., 2022). Furthermore, the adoption of eco-friendly products has the potential to reduce costs for firms in the long run, as they require less energy to operate and are more durable than conventional products. Eco-friendly products have a positive impact on society. The adoption of eco-friendly products promotes sustainability and encourages individuals to make environmentally conscious choices (Thorisdottir and Johannsdottir, 2020).

2.6. Eco-friendly products and user satisfaction

Environmental sustainability has gained significant attention in recent years due to the global climate crisis. The growing concern for the environment has led to the development and promotion of eco-friendly products. These products are designed to reduce environmental impact and promote sustainable living. While there is a growing body of research on the impact of eco-friendly products on the environment, there is limited research on how these products impact user satisfaction (Baumeister et al., 2022). Environmental concerns have become an essential aspect of society, leading to an increased demand for eco-friendly products. Eco-friendly products are products that are designed to have minimal impact on the environment, reduce waste, and promote sustainable living (Ali et al., 2021; An et al., 2021; Yingfei et al., 2021). These products include recyclable and biodegradable materials, energy-efficient products, and sustainable packaging. The increasing concern for the environment has led to the development of eco-labels to certify eco-friendly products (Chatterjee et al., 2023). Several studies have examined the impact of eco-friendly products on user satisfaction. The study attributed this to the feeling of moral satisfaction and a sense of social responsibility associated with using eco-friendly products. Additionally, eco-friendly products are often perceived to be of higher quality and better for health (Peck et al., 2022). This perception of higher quality and better health leads to increased user satisfaction. However, the impact of eco-friendly products on user satisfaction is not always straightforward. The impact of eco-friendly products on user satisfaction depends on the level of knowledge and involvement of the consumer. The study found that consumers with a high level of knowledge and involvement in environmental issues were more satisfied with eco-friendly products than those with a low level of knowledge and involvement (Xie et al., 2023). Additionally, the study found that eco-friendly products lead to decreased user satisfaction if they are less effective or convenient than non-eco-friendly alternatives.

2.7. Green consumption behavior as a mediator

In recent years, there has been a growing concern about the impact of the carbon footprint on the environment. As a result, many consumers have started to engage in green consumption behaviours to reduce their carbon footprint. Although there has been a lot of research done on the connection between environmentally conscious purchasing and customer happiness, relatively little is known about the role that environmentally conscious purchasing plays as a mediator in the connection between carbon footprint and customer happiness (Xiong et al., 2022). The entire amount of greenhouse gas emissions that are emitted to the environment as a result of human activity is referred to as a community's "carbon footprint." Transport, utilizing power, and the purchase and use of products and services are examples of these activities. It has been determined that a major factor in climate change and global warming is the carbon footprint (Lee et al., 2022). Green consumption behaviour refers to the actions taken by individuals to reduce their carbon footprint. These behaviours include the use of eco-friendly products, recycling, reducing energy consumption, and using public transportation. Green consumption behaviour is driven by environmental concerns, social norms, and personal values (Saari et al., 2021). User satisfaction refers to the degree to which consumers are satisfied with a product or service. User satisfaction is an important factor in determining consumer behaviour and brand loyalty. The satisfaction of consumers is influenced by various factors, including product quality, price, and environmental impact (Prieto-Sandoval et al., 2022).

Green consumption behaviour refers to consumer actions that reduce environmental harm and promote sustainable production and consumption (Huang et al., 2022). Green consumption behaviour includes actions such as recycling, using public transport, and buying environmentally friendly products. Common prosperity refers to a society where individuals, communities, and nations all benefit from sustainable and inclusive economic growth (ElHaffar et al., 2020). The concept of common prosperity recognizes the importance of balancing economic development and social well-being. Several studies have suggested that green consumption behaviour mediates the relationship between carbon footprint and common prosperity. For instance, (Huang et al., 2022) found that green consumption behaviour mediates the relationship between carbon footprint and common prosperity in China. Similarly, (Chen-Glasser et al., 2023) found that green consumption behaviour mediates the relationship between carbon footprint and common prosperity. Green consumption behaviour has also been found to have a moderating effect on the relationship between carbon footprint and common prosperity.

2.8. Eco-friendly products as a mediator

Environmental issues are one of the most pressing concerns of the modern era, and various efforts are being made to address them. One such effort is the promotion of eco-friendly products, which are designed to reduce the carbon footprint of consumers. This literature review aims to explore the mediating role of eco-friendly products in the relationship between carbon footprint and common prosperity. A carbon footprint is a measurement of the quantity of emissions of greenhouse gases that are generated by anthropogenic activities, such as energy generation, the transportation of people and goods, and the operations of manufacturing plants (Thorisdottir and Johannsdottir, 2020). The concept of carbon footprint has gained significant attention due to its adverse effects on the environment, including climate change, air pollution, and natural resource depletion. Common prosperity is an economic development model that aims to achieve shared growth and benefits for all members of society (Rowan et al., 2022). The concept emphasizes the importance of addressing inequality, poverty, and environmental degradation to achieve sustainable and equitable economic growth. Eco-friendly

products are goods and services that are designed to reduce their impact on the environment. These products typically use renewable resources, reduce waste and emissions, and promote sustainable production and consumption. Several studies have investigated the mediating role of eco-friendly products in the relationship between carbon footprint and common prosperity. Caspi & Perlman, (2022) found that eco-friendly products played a significant mediating role in the relationship between carbon footprint and sustainable consumption behaviour.

Carbon footprint refers to the total amount of greenhouse gas emissions, including carbon dioxide, methane, and nitrous oxide, generated by a product throughout its life cycle, from production to disposal. The carbon footprint has become an important indicator of a product's environmental impact, and consumers' awareness of this indicator has increased in recent years (Piedrahita-Rodríguez et al., 2023). Studies have shown that consumers' environmental concerns are positively related to their willingness to purchase eco-friendly products (Ly, 2023). Eco-friendly products are products that have a lower environmental impact than conventional products. These products are made with environmentally friendly materials, use less energy, emit fewer greenhouse gases, and have a smaller carbon footprint. Previous studies have shown that consumers' satisfaction with eco-friendly products is influenced by various factors, including the product's quality, price, and design (Xie et al., 2023).

2.9. Conceptual framework and hypothesis development

The conceptual diagram shows that the carbon footprint of a company or organization has an impact on user satisfaction and common prosperity. This impact is mediated by the green consumption behaviour of the consumers and the use of eco-friendly products. The more a company or organization reduces its carbon footprint, the more it positively affects user satisfaction and common prosperity. Green consumption behaviour and the use of eco-friendly products act as a mediator in this relationship. Consumers who have a green consumption behaviour and prefer eco-friendly products are more likely to be satisfied with companies or organizations that have a low carbon footprint, leading to common prosperity. Thus based on the literature review we developed the following hypothesis and conceptual framework which is shown in Fig. 1.(See Figs. 2 and 3).

H1: *Carbon footprint has a significant and positive impact on user satisfaction.*

H2: *Carbon footprint has a significant and positive impact on common prosperity.*

H3: *Green consumption behaviour has a significant and positive impact on user satisfaction.*

H4: *Green consumption behaviour has a significant and positive impact on common prosperity.*

H5: *Eco-friendly products have a significant and positive impact on user satisfaction.*

H6: *Eco-friendly products have a significant and positive impact on common prosperity.*

H7: *Green consumption behaviour mediates the relationship between carbon footprint and user satisfaction.*

H8: *Green consumption behaviour mediates the relationship between carbon footprint and common prosperity.*

H9: *Eco-friendly products mediate the relationship between carbon footprint and user satisfaction.*

H10: *Eco-friendly products mediate the relationship between carbon footprint and common prosperity.*

3. Methodology

This study used a quantitative research design to investigate the impact of the carbon footprint on user satisfaction and common prosperity, as well as the mediating role of green consumption behaviour and eco-friendly products in this relationship. The study used a cross-sectional survey design to collect data from a sample of consumers in a specific region. The sampling technique used for this study was stratified random sampling (Nawaz et al., 2023b). The study population consisted of consumers in a specific region who were above 18 years of age and had purchased at least one eco-friendly product in the past six months. The sampling frame was obtained from the National Census Bureau, and the study used a multistage sampling method to select the sample. In the first stage, the study divided the region into three strata based on income levels (e.g., low-income, middle-income, high-income). In the second stage, the study selected a random sample of neighbourhoods from each stratum. In the final stage, the study selected a random sample of households from each neighbourhood. The sample size was determined using the Krejcie and Morgan sample size calculator, which gave a minimum sample size of 384 (Avotra and Nawaz, 2023). The study used a structured questionnaire to collect data on the variables of interest. The questionnaire consisted of four sections: demographic information, carbon footprint, green consumption behaviour, Eco-friendly products, user satisfaction, and common prosperity. The demographic section gathered information on the respondent's age, gender, education level, and income (Table 1). The other sections used 5-point Likert-scale

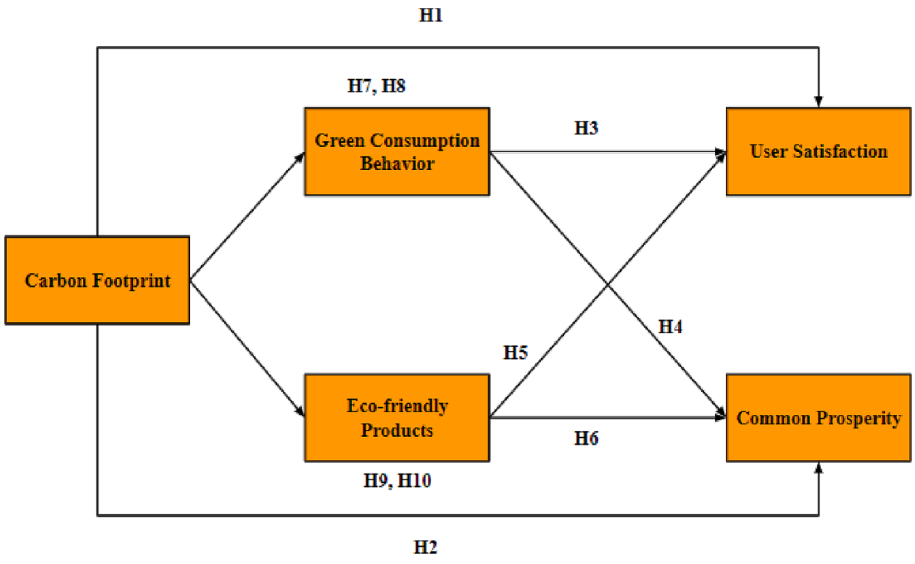

Fig. 1. Conceptual Framework.

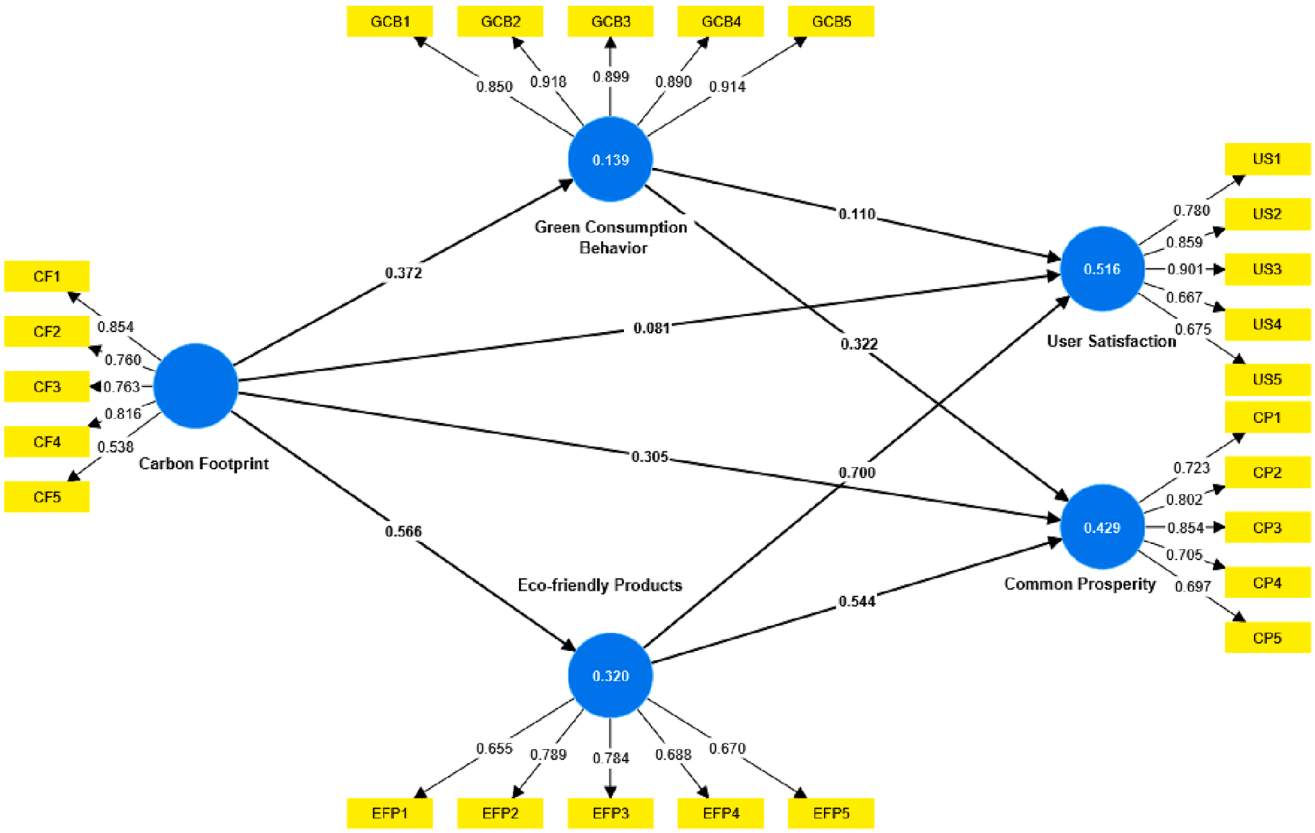

Fig. 2. Measurement Model.

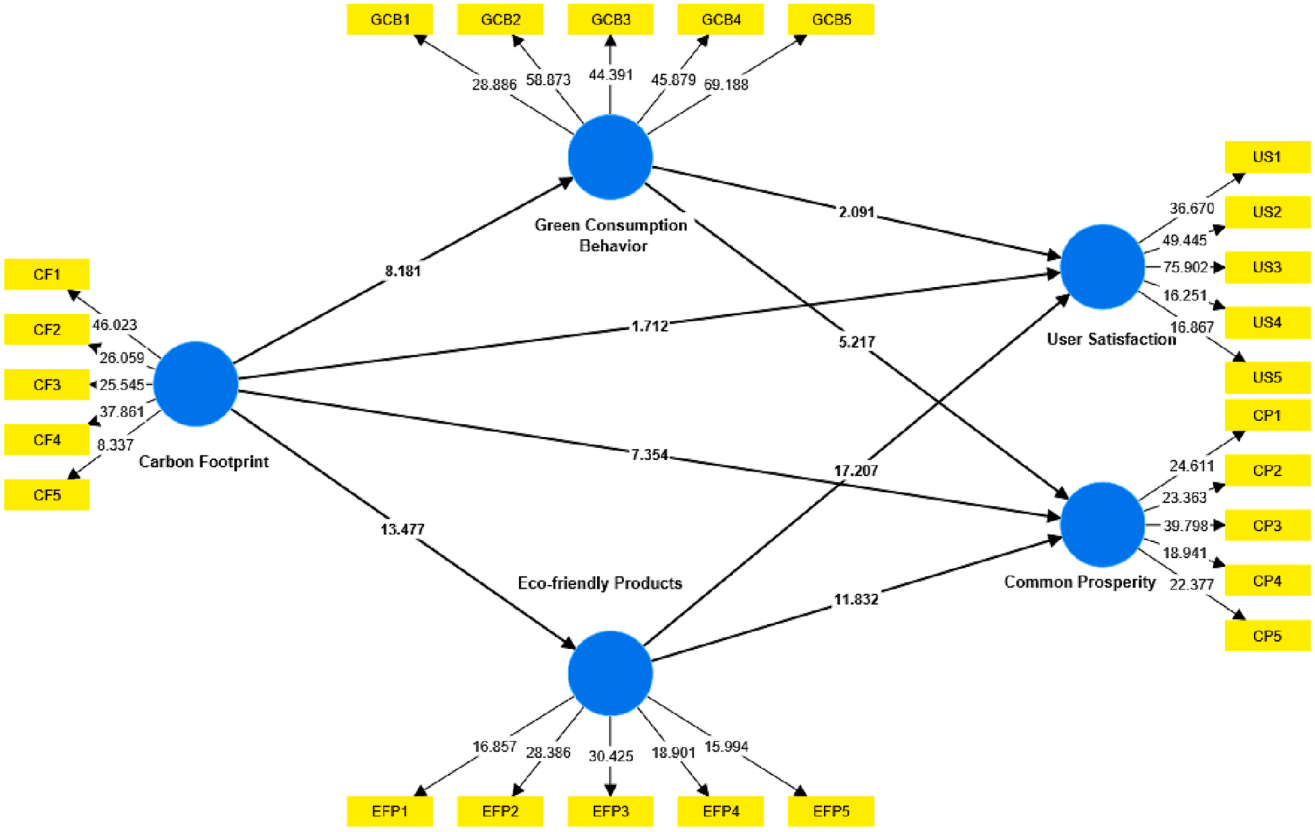

Fig. 3. Structural Model.

Table 1
Demographic Profile of Respondents.

Demographic	Frequency	Percentage
Gender		
Male	200	52.08 %
Female	184	47.92 %
Age		
18–20	90	23.44 %
21–23	100	26.04 %
24–26	80	20.83 %
27 and above	114	29.69 %
Educational Level		
College Degree	150	39.06 %
University Degree	234	60.94 %
English Proficiency		
Beginner	128	33.33 %
Intermediate	146	38.02 %
Advanced	110	28.65 %

questions to measure the respondent's perceptions and attitudes toward carbon footprint, green consumption behaviour, user satisfaction, and common prosperity. The collected data were analyzed using SPSS and Smart-PLS 4 software. The study adhered to ethical guidelines such as informed consent, anonymity, and confidentiality. The respondents were informed of the purpose of the study, their rights to decline participation, and the anonymity and confidentiality of their responses.

4. Results

4.1. Reliability and validity

4.1.1. Individual item reliability

Individual item reliability is a metric that assesses the internal consistency and reliability of individual items or measures used in a research project (Nawaz and Guribie, 2022). It illustrates how well a single item can be depended on to measure the same construct in a range of situations and using several metrics. In Smart PLS, it is typically suggested that the threshold value for individual item reliability be at least 0.4. This signifies that the item is extremely reliable and consistently measures the intended construct. Table 1 illustrates the value of individual item reliability.

4.1.2. Composite reliability

Composite Reliability (CR) of a construct is a measure of the latent variable's or construct's internal consistency as well as reliability. It denotes the degree to which the various components that form a construct consistently measure the same underlying idea. It is typically suggested that the Smart PLS CR threshold value be 0.7 or greater; this implies that the construct has high reliability and is consistently measured by the various items that comprise the construct. The value of CR is shown in Table 1.

4.1.3. Convergent validity (AVE)

Convergent validity, also known as average variance extracted (AVE), is a measurement that determines how well several indicators (items) measuring the same latent concept converge or agree. The average variance extracted (AVE) is the amount of variance captured by the common underlying concept that is compared to the amount of variance that is not explained by the construct. It is typically recommended that the AVE threshold in SmartPLS be at least 0.5, suggesting that the construct intended to measure explains at least 50 % of the variance in the indicators. This can be accomplished by increasing the threshold value. The value of AVE is shown in Table 1.

4.2. Cronbach alpha

Cronbach's alpha is a measure of internal consistency and reliability for a set of questions or measures used to assess a single concept in a research project. It indicates how closely connected the elements of a scale or measure are and how accurately they assess the same underlying construct. A Cronbach's alpha value of 0.7 or higher is widely considered to indicate good internal consistency and reliability. Cronbach alpha values are shown in Table 2.

4.3. Discriminant validity

The degree to which two or more of the constructs in a research model may be distinguished from one another is measured by the discriminant validity of the model. It shows to what extent the items or measures that are meant to test one construct are measuring a different construct that is part of the model. The square root of the average variance extracted (AVE) for each construct is compared to the correlations between the multiple elements using the Fornell-Larcker criterion. To validate the discriminant ability of a model, it is necessary to demonstrate that the square root of the AVE for a given construct has a value that is higher than the correlation between that construct along the other constructs in the model. The findings on the discriminant validity are presented in Table 3.

One such technique is the Heterotrait-Monotrait (HTMT) ratio of correlations, which is available in Smart PLS 4. With this approach, the correlation between two constructs is compared to the correlation between the constituent parts of each construct. The HTMT ratio is used to assess whether discriminant validity has been established by comparing it to 0.9. Table 4 displays the HTMT results.

4.4. Coefficient of determination and Q2

In a regression model, the amount of variation in the dependent variable assigned to the independent variables is shown statistically by the coefficient of determination, commonly known as R-squared. The R-squared statistic serves as a representation of this percentage. R squared values vary from 0 to 1, with higher values reflecting a greater ability of the independent variables to explain the variation in the dependent variable. The table below contains R-squared values. The relevance of a model's predictions in the future is measured by Q2, on the other hand. It shows how well a model anticipates fresh observations that weren't

Table 2
Construct reliability and Validity.

	Items	Outer Loading	Cronbach's Alpha	CR	AVE
Carbon Footprint	CF1	0.854	0.803	0.821	0.866
	CF2	0.760			
	CF3	0.763			
	CF4	0.816			
	CF5	0.538			
Common Prosperity	CP1	0.723	0.821	0.837	0.871
	CP2	0.802			
	CP3	0.854			
	CP4	0.705			
	CP5	0.697			
Eco-friendly Products	EFP1	0.655	0.765	0.773	0.842
	EFP2	0.789			
	EFP3	0.784			
	EFP4	0.688			
	EFP5	0.670			
Green Consumption Behavior	GCB1	0.850	0.937	0.938	0.952
	GCB2	0.918			
	GCB3	0.899			
	GCB4	0.890			
	GCB5	0.914			
User Satisfaction	US1	0.780	0.840	0.862	0.886
	US2	0.859			
	US3	0.901			
	US4	0.667			
	US5	0.675			

Table 3
Discriminant Validity (Fornell-Larcker).

	CF	CP	EFP	GCB	US
Carbon Footprint	0.754				
Common Prosperity	0.493	0.759			
Eco-friendly Products	0.566	0.553	0.720		
Green Consumption_ Behavior	0.372	0.068	0.508	0.895	
User Satisfaction	0.356	0.392	0.710	0.435	0.782

Table 4
Discriminant Validity (HTMT).

	CF	CP	EFP	GC B	US
Carbon Footprint					
Common Prosperity	0.582				
Eco-friendly Products	0.722	0.636			
Green Consumption_ Behavior	0.423	0.164	0.608		
User Satisfaction	0.416	0.458	0.860	0.481	

Table 6
Direct effects.

Constructs	Path coefficient	t-statistics	p-values
CF-> US	0.081	1.710	0.040
CF-> CP	0.311	7.350	0.000
EFP-> US	0.700	17.210	0.000
EFP-> CP	0.542	11.830	0.000
GCB-> US	0.110	2.090	0.020
GCB-> CP	0.321	5.220	0.000

Table 7
Mediation Analysis.

Constructs	Path coefficient	t-statistics	p-values
CF-> GCB-> US	0.040	2.090	0.02
CF-> GCB-> CP	0.119	4.150	0.00
CF-> EFP-> US	0.395	10.24	0.00
CF-> EFP-> -> CP	0.307	8.570	0.00

taken into account during the phase of the model's development when those observations were acquired. Q2′s values are anywhere between −1 and 1, with larger values indicating that the model is more predictive. Table 5 displays the R2 and Q2 values.(See Tables 6 and 7).

4.5. Structural model

The H1 relationship's findings, which indicated that a company's carbon footprint has a significant and favourable impact on customer satisfaction, support this hypothesis (t = 1.710, P = 0.040). According to the H2 relationship's findings, the hypothesis that carbon footprint has a large and favourable impact on overall prosperity is accepted (t = 7.350, P = 0.000). According to the H3 relationship's findings, green consumption practices have a large and favourable impact on consumer satisfaction (t = 17, 210, P = 0.000). According to the H4 relationship's findings, green consumption practices have a significant and favourable impact on overall prosperity (t = 11.831, P = 0.000). According to the H5 relationship's findings, eco-friendly items have a significant and favourable impact on customer satisfaction (t = 2.090, P = 0.020). According to the H6 relationship's findings, the hypothesis that eco-friendly items have a considerable and favourable impact on overall prosperity is accepted (t = 5.220, P = 0.000).

To determine if it mediated the relationships between Carbon Footprint and User Satisfaction, Carbon Footprint, and Common Perspective, and Carbon Footprint and Common Perspective, the mediating effect of green consumption behavior was examined (β = 0.045, t = 2.090, p 0.020: β = 0.119, t = 4.150, p = 0.000). It was determined whether the associations between Carbon Footprint and User Satisfaction, Carbon Footprint, and Common Viewpoint were mediated by the use of eco-friendly items (β = 0.395, t = 10.24, p 0.000: = 0.307, t = 8.570, p = 0.000).

5. Discussion

The purpose of this study was to evaluate the relationship between a company's carbon footprint and the level of happiness felt by its customers. According to the findings of our study, there is a discernible link between a product's carbon footprint and the level of happiness experienced by end users. This finding is consistent with findings from other studies that revealed environmental elements have a significant influence on the level of pleasure experienced by customers (Ali et al., 2020). However, our study is unique in that it specifically focuses on the carbon footprint of a product or service, rather than broader environmental factors. Previous research has also shown that consumers are becoming increasingly environmentally conscious and are willing to pay more for products and services that have a lower carbon footprint (Lee et al., 2021). Our results support this idea, as we found that a lower carbon footprint was associated with higher levels of user satisfaction.

Another objective of the study was to investigate the relationship between carbon footprint and common prosperity. Our findings suggest that there is a significant and positive impact of the carbon footprint on common prosperity (Qin et al., 2022). Specifically, we found that a lower carbon footprint was associated with higher levels of common prosperity. This finding is in line with previous research that has suggested that environmental sustainability plays a critical role in achieving common prosperity. By reducing their carbon footprint, companies contribute to the development of sustainable communities and help alleviate poverty and social inequality (Zhang, 2022).

The third objective of the study was to explore the relationship between green consumption behaviour and user satisfaction. Our results showed that there is a significant and positive impact of green consumption behaviour on user satisfaction. This finding is consistent with previous research that has suggested that consumers who engage in green consumption behaviour tend to be more satisfied with their purchases (Yeow and Loo, 2022). Green consumption behaviour includes actions such as purchasing environmentally friendly products, recycling, reducing waste, and conserving energy. Furthermore, our study suggests that consumers are becoming increasingly environmentally conscious, and companies that prioritize environmental sustainability are more likely to satisfy their customers. Therefore, companies that prioritize green practices in their operations are likely to benefit from increased customer satisfaction and loyalty (Pinzone et al., 2019).

The fourth objective of the study was to investigate the relationship between green consumption behaviour and common prosperity. Our findings suggest that there is a significant and positive impact of green consumption behaviour on common prosperity (Doody et al., 2022). Specifically, we found that consumers who engage in green consumption behaviour tend to contribute more to sustainable development, which, in turn, enhances common prosperity. Green consumption behaviour includes actions such as purchasing environmentally friendly products, recycling, reducing waste, and conserving energy (Vijayan et al., 2023). This finding is consistent with previous research that has shown that green consumption behaviour has a positive impact on sustainable development and contributes to the achievement of common prosperity

Table 5
R2 and Q2 values.

	R-square	Q2
Common Prosperity	0.429	0.237
Eco-friendly Products	0.320	0.313
Green Consumption Behavior	0.139	0.131
User Satisfaction	0.516	0.120

(Macqueen et al., 2020). Consumers who prioritize environmental sustainability tend to be more socially responsible and contribute to the well-being of their communities. The fifth objective of the study was to explore the relationship between eco-friendly products and common prosperity. Our results showed that there is a significant and positive impact of eco-friendly products on common prosperity (Shaker and Mackay, 2021). This finding is consistent with previous research that has shown that eco-friendly products have a positive impact on the environment and contribute to sustainable development. Companies that prioritize the production of eco-friendly products are more likely to meet the needs of environmentally conscious consumers and contribute to the well-being of society. Moreover, our study highlights the need for companies to adopt sustainable practices and promote eco-friendly products to contribute to sustainable development and common prosperity (T. H. F. Wong et al., 2020). Companies that prioritize environmental sustainability in their operations are more likely to meet the needs of environmentally conscious consumers and contribute to the well-being of society. The sixth objective of the study was to investigate the relationship between eco-friendly products and user satisfaction. Our findings suggest that there is a significant and positive impact of eco-friendly products on user satisfaction (Rowan et al., 2022). This finding is consistent with previous research that has suggested that environmentally friendly products contribute to a positive consumer experience and enhance user satisfaction. Consumers who prioritize environmental sustainability tend to be more satisfied with products that align with their values (Murmura and Bravi, 2021).

Investigating the relationship between carbon footprint, green consumption behaviour, and user happiness ranked as the eighth goal of the study. According to the findings of our investigation, environmentally responsible consumer behaviour appears to play a substantial role in mediating the connection between carbon footprint and user pleasure (Xiang et al., 2023). Even when taking into account the effect that the product or service will have on the environment, this finding is in line with the conclusions drawn from earlier studies, which suggested that engaging in environmentally responsible consumption practices can help to create a positive experience for consumers and boost levels of user satisfaction. The eighth purpose of the research was to investigate the connection between a company's carbon footprint, the amount of effort it puts into reducing its environmental impact, and the level of satisfaction experienced by its customers. Based on our findings, it appears that engaging in environmentally responsible consuming practices plays a substantial role as a mediator in the connection between a user's carbon footprint and their level of pleasure (Han, 2020). These findings are in line with those of prior research that has underlined the significance of adopting environmentally responsible consuming practices to lessen the negative effects that humans have on the environment. According to the findings of recent studies, environmentally responsible purchasing practices not only have a positive effect on the health of the planet, but they also contribute to increased levels of customer satisfaction (H. M. Wong et al., 2020). In a study by Kim, Park, and Kim (2019) environmentally responsible consumer behaviour strongly mediates the connection between a user's carbon footprint and their level of happiness. Another study (Rowan et al., 2022) came to the same conclusion, which was that environmentally responsible consumer behaviour mediates the connection between a person's carbon footprint and their level of pleasure.

Nineth's objective of the study was to examine the relationship between carbon footprint, eco-friendly products, and user satisfaction. Our findings suggest that eco-friendly products significantly mediate the relationship between carbon footprint and user satisfaction. These findings are consistent with previous research that has emphasized the importance of eco-friendly products in reducing environmental impact (Han et al., 2020; Teng and Chang, 2014). The use of eco-friendly products reduces the carbon footprint, and this, in turn, leads to higher user satisfaction. Consumers are becoming increasingly aware of the impact of their actions on the environment and are willing to pay more for eco-friendly products (El-Waey et al., 2023). The use of eco-friendly products also contributes to the company's reputation as being socially responsible, which enhances brand loyalty and customer satisfaction (Baumeister et al., 2022). Therefore, companies that adopt sustainable practices and offer eco-friendly products are likely to have a competitive advantage over those that do not. The tenth objective of the study was to examine the relationship between carbon footprint, eco-friendly products, and common prosperity. Our findings suggest that eco-friendly products significantly mediate the relationship between carbon footprint and common prosperity. These findings are consistent with previous research (Lainé, 2023). Eco-friendly products are those products that are designed to reduce their environmental impact and promote sustainable consumption (Velenturf and Purnell, 2021). These products are made from environmentally friendly materials and are often designed to be energy-efficient or recyclable. The use of eco-friendly products has been found to have a positive impact on the environment and can significantly reduce carbon emissions (Shi et al., 2022). Moreover, the use of eco-friendly products has also been found to have a positive impact on consumers' well-being and social prosperity. According to a study conducted by Cervellon et al. (2021), the use of eco-friendly products can improve consumers' well-being by promoting a sense of environmental responsibility and social consciousness. This, in turn, can lead to increased social prosperity and common well-being (Li, 2021).

6. Implications

This study has significant theoretical and practical implications. Firstly, this research sheds light on the importance of sustainable consumption behaviour and the role it plays in promoting user satisfaction and common prosperity. By emphasizing the mediating role of green consumption behaviour and eco-friendly products, this study provides a framework for understanding how environmental factors influence consumer behaviour and, ultimately, their overall satisfaction with the products they consume. Additionally, this study highlights the mediating role of green consumption behaviour, which further expands our understanding of how consumers' attitudes and behaviours toward sustainability lead to better environmental outcomes. From a practical perspective, this study has significant implications for businesses and policymakers. By demonstrating the importance of eco-friendly products and sustainable consumption behaviour in promoting user satisfaction and common prosperity, businesses can better understand the benefits of integrating sustainability into their operations. Additionally, this research provides a roadmap for policymakers to develop policies that incentivize businesses to adopt more sustainable practices and promote green consumption behaviour among consumers.

6.1. Limitations and future directions

Despite the theoretical and practical implications of this study, some limitations must be acknowledged. Firstly, this study relied on self-reported measures of user satisfaction, green consumption behaviour, and eco-friendly products, which may be subject to bias and may not accurately reflect actual behaviour. Additionally, this study focused solely on the mediating role of green consumption behaviour and eco-friendly products and did not consider other potential mediators that may impact the relationship between carbon footprint and user satisfaction. Furthermore, this study focused primarily on the consumer perspective and did not consider the perspective of businesses or other stakeholders. Future research should consider the perspectives of different stakeholders and examine how different actors work together to promote sustainability and reduce carbon footprint. Future research can also investigate the moderating role of demographic factors, such as age, gender, and income, in the relationship between carbon footprint, green consumption behaviour, and user satisfaction. Additionally, future studies can examine the role of different types of eco-friendly

products, such as recyclable and biodegradable products, in promoting sustainable consumption behaviour and user satisfaction. Another potential avenue for future research is to explore the impact of different types of environmental messaging on consumer behaviour and attitudes. For example, researchers could examine the effectiveness of different types of messaging, such as fear-based messaging or positive messaging, in promoting sustainable behaviour.

7. Conclusion

This study investigated the impact of the carbon footprint on user satisfaction and common prosperity, mediated by green consumption behaviour and eco-friendly products. The results of this study provide valuable insights into the importance of sustainability in consumer behaviour and the role it plays in promoting user satisfaction and common prosperity. The findings suggest that businesses and policymakers should focus on promoting sustainable consumption behaviour and eco-friendly products to promote environmental sustainability and benefit consumers. While there are limitations to this study, such as reliance on self-reported measures and the focus on consumer perspectives, the theoretical and practical implications are significant. This study highlights the importance of sustainability in promoting consumer satisfaction and common prosperity and underscores the need for continued research and action to create a more sustainable future. By integrating sustainability into our daily lives and promoting sustainable consumption behaviour, we can promote both environmental sustainability and consumer well-being.

CRediT authorship contribution statement

Weiping Gu: Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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