

Algorithm-Driven Sustainable Consumption: Examining the Influence of Social Media Algorithms on Consumer Behavior Through Perceived Green Value and Environmental Awareness

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Abstract

The rapid growth of social media platforms has significantly influenced how consumers access information and make purchasing decisions. This study examines the impact of social media algorithm on consumer behavior, with perceived green value and environmental awareness serving as mediating variables among consumers in Pakistan. The study investigates how algorithm-driven content shapes consumers' perceptions of green products, increases environmental awareness, and influences sustainable purchasing behaviour. A quantitative research design was adopted, and data were collected from 360 respondents using a structured questionnaire based on a five-point Likert scale. The data were analyzed using SmartPLS 4 to assess both the measurement and structural models. The structural model showed that all proposed hypotheses were supported. Social media algorithm had significant positive effects on perceived green value ($\beta = 0.681$, $p < 0.001$) and environmental awareness ($\beta = 0.592$, $p < 0.001$). In addition, perceived green value ($\beta = 0.473$, $p < 0.001$) and environmental awareness ($\beta = 0.286$, $p < 0.001$) significantly influenced consumer behavior, while the direct effect of social media algorithm on consumer behavior was also positive and significant ($\beta = 0.162$, $p = 0.001$). The findings highlight the role of social media algorithms in promoting sustainable consumer behavior through enhanced green value perceptions and environmental awareness.

Keywords: social media algorithm; perceived green value; environmental awareness; consumer behavior; sustainable consumption

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1. Introduction

The rapid advancement of digital technologies has transformed the way businesses communicate with consumers and influence their purchasing decisions (Antczak, 2024). Among these technological developments, social media has emerged as one of the most powerful marketing platforms, enabling organizations to reach millions of users through personalized content and targeted advertising. Social media platforms such as Facebook, Instagram, TikTok, YouTube, and X (formerly Twitter) use sophisticated algorithms to analyze users' interests, browsing history, interactions, and online behavior (Poleac & Gherguț-Babii, 2024). These algorithms determine the type of content displayed to users, making social media an effective tool for influencing consumer attitudes and purchasing decisions (Joans & Sheila, 2025). Understanding the role of social media algorithms has become increasingly important for researchers, marketers, and policymakers.

In recent years, growing environmental concerns, including climate change, pollution, and resource depletion, have encouraged consumers to adopt more sustainable consumption patterns. Consumers are becoming more aware of the environmental consequences of their purchasing decisions and are increasingly demanding

products that are environmentally friendly (Mahmoud et al., 2022). This shift has motivated businesses to adopt green marketing strategies and communicate the environmental benefits of their products through digital platforms. Social media has become a key channel for promoting sustainability because it allows organizations to share information about green products, environmental campaigns, and sustainable business practices with a large audience (Ummar et al., 2023). Social media algorithms play a significant role in determining which environmental messages consumers receive. By analyzing users' preferences and engagement patterns, algorithms deliver personalized content that is more likely to capture users' attention (Eg et al., 2023). Consequently, consumers who frequently engage with sustainability-related content are more likely to receive additional information about environmentally friendly products and practices. According to Hlaváček et al. (2023), repeated exposure may increase consumers' awareness of environmental issues and improve their perceptions of the value associated with green products. Therefore, social media algorithms have the potential to influence not only consumers' knowledge but also their purchasing behavior.

Perceived green value refers to consumers' overall evaluation of the environmental benefits and usefulness of a product compared with its alternatives (Ng et al., 2024). When consumers believe that a product contributes to environmental protection while also providing quality and value, they are more likely to purchase it. Similarly, environmental awareness reflects consumers' understanding of environmental problems and their willingness to support environmentally responsible behavior (García-Salirrosas et al., 2024). Individuals with higher levels of environmental awareness are generally more inclined to choose sustainable products and adopt eco-friendly consumption practices (Kim & Lee, 2023). These two factors are therefore expected to play important mediating roles between social media algorithms and consumer behavior.

Consumer behavior is a dynamic concept that involves the processes through which individuals select, purchase, use, and evaluate products and services (Islam & Ali Khan, 2024). In the context of green marketing, consumer behavior refers to consumers' willingness to purchase environmentally friendly products and support sustainable business practices. Modern consumers are increasingly influenced by online information, peer recommendations, influencer marketing, and personalized advertisements generated through social media algorithms (Theodorakopoulos et al., 2025). As digital platforms continue to dominate communication and marketing activities, understanding how algorithm-driven content affects consumer behavior has become essential for organizations seeking to promote sustainable products.

In Pakistan, internet access and smartphone use have increased significantly over the past decade, driving rapid growth in social media use across demographic groups (Ittefaq et al., 2022). Businesses are increasingly investing in digital marketing campaigns to engage consumers and build long-term relationships through personalized online experiences (More, 2023). At the same time, environmental challenges such as pollution, waste management, and climate change have heightened public interest in sustainability. Afzal et al. (2024) also found that social media algorithms influence green consumer behavior in Pakistan. Most previous studies have focused on general social media marketing or green marketing independently, leaving a gap in understanding the combined influence of algorithm-driven content, perceived green value, environmental awareness, and consumer behavior.

This study addresses this gap by examining the direct effect of social media algorithm on consumer behavior, as well as the mediating roles of perceived green value and environmental awareness. The study provides empirical evidence regarding the relationships among these variables. By understanding how social media algorithms shape consumers' environmental perceptions and purchasing decisions, organizations can develop more effective digital marketing strategies that promote sustainable products and encourage environmentally responsible consumer behavior in Pakistan.

2. Literature Review

2.1. Social Media Algorithm and Perceived Green Value

Social media algorithms have significantly transformed digital marketing by delivering personalized content based on users' interests, online activities, and previous interactions (Ittefaq et al., 2022). In green marketing,

these algorithms recommend environmentally friendly products, sustainability campaigns, and eco-conscious brands that match consumers' preferences. Personalized recommendations improve the visibility of green products and enable consumers to access relevant environmental information more efficiently (Singha, 2024). As consumers are repeatedly exposed to sustainability-related content, they become more familiar with the environmental attributes and benefits of green products. Perceived green value refers to consumers' overall assessment of a product's environmental benefits and value. Consumers who receive accurate and personalized green marketing information through social media algorithms are more likely to recognize the environmental advantages of sustainable products (Nair & Manohar, 2024). Algorithm-driven recommendations reduce information overload and help consumers evaluate green products more effectively, leading to stronger perceptions of environmental value (Gombar, 2025). Therefore, personalized social media algorithms can enhance consumers' perceived green value by providing relevant and informative sustainability-related content. Thus, the following hypothesis is proposed.

H1: Social media algorithm positively influences perceived green value.

2.2. Social Media Algorithm and Environmental Awareness

Environmental awareness reflects an individual's understanding of environmental issues and the willingness to adopt environmentally responsible behaviors (de Groot et al., 2023). Social media has become a primary source of environmental information because it continuously exposes users to educational content, environmental campaigns, and sustainability initiatives (Meng et al., 2023). Social media algorithms further strengthen this process by prioritizing content that matches users' interests and previous online engagement. Through repeated exposure to personalized environmental messages, consumers become more aware of issues such as climate change, pollution, waste management, and sustainable consumption. Algorithmically curated green marketing content encourages consumers to understand the environmental consequences of their purchasing decisions and motivates them to adopt environmentally friendly lifestyles (Gombar, 2025). Consequently, social media algorithms significantly increase consumers' environmental awareness through continuous, personalized information delivery. Thus, the following hypothesis is proposed.

H2: Social media algorithm positively influences environmental awareness.

2.3. Perceived Green Value and Consumer Behavior

Consumer behavior refers to consumers' purchasing and consumption decisions regarding environmentally friendly products and sustainable practices (Abdou et al., 2022). Perceived green value plays an important role in influencing these decisions because consumers tend to purchase products that they believe provide superior environmental benefits and overall value (Luo et al., 2022). When consumers perceive that a product contributes positively to environmental protection while meeting their expectations, they are more likely to prefer it over conventional alternatives (Shimul & Cheah, 2023). Higher perceived green value also strengthens consumers' confidence in purchasing sustainable products and encourages long-term environmentally responsible behavior. As consumers recognize the environmental and functional benefits associated with green products, they become more willing to support businesses that adopt sustainable practices (Zhu et al., 2023). Perceived green value serves as a key determinant of environmentally responsible consumer behavior. Thus, the following hypothesis is proposed.

H3: Perceived green value positively influences consumer behavior.

2.4. Environmental Awareness and Consumer Behavior

Environmental awareness is widely recognized as one of the strongest predictors of sustainable consumer behavior (García-Salirrosas et al., 2024). Individuals who possess greater knowledge of environmental problems are more likely to consider the environmental consequences of their purchasing decisions (Ogiemwonyi et al., 2023). They actively seek eco-friendly products, reduce unnecessary consumption, and support organizations that promote sustainability. Environmentally aware consumers are also more willing

to adopt behaviors that contribute to environmental preservation, including purchasing biodegradable products, reducing waste, and supporting green marketing initiatives (Mahmoud et al., 2022). According to Kumar and Pandey. (2023), awareness of environmental issues increases, consumers become more motivated to integrate sustainability into their everyday purchasing decisions. Therefore, environmental awareness positively contributes to environmentally responsible consumer behavior. Thus, the following hypothesis is proposed.

H4: Environmental awareness positively influences consumer behavior.

2.5. Social Media Algorithm and Consumer Behavior

Social media algorithms have become influential tools in shaping consumer behavior by continuously recommending products and information that align with users' interests and preferences (Joans & Sheila, 2025). Within the context of green marketing, personalized algorithms expose consumers to environmentally friendly products, sustainability campaigns, and educational content that encourage environmentally responsible purchasing decisions. According to Nabivi (2025), frequent interaction with personalized green content increases consumer engagement and strengthens trust in sustainable brands. Besides influencing consumers through perceived green value and environmental awareness, social media algorithms may also directly affect purchasing behavior by repeatedly presenting environmentally friendly products during consumers' online activities (Xie & Madni, 2023). Continuous exposure to such recommendations encourages consumers to consider sustainable alternatives and adopt environmentally responsible consumption patterns. Social media algorithms directly promote sustainable consumer behavior while simultaneously supporting the development of green values and environmental awareness. Thus, the following hypothesis is proposed.

H5: Social media algorithm influences consumer behavior.

2.6. Mediation Role of Perceived Green Value and Environmental Awareness

Social media algorithms play a significant role in shaping the content users see, including environmentally related information, eco-friendly products, and green brand messaging. When users are repeatedly exposed to such content through algorithmic curation, they develop a stronger perceived green value—that is, an enhanced belief that green products or services offer meaningful benefits and align with their personal values. This perceived green value, in turn, serves as an internal motivational driver that encourages individuals to translate their green beliefs into actual consumer behavior, such as purchasing eco-friendly products, supporting sustainable brands, or adopting green consumption practices. Drawing on the Stimulus–Organism–Response (SOR) framework and Value–Belief–Norm perspective, the social media algorithm can be viewed as an external stimulus that influences the consumer's internal value perception (organism), which subsequently shapes their behavioral response. Social media algorithms also determine the frequency, prominence, and framing of environmental content — such as climate change news, sustainability campaigns, and eco-friendly practices — delivered to users. Continuous exposure to such algorithmically curated content enhances users' environmental awareness, referring to their knowledge, concern, and consciousness about environmental issues and the consequences of their actions. When environmental awareness is heightened, individuals are more likely to engage in responsible consumer behavior, including choosing sustainable products, reducing waste, and favoring environmentally responsible brands. From a social cognitive and information-processing standpoint, algorithmic exposure serves as an informational input that raises awareness (a cognitive state), which then motivates behavior (an action state). Environmental awareness has been widely validated as a mediator between environmental communication and pro-environmental behavior. Hence, it is proposed that:

H6: Perceived green value mediates the relationship between social media algorithm and consumer behavior.

H7: Environmental awareness mediates the relationship between social media algorithm and consumer behavior.

Figure 1 presents research model.

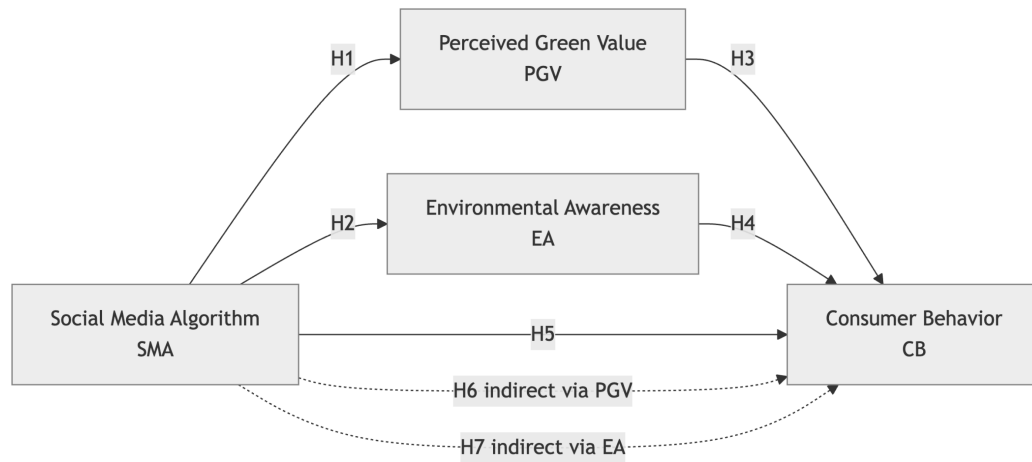


Figure 1. Research model.

3. Methodology

This study employed a quantitative research design to examine the influence of social media algorithms on promoting sustainable consumption with respect to green marketing. A convenience sampling technique was adopted to collect data from 360 active social media users in Pakistan. The sampling technique was considered appropriate because it enabled the researcher to obtain responses from individuals who regularly use social media platforms and are exposed to green marketing content. Data were collected through a structured self-administered questionnaire distributed online. The questionnaire consisted of two sections: the first section gathered respondents' demographic information, while the second section measured the study constructs. All measurement items were assessed using a five-point Likert scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree), to capture respondents' perceptions regarding social media algorithms, perceived green value, environmental awareness, and consumer behavior.

The measurement scales used in this study were adapted from previously validated research and modified to suit the context of social media-based green marketing. Social media algorithm was measured using four items adapted from prior research (Zarouali et al., 2021) on algorithmically curated social media content and modified to reflect personalized sustainability-related recommendations. Perceived green value was measured using four items adapted from Chen and Chang (2012). Environmental awareness was assessed using four items adapted from previous sustainability studies (Nekmahmud & Fekete-Farkas, 2020), while consumer behavior was measured using six items adapted from Quoquab and Mohammad (2020) and Nabivi (2025). Data analysis was conducted using Structural Equation Modeling (SEM) through SmartPLS 4. This approach enabled assessment of direct and indirect relationships among the study variables and provided empirical evidence to test the proposed hypotheses on the impact of social media algorithms on perceived green value, environmental awareness, and consumer behavior.

4. Results

Table 1 presents the demographic characteristics of the 360 respondents who participated in this study. The sample consisted of 52.2% females and 47.8% males, indicating a relatively balanced gender distribution. Most respondents (43.3%) were aged 18–25 years, followed by 32.8% in the 26–35 years age group, suggesting that the sample primarily represents young adults who are active social media users. In terms of education, 51.1% of respondents held a Bachelor's degree, while 30.0% possessed a Master's degree, indicating a well-educated sample. Regarding occupation, 37.8% were employed in the private sector, followed by 33.9% who were students. Most respondents (39.4%) reported a monthly income between PKR 50,001 and 100,000. The findings also reveal that 40.6% of respondents spent 3–4 hours daily on social media, with Instagram (31.1%) being the most frequently used platform, followed by TikTok (27.2%) and Facebook (23.9%).

Table 1: Demographic profile (n=360).

Demographic Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	172	47.8
	Female	188	52.2
Age (Years)	18–25	156	43.3
	26–35	118	32.8
	36–45	56	15.6
	46 years and above	30	8.3
Education Level	Intermediate	42	11.7
	Bachelor's Degree	184	51.1
	Master's Degree	108	30
	MPhil/PhD	26	7.2
Occupation	Student	122	33.9
	Private Employee	136	37.8
	Government Employee	46	12.8
	Self-Employed	34	9.4
	Others	22	6.1
Monthly Income (PKR)	Less than 50,000	98	27.2
	50,001–100,000	142	39.4
	100,001–150,000	76	21.1
	Above 150,000	44	12.2
Social Media Usage (Daily)	Less than 1 hour	26	7.2
	1–2 hours	84	23.3
	3–4 hours	146	40.6
	More than 4 hours	104	28.9
Most Frequently Used Social Media Platform	Facebook	86	23.9
	Instagram	112	31.1
	TikTok	98	27.2
	YouTube	46	12.8
	Others	18	5

Table 2 presents the results of the measurement model assessment for the four constructs. The findings indicate that all indicator loadings range from 0.839 to 0.891, exceeding the recommended threshold of 0.70. This demonstrates that each measurement item adequately represents its respective construct and contributes significantly to measuring the intended concept. The reliability assessment shows that the Cronbach's alpha values range from 0.884 to 0.931, while the composite reliability values range from 0.920 to 0.946. These values exceed the recommended minimum threshold of 0.70, indicating strong internal consistency and confirming that the measurement items reliably assess their corresponding latent constructs. Furthermore, the AVE values range from 0.742 to 0.773, all of which are above the recommended threshold of 0.50. This indicates that each construct explains more than half of the variance in its indicators, thereby confirming satisfactory convergent validity.

Table 3 presents the discriminant validity assessment using the Fornell–Larcker criterion. Discriminant validity is established when the square root of the Average Variance Extracted (AVE), represented by the diagonal values, is greater than the correlations between each construct and the other constructs. This indicates that each construct measures a distinct concept and shares more variance with its own indicators than with other constructs.

Table 4 presents the results of structural model assessment and hypothesis testing. The findings indicate that H1, which proposed that social media algorithm positively influences perceived green value, is supported ($\beta = 0.681$, $t = 15.326$, $p < 0.001$). This result suggests that algorithmically curated green marketing content significantly enhances consumers' perceptions of the environmental value of sustainable products. H2 is also supported ($\beta = 0.592$, $t = 11.874$, $p < 0.001$), demonstrating that social media algorithm has a significant positive effect on environmental awareness. This indicates that exposure to personalized sustainability-related content on social media increases consumers' awareness of environmental issues. The results further show that perceived green value significantly and positively influences consumer behavior, supporting H3 ($\beta = 0.701$, $t = 16.412$, $p < 0.001$). This represents the strongest relationship in the model, suggesting that consumers who perceive greater environmental value in green products are more likely to engage in sustainable purchasing behavior. H4 is supported, as environmental awareness positively affects consumer behavior ($\beta = 0.628$, $t =$

12.983, $p < 0.001$). This finding indicates that environmentally aware consumers are more inclined to adopt environmentally responsible purchasing and consumption practices. Finally, H5 confirms that social media algorithm has a direct positive effect on consumer behavior ($\beta = 0.534$, $t = 9.845$, $p < 0.001$). Although this relationship is weaker than the indirect effects through perceived green value and environmental awareness, it remains statistically significant, suggesting that social media algorithms directly encourage sustainable consumer behavior by delivering personalized green marketing content.

Table 2. Measurement model assessment.

Construct	Code	Measurement Item	Loading	Cronbach's Alpha	Composite Reliability	Average Variance Extracted
Social Media Algorithm (SMA)	SMA1	Sustainable product posts recommended by social media algorithms offer accurate information.	0.842	0.903	0.932	0.773
	SMA2	The green marketing posts curated on my social media feed offer useful information.	0.891			
	SMA3	The eco-friendly content selected for me by social media algorithms is highly educational for me.	0.887			
	SMA4	The tailored environmental posts on my feed have made me more knowledgeable about sustainable options.	0.885			
Perceived Green Value (PGV)	PGV1	The product's environmental functions provide very good value.	0.861	0.918	0.939	0.755
	PVG2	The product's environmental performance meets my expectations.	0.879			
	PVG3	The product provides greater environmental benefits than comparable products.	0.854			
	PGV4	The product is environmentally friendly and offers good overall value.	0.871			
Environmental Awareness (EA)	EA1	I am a strong believer in the preservation of nature and wildlife.	0.839	0.884	0.92	0.742
	EA2	I consider the potential environmental impact of my purchase when making many of my decisions.	0.873			
	EA3	I am pleased to purchase green products.	0.869			
	EA4	I feel happy to give priority to environmental welfare.	0.861			
Consumer Behavior (CB)	CB1	I will continue to purchase environmentally friendly products even though they are slightly expensive.	0.851	0.931	0.946	0.745
	CB2	I will avoid consumption activities that can lead to environmental pollution.	0.882			
	CB3	I will continue to purchase biodegradable packages.	0.857			
	CB4	I will not engage in any purchase that can have a negative effect on the environment.	0.873			
	CB5	I will spend my money wisely in order to avoid wastage and excessive purchases.	0.848			
	CB6	I would be willing to reduce my consumption to help protect the environment.	0.867			

Table 3. Discriminant validity (Fornell–Larcker Criterion).

Constructs	Social Media Algorithm	Perceived Green Value	Environmental Awareness	Consumer Behavior
Social Media Algorithm	0.879			
Perceived Green Value	0.681	0.869		
Environmental Awareness	0.592	0.645	0.861	
Consumer Behavior	0.534	0.701	0.628	0.863

The findings demonstrate that social media algorithms play a significant role in promoting sustainable consumption by enhancing consumers' perceived green value and environmental awareness, while also directly influencing environmentally responsible consumer behavior. These results provide strong empirical support for the proposed research model. Table 5 presents the mediation analysis examining the indirect effects of perceived green value and environmental awareness on the relationship between social media algorithm and consumer behavior. The results indicate that perceived green value significantly mediates the relationship between social media algorithm and consumer behavior ($\beta = 0.477$, $t = 10.964$, $p < 0.001$). This finding suggests that exposure to algorithmically curated green marketing content enhances consumers' perceptions of the environmental value of sustainable products, which subsequently encourages environmentally responsible purchasing behavior. Therefore, H6 is supported. Similarly, environmental awareness also significantly mediates the relationship between social media algorithm and consumer behavior ($\beta = 0.372$, $t = 8.847$, $p < 0.001$), supporting H7. This result indicates that social media algorithms contribute to increasing consumers' environmental awareness, which in turn promotes sustainable consumption and environmentally friendly purchasing decisions.

Table 4. Structural model.

Hypothesis	Relationship	Path Coefficient (β)	t-value	p-value	Decision
H1	Social Media Algorithm $\rightarrow$ Perceived Green Value	0.681	15.326	<0.001	Accepted
H2	Social Media Algorithm $\rightarrow$ Environmental Awareness	0.592	11.874	<0.001	Accepted
H3	Perceived Green Value $\rightarrow$ Consumer Behavior	0.701	16.412	<0.001	Accepted
H4	Environmental Awareness $\rightarrow$ Consumer Behavior	0.628	12.983	<0.001	Accepted
H5	Social Media Algorithm $\rightarrow$ Consumer Behavior	0.534	9.845	<0.001	Accepted

Table 5: Mediation analysis.

Hypothesis	Indirect Relationship	Indirect Effect (β)	t-value	p-value	Mediation	Decision
H6	Social Media Algorithm $\rightarrow$ Perceived Green Value $\rightarrow$ Consumer Behavior	0.477	10.964	<0.001	Partial Mediation	Accepted
H7	Social Media Algorithm $\rightarrow$ Environmental Awareness $\rightarrow$ Consumer Behavior	0.372	8.847	<0.001	Partial Mediation	Accepted

Figure 2 presents the coefficient of determination (R^2) values for the endogenous constructs. The results show that the social media algorithm explains 46.4% of the variance in perceived green value and 35% of the variance in environmental awareness, indicating moderate explanatory power. Furthermore, social media algorithm, perceived green value, and environmental awareness jointly explain 67.8% of the variance in consumer behavior, indicating substantial explanatory power.

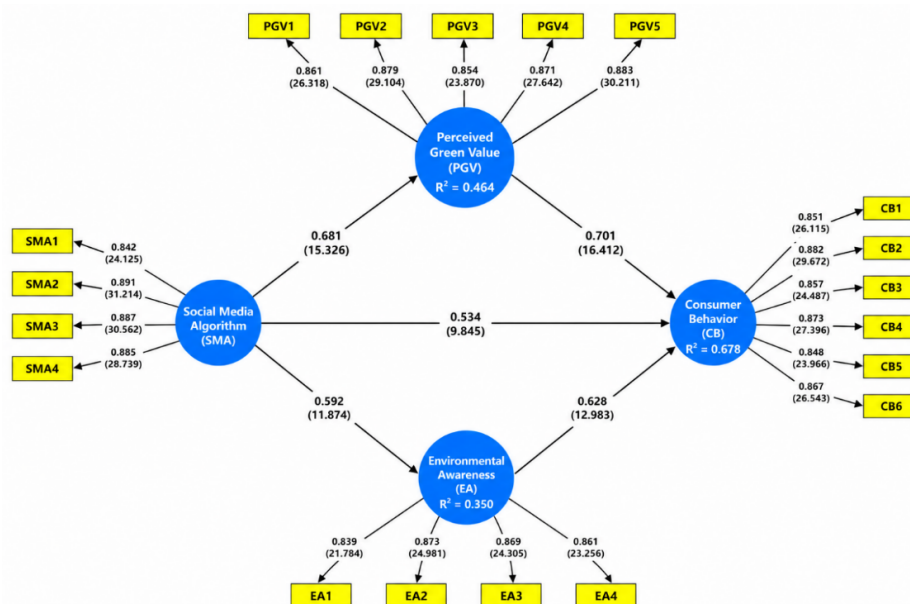


Figure 2: Structural model.

5. Discussion

The findings of this study provide strong empirical evidence that social media algorithms play a significant role in promoting sustainable consumption by influencing consumers' perceived green value, environmental awareness, and consumer behavior. All five proposed hypotheses were supported, demonstrating that personalized green marketing content delivered through social media platforms can positively shape consumers' attitudes and purchasing decisions (Gupta & Syed, 2022). These results suggest that algorithm-driven content recommendation systems are effective tools for encouraging sustainable consumption and strengthening green marketing efforts in the digital environment (Cerasi et al., 2024).

The study found that social media algorithm significantly and positively influences perceived green value. This suggests that consumers exposed to personalized recommendations and sustainability-related content are more likely to recognize the environmental benefits and value of green products (Bashynska, 2023). By providing relevant, informative, and tailored content, social media algorithms help consumers make informed purchasing decisions and develop favorable perceptions of environmentally friendly products (Xie & Madni, 2023). This finding highlights the importance of personalized digital marketing in enhancing consumers' evaluation of green products. The results also reveal that social media algorithms significantly enhance environmental awareness. Personalized exposure to environmental campaigns, sustainability messages, and eco-friendly product information increases consumers' understanding of environmental issues and encourages them to consider the environmental consequences of their purchasing decisions (Savale et al., 2023). According to Mastria et al. (2023), increased awareness subsequently motivates consumers to adopt more sustainable lifestyles and support environmentally responsible products and brands.

Perceived green value and environmental awareness both positively influenced consumer behavior. Among these relationships, perceived green value exhibited the strongest effect on consumer behavior, indicating that consumers are more likely to purchase green products when they believe those products provide meaningful environmental benefits (Lin & Dong, 2023). Similarly, greater environmental awareness encourages consumers to make responsible purchasing decisions and engage in sustainable consumption practices (Gunawan et al., 2025). In addition, the direct effect of social media algorithms on consumer behavior remained significant, suggesting that personalized content not only shapes consumers' perceptions but also directly influences their purchasing intentions (Burkert et al., 2023).

This study's findings offer several practical implications for businesses, marketers, policymakers, and environmental organizations in Pakistan. With the rapid growth of internet penetration and social media usage, digital platforms have become one of the most effective channels for influencing consumer attitudes and purchasing decisions. The results demonstrate that social media algorithms can significantly encourage sustainable consumer behavior by enhancing consumers' perceived green value and environmental awareness. Therefore, businesses operating in Pakistan should strategically utilize algorithm-driven social media platforms such as Facebook, Instagram, TikTok, and YouTube to promote environmentally friendly products and services. By creating informative, engaging, and personalized green marketing content, organizations can improve consumers' understanding of their products' environmental benefits while strengthening their willingness to adopt sustainable purchasing behaviors.

The findings also suggest that marketers should move beyond conventional advertising by investing in content that educates consumers about environmental sustainability rather than merely promoting products. Personalized recommendations, interactive campaigns, influencer collaborations, and educational videos can increase consumers' perceptions of green value and motivate environmentally responsible consumption. Since perceived green value was identified as the strongest predictor of consumer behavior, businesses should emphasize the quality, environmental performance, and long-term benefits of green products in their digital marketing strategies. From a policy perspective, government agencies such as the Ministry of Climate Change and Environmental Coordination and the Pakistan Environmental Protection Agency (Pak-EPA) can collaborate with digital marketing firms, social media companies, educational institutions, and environmental organizations to launch nationwide awareness campaigns promoting sustainable consumption. Such initiatives can educate citizens about waste reduction, recycling, energy conservation, and environmentally

responsible purchasing practices. Universities and educational institutions can also incorporate sustainability awareness into digital literacy and environmental education programs, encouraging young consumers to make informed purchasing decisions.

Furthermore, the study provides valuable insights for policymakers seeking to achieve Pakistan's environmental sustainability objectives and the Sustainable Development Goals (SDGs). By encouraging businesses to adopt ethical green marketing practices and use social media algorithms effectively, policymakers can support responsible production and consumption while reducing environmental degradation. Overall, the findings highlight that algorithm-driven social media marketing can serve as a powerful strategic tool for promoting sustainable consumer behavior, strengthening green marketing initiatives, and fostering a more environmentally conscious society in Pakistan.

6. Conclusions

This study examined the influence of social media algorithm on consumer behavior, with the mediating roles of perceived green value and environmental awareness among consumers in Pakistan. The findings revealed that social media algorithms significantly affect consumers' purchasing decisions by enhancing their perceptions of green value and increasing their awareness of environmental issues. All proposed hypotheses were supported, indicating that the relationships among the study variables are statistically significant. The results showed that social media algorithm has a positive influence on both perceived green value and environmental awareness. This suggests that personalized content, targeted advertisements, and algorithm-based recommendations on social media platforms can effectively educate consumers about environmentally friendly products and encourage sustainable consumption. Furthermore, both perceived green value and environmental awareness positively influenced consumer behavior, indicating that consumers are more likely to purchase green products when they recognize their environmental benefits and have greater awareness of environmental issues. Among the predictors, perceived green value had the strongest effect on consumer behaviour, emphasizing the importance of communicating the value of sustainable products to consumers. The study also found a direct positive relationship between social media algorithm and consumer behavior, although the effect was smaller than the indirect effects through the mediating variables. This demonstrates that social media algorithms influence purchasing decisions not only directly but also by shaping consumers' attitudes and perceptions toward sustainability.

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