

Exploring green purchase behavior in online agricultural markets: a multi-phase consumer decision model

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Abstract

Purpose – This study aims to explore consumer behavior in terms of pre-, actual, and post-purchase behavior of green agricultural food products based on planned behavior and social exchange theory.

Design/methodology/approach – A longitudinal study design was employed, utilizing a structured questionnaire to collect data from the same 473 respondents across different phases.

Findings – The findings reveal that quality factors significantly influence consumer purchase behavior. Additionally, environmental and societal factors significantly enhance consumer behavior in online shopping for these products. Notably, consumer complaints have an inverse relationship with consumer satisfaction and loyalty. Meanwhile, emotional intensity was identified as a moderator, identifying the role these relationships play in the online shopping context of agricultural products.

Originality/value – Practically, the research can guide businesses in developing marketing strategies that align with consumers' behavior toward green products.

Keywords Quality factors, Societal factors, Green purchase behavior, Emotional intensity, Green repurchase, Recommendation intention

Paper type Research paper

1. Introduction

The world becomes more environmentally conscious; therefore, consumers are increasingly prioritizing sustainability in their purchasing decisions, particularly when it comes to agricultural products (Baca and Reshidi, 2025; Nair and Manohar, 2024; Wang *et al.*, 2025). Online marketplaces for green products can help build consumer trust and overcome consumers' heightened sensitivity to food insecurity by promoting transparency, presenting information on sources, production practices, and environmental impacts (Tran *et al.*, 2024). The confluence of online service quality (OSQ) and product quality (PRQ) has emerged as a crucial driver of CS within the framework of sustainability in an era marked by increased environmental concern (Tannady and Purnamaningsih, 2023). The interaction between OSQ and PRQ is complex regarding green consumer behavior. Due to its dynamic characteristics, consumer behavior will remain a hot topic of study. Progress has been made in the field;

Ethical statement: The Human Research Ethics Committee (HREC) of Jiangsu University, China, reviewed and approved the proposal for this study on December 20, 2023. The purpose of the study was briefly explained to the respondents, and questionnaires were distributed for data collection once they were willing to participate. No participants were forced to participate in the study, and no rewards were offered.



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however, a notable research gap exists regarding how consumers behave when buying green agricultural products (GAPs) during the entire purchase process in a developing nation's context.

Moreover, the theory of Planned Behavior's application in the context of GAPs reveals that strong purchase intentions are linked to higher consumer satisfaction and loyalty. As consumer perceive the value and benefits of GAPs, their satisfaction with the purchase decision increases, and they will contribute to the theory of planned behavior in making an eco-friendly purchase, a developed behavior which is linked with this theory. The positive experience of the consumers and their trust in those products helps them save the environment (Yadav *et al.*, 2023). Previous study support the environment-friendly behavior of consumers (Zhang *et al.*, 2019). However, there is a clear gap in examining the integrated inspection of green consumer satisfaction (GCS) leading to green consumer loyalty (GCL). This study also investigates complex factors shaping green purchase behavior (GPB), focusing on the roles of quality, environmental knowledge (EK), and societal factors (SF). It examines how these factors influence environmentally conscious purchasing, build consumer loyalty (CL), and lead to green repurchases and recommendations.

Meanwhile, the concept of consumer complaints (CC) has been introduced, showing its mediating role between satisfaction and loyalty. CC exercise significant influence over online buying decisions (Dogan, 2021). Recent research indicates that online purchasing decisions are influenced by CC (Wattoo *et al.*, 2025). It serves as valuable feedback, guiding potential buyers in assessing product or online service quality in an online shopping environment. A thorough analysis of complaint behavior related to satisfaction and loyalty for eco-friendly products is needed in the developing country's online shopping market for GAP. Additionally, the study explores how emotional intensity impacts green consumers' recommendations, repurchases, and loyalty, offering new insights into the emotional components of sustainable consumption decisions.

The key research problem of this study revolves around understanding consumer behavior in the online agricultural products shopping environment. Specifically, it is necessary to examine how the various stages of consumer decision-making - pre-purchase, actual purchase, and post-purchase factors - interact and influence GPB, providing a comprehensive view that has not been explored previously. Combining novel insights into how environmentally conscious consumers make decisions has the potential to improve and broaden preexisting ideas like the Theory of Planned Behavior (TBP) or the Social Exchange Theory (SET). Previous studies have examined these studies individually (Yu *et al.*, 2024) however, no research has integrated them into a single comprehensive framework. This study's novelty is identifying its entire buying process, encompassing pre-purchase, actual purchase, and post-purchase behavior in online agricultural markets. This study's framework provides a holistic view of how consumers make decisions, the key factors that drive them to purchase green products, their expectations from sellers, and whether those expectations were met. Furthermore, this study contributes by modeling key constructs like Online Service Quality, Product Quality, and Societal Factors as higher-order constructs, enhancing measurement depth and precision. These elements mark a crucial step in understanding the drivers of environmentally responsible behavior in digital marketplaces.

To confirm this, the following research questions are identified in this study.

- RQ1. What is the impact of Pre-purchase behavioral factors on GPB?
- RQ2. What is the effect of the actual purchase behavior of consumers buying products in an online agriculture shopping environment?
- RQ3. What is the strength of the relationship between actual purchase and post-purchase behavior in the online agriculture market?

This study outlines the different phases of the consumer buying process for agricultural products in Pakistan's online shopping environment. It enhances understanding of sustainable consumer behavior in agriculture and provides insights for businesses and policymakers on eco-conscious consumption. The manuscript includes several sections: the second discusses theories and hypotheses, the third covers research methodology, the fourth presents results, and the fifth concludes with implications and future directions.

2. Theoretical background and hypothesis development

2.1 TPB and social exchange theory

The theory of Planned Behavior (TPB) explores how deliberate consumer behavior can be predicted (Ajzen, 1991). The theory assumes that consumer behavior in buying products is based on people's actions or behavior towards that specific product. However, this willingness or intention can also be influenced by people's attitudes toward behavior, subjective and social norms, and a sense of control over their behavior (Wallace and Buil, 2023). In such situations, consumers are in favor of performing specific behaviors. Some strong supporters are perceived behavior control, subjective norms, and attitudes toward behavior (Ajzen and Schmidt, 2020). In this study, consumer-perceived behavior control can affect the purchase of environment-friendly products. A complex and accurate recommendation system can be developed by comprehensively analyzing and evaluating these factors related to consumers' decision-making to purchase GAPs online. Such sustainable choices will promote the adoption of environmentally friendly practices and help the organic food industry work and grow their business in an online shopping environment (Kumar *et al.*, 2021). As the TPB has relevant features to this study, which can help to support the empirical idea in this research. In addition to previous indicators validated by various studies, our research broadens the TPB framework by incorporating quality factors—online service quality and product quality—along with environmental knowledge and societal factors. These elements significantly influence attitude formation and ultimately affect GPB. Therefore, a research model based on TPB has been developed for this study to better articulate the novelty of our study.

Furthermore, Social Exchange Theory (SET) is outlined as “one of the oldest theories of social behavior”; any interaction between individuals is an exchange of resources (Homans, 1958). The resources exchanged in a relationship can take many tangible and intangible forms. Tangible resources may include products or financial assets, while intangible resources may include social relationships or friendship ties. The SET assumes that individuals cultivate relationships with the expectation of receiving benefits and rewards (Blau, 1960; Homans, 1958). In the context of SET, consumers' green purchase intention can be seen because of the perceived benefits they associate with buying green agricultural items online. These benefits may include environmental consciousness, health benefits, ethical considerations, and personal satisfaction. According to SET, satisfied consumers are more likely to develop a sense of trust and reciprocity with the online retailer, leading to green consumer loyalty (Dutt *et al.*, 2023). Integrating SET allows us to capture post-purchase behaviors like loyalty and repurchase intentions, enhancing the novelty of our research model beyond TPB. Loyal consumers are inclined to repeat green purchases from the same retailer and are likelier to recommend the brand and its products to others in their social network. Figure 1 represents the proposed research model.

2.2 Relationship explored OSQ, PRQ, EK, and SF with GPB

An easy-to-navigate online shopping platform enhances consumers' perceptions of reliability and efficiency, promoting environmentally friendly purchasing choices (Ahmad *et al.*, 2023; Halim *et al.*, 2023; Wattoo *et al.*, 2025). The influence of CS in purchasing green products and information quality plays a significant role. When sufficient information is provided to consumers about the consumption of sustainable green products, this can help them evaluate

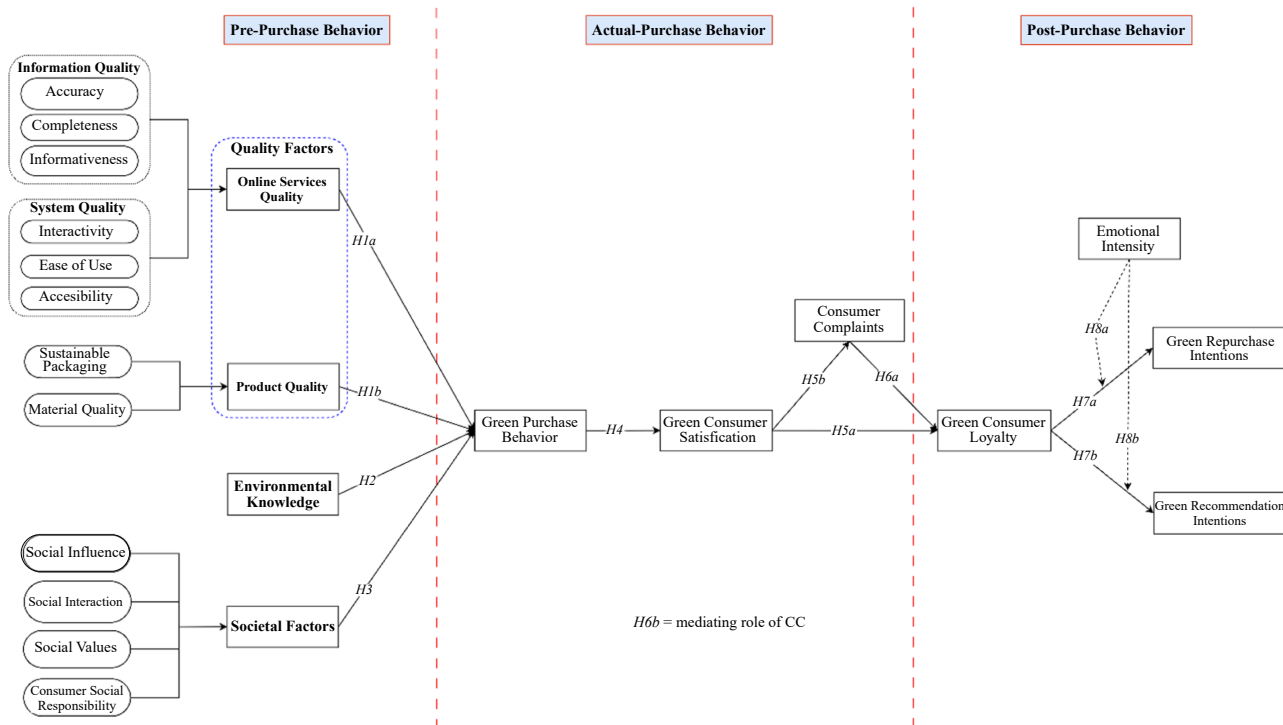


Figure 1. Research framework. Source: Authors' own work

the benefits of using these products or services (Pittman *et al.*, 2022). Consumers are more likely to perceive an online shopping platform as reliable and effective when it is well-designed and user-friendly. The PRQ describes a product's overall excellence or superiority regarding its features and properties (De Giovanni and Zaccour, 2023). PRQ goes beyond conventional criteria for green products to incorporate environmental standards compliance, sustainability, recyclability, and eco-friendliness.

Considering sustainable practices while purchasing goods and services is a result of this environmental knowledge. Those consumers with enough environmental knowledge can better contribute to the environment by investing in the purchase of green products (Noubar *et al.*, 2023). Consumers who obtain detailed sustainable product information become capable of making better purchasing decisions through improved benefit evaluation (Aliyah and Williady, 2025). Furthermore, EK helps consumers understand how their purchases impact the environment, leading to more green purchasing behavior (He *et al.*, 2019; Irshad, 2025). Social media and other communities pressure consumers to buy environmentally friendly products. Through this eye, we believe there can be a strong correlation among all the variables, including SQ, PRQ, EK, and SF, towards GPB. Thus, we propose the following hypothetical relationship to be tested to explore their link:

H1a. Online Service Quality Positively Impacts GPB.

H1b. Product Quality Positively Influences GPB.

H2. Environmental Knowledge has a Positive Impact on GPB.

H3. Societal Factors have a Positive Impact on GPB.

2.3 Relationship explored between GPB and green consumer satisfaction

The studies identified the consumer behavior level of satisfaction in making ecologically friendly purchases, which means consumers who buy green products have a higher degree of satisfaction than those who make purchases of non-green products (Kumar *et al.*, 2021; Ng *et al.*, 2024). Purchasing eco-friendly products enhances consumer attachment and satisfaction due to their perceived environmental impact (Kumar *et al.*, 2021; Mansoor *et al.*, 2025). It can be assumed that those consumers who believe that their eco-friendly choices contribute to the environment in a better way are highly engaged and more satisfied with purchasing green products. To support this green behavior of consumers to enhance their satisfaction level, assume the following hypothesis:

H4. GPB has a Positive Impact on Green Consumer Satisfaction.

2.4 Relationship explored between green consumer satisfaction and green consumer loyalty

Several studies show that effective consumer satisfaction directly influences environmentally friendly consumer purchasing choices (Azhari *et al.*, 2023; Schena *et al.*, 2015). Satisfaction is not just a feeling of independence. It is a necessary element for loyalty (Wattoo and Iqbal, 2022). Studies identify that satisfied consumers are more likely to buy products from the same seller again, and develop a long-term relationship that forms an exclusive loyalty beyond simple buying (Zhou *et al.*, 2023a, b). The story of the relationship between green consumer satisfaction and loyalty is not only an idea based on theory; it is an inspiring activity to maintain long-term relationships and promote environmentally friendly products. We proposed the following hypothesis based on the above study:

H5a. Green Consumer Satisfaction has a positive relationship with Green Consumer Loyalty.

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2.5 Relationship explored between green consumer satisfaction and consumer complaint

In academic research, scholars have focused on the curious connection between CC and GCS (Dike *et al.*, 2021). They suggest that while contentment is a positive note in the business symphony, it can occasionally generate concerns that lead to productive conversations between consumers and companies (Wattoo and Iqbal, 2022). Studies revealed that complaints weren't always expressions of dissatisfaction in the context of green and sustainable shopping. They were sometimes the nuanced echoes of expectations and aspirations, signposts pointing toward opportunities for improvement (Susiyanto *et al.*, 2023). Occasional discord catalyzed improvement, reminding us that the journey toward perfection is an ongoing symphony, where each note contributes to the evolving melody of consumer experience. Therefore, we assume the following research hypothesis:

H5b. Green Consumer Satisfaction has a negative relationship with Consumer Complaint.

2.6 Relationship explored between consumer complaint and green consumer loyalty

CC is typical, particularly in the business-to-consumer industry (Homburg and Fürst, 2005; von Janda *et al.*, 2021). CC has risen along with the popularity of digital channels like email and social media (Jo, 2015). The rise of digital complaint channels has made it easier for consumers to communicate with businesses, increasing complaints. While companies can use this feedback for service improvements, unresolved issues in online shopping may drive consumers to competitors (Wattoo *et al.*, 2025). Consumer behavior studies reveal that getting a new consumer costs five to eight times more than retaining an existing one. This shows the cost-efficiency of consumer retention and strong consumer connections. This means that when consumers have complaints or problems with their online purchasing experience, it can harm their loyalty to e-commerce platforms or online shops (von Janda *et al.*, 2021).

CC is typical, particularly in the business-to-consumer industry. CC has risen along with the popularity of digital channels like email and social media (Jo, 2015). This means that when consumers have complaints or problems with their online purchasing experience, it can harm their loyalty to e-commerce platforms or online shops (von Janda *et al.*, 2021). Through the eyes of previous research, it can be assumed that there can be a significant relationship between CC in CS and enhancing the overall CL; thus, we proposed the following hypothesis:

H6a. Consumer complaint has a negative relationship with Green Consumer Loyalty.

H6b. Consumer Complaints mediate the relationship between GCS and GCL.

2.7 Relationship explored between GCL towards GRI and GRPI

Research shows that loyalty is motivated by shared ideals and a sense of community, not just transactional interactions (Mohd Suki *et al.*, 2022). The modern consumer base dedicated to green consumption exhibits that they buy again and spread awareness about ecological responsibility through advocacy for sustainable choices (Ko and Jeon, 2024). The linked cycle of repetition and consumer recommendations creates an eco-conscious community among consumers (Rosi and Ekasari, 2023). Scholars theorized that loyal consumers connected to a brand's philosophy were inclined to recommend it to friends and family (Vranešević and Stančec, 2003). The narrative of loyalty for repurchase and recommendation intention for green products became a harmonious symphony. It was not selling products, but about fostering a community where consumers became sustainability ambassadors. Thus, based on this, we propose the research hypothesis as follows:

H7a. GCL has a positive relationship with Green Repurchase Intention.

H7b. GCL has a positive relationship with Green Recommendation Intention.

2.8 The moderating role of EI has been explored between GCL and GRI & GRPI

Previous research has shown that EI is a major factor in determining consumer behavior (Nittala and Moturu, 2023; Wattoo *et al.*, 2025), especially in green consumption. Emotions linked to environment-sustainable choices include pride, guilt, empathy, and satisfaction (Nittala and Moturu, 2023). Consumers with a strong emotional attachment to sustainability may feel responsible for environmental issues, making them more willing to purchase environmentally friendly products and services (Simanjuntak *et al.*, 2020). Consumer RI is regarded as one of the most significant indicators in strategic planning for a business. It affects each consumer's decision and has been a significant indicator for firms to measure their reputation and satisfaction level (Zhang *et al.*, 2018). Based on previous studies and contextual attributes of businesses, emotion is a key factor that can make a difference in a consumer's recommendation intention. The positive relationship between GCL, GRI, and GRPI is strengthened when emotional intensity is high. Emotionally engaged consumers are more likely to actively repurchase, recommend, and promote green products and practices, highlighting the significance of emotional connections in driving sustainable CL and environmentally friendly recommendations. Thus, we proposed the following hypothesis:

H8a. Emotional Intensity Moderates the Relationship Between Green Consumer Loyalty and Green Repurchase Intention.

H8b. Emotional Intensity Moderates the Relationship Between Green Consumer Loyalty and Green Recommendation Intention.

3. Methodology

3.1 Study context

Consumers in developing nations are increasingly worried about online shopping due to risks of fraud, privacy breaches, and data abuse (Wattoo and Iqbal, 2022). Thus, this study targets consumers for data collection who shop or frequently use online services across various Pakistani communities and have experienced an online purchase of GAPs. GAPs are items produced in the agriculture industry that implement environmentally friendly and sustainable techniques. This includes environmentally friendly farming, processing, and distribution methods, encouraging biodiversity and long-term ecological equilibrium. GAP includes organic products, grass-fed and pasture-raised livestock, and their products, as well as crops grown using crop rotation, pesticide reduction, and soil conservation. However, because of the current research objectives, this study only focuses on the finished GAP online, such as pure dairy products, honey, and livestock.

3.2 Measurement

To ensure the content validity of the research framework, we designed a structured questionnaire to collect data. Measurement items are carefully adapted from previous studies and refined as per this study context. The scale components are expressed in simple, understandable language to improve clarity and encourage unrestricted responses. The questionnaire used a 5-point Likert scale in which participants indicated their level of agreement with statements, ranging from 1 (strongly disagree) to 5 (strongly agree), consistent with the methodology used in previous studies (Wattoo *et al.*, 2025; Wattoo and Iqbal, 2022). This study conceptualized and measured several higher-order constructs. Specifically, Online Service Quality was modeled as a third-order construct composed of two second-order constructs: Information Quality (formative by *Accuracy, Completeness, and Informativeness*) and System Quality (formative by *Interactivity, Ease of Use, and Accessibility*). Similarly, Product Quality (formative by *Sustainable Packaging and Material Quality*) and Societal Factors (formative by *Social Influence, Interaction, values, and Consumer Social Responsibility*) were also modeled. While the hypotheses do not individually reference the

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lower-order constructs, they are foundational in operationalizing the higher-order constructs directly linked to the proposed relationships.

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3.3 Sampling and data collection

Researchers worked with a sample of the population rather than an entire population and applied a “Random sampling” technique. We ensure simple random sampling by randomly selecting participants from targeted populations, giving everyone an equal chance of being selected. A multi-step approach ensured random sampling principles were followed. Firstly, a sampling framework related to green agricultural products was constructed to access individuals with verified online purchasing behaviors. Secondly, a screening question was inserted to assess the relevancy of the data collected: “Have you ever shopped online?” This filtering question enables participants to be chosen on purpose within the scope of randomization. Any participants who did not meet the study inclusion criteria were excluded from the sample. Thirdly, regarding outreach to online communities, the questionnaires were distributed at random time intervals among different user groups to prevent systematic biases. Fourth, in order to avoid duplication, an email was required from the respondents. This comprehensive method ensures that each eligible individual has the same selection probability, meeting the criteria of random sampling. We employed the computer-assisted web interviewing (CAWI) technique to complete an online survey (Ziemba *et al.*, 2016). The survey was collected from different social media and e-commerce platforms using Google Forms.

In this study, we collected data in two phases for this longitudinal study to remove the response bias. To maintain data integrity in two phases, we required participants’ email addresses to contact them for the second phase and track their responses. In the first phase, data collection was started in May 2023, and we received 632 responses by the end of July 2023. After removing 13 unengaged responses, we got 619 valid responses. The factors impacting GPB (e.g. Quality factors, Environmental knowledge, and Societal factors) were measured in this stage. After a gap of four months, we started collecting data from these 619 respondents for the remaining factors by the end of November 2023. In this phase, we collected 479 responses, removing 6 due to incorrectly filled questionnaires, resulting in a final dataset of 473 responses. Including these responses in the data analysis may have negatively impacted the results. The final data set for this study analysis comprises 473 final responses. We have used SmartPLS v4 for data analysis and results. This method advocates time separation as a powerful strategy to reduce endogeneity when experimental operations are unavailable.

3.4 Common method bias

This research applied PLS-SEM and common method bias (CMB), which is considered a phenomenon triggered by the measurement method adopted by the study instead of a network of causes and effects in the studied model. It usually happens when the data is collected from a single source simultaneously. The CMB potentially poses a threat to the validity of the study. Harman’s single-factor test is the most common method to test the CMB, especially in social sciences research. The researcher used Harman’s single-factor test in SPSS v26 to assess CMB in this study. The results indicated that the first factor explained 30.475% of the variance. According to social sciences literature, the threshold value of CMB is considered below 50%.

Prior studies identify the CMB in PLS-SEM, particularly using SmartPLS. They assess this using the inner variance inflation factor (VIF), with acceptable values being below 3.3. Our results showed a maximum VIF of 3.210, which is within the acceptable range. Therefore, it can be concluded that CMB was not seriously alarming in this research.

3.5 Demographic profile

The study examined various demographic factors such as gender, age, education, and income. This study’s total number of respondents is 473, of which 372 were males and 101 were

females. According to the income (in PKR) statistics, 23.3% of respondents earned less than 50,000 PKR, 44% earned between 50,001–100,000 PKR, 22.2% of respondents have their income level between the income range of 100,001–150,000 PKR, 4.7% of the respondents earned in the range of 150,001–200,000 PKR, and the remaining 5.9% of respondents earned above 200,000 PKR. The study also collected data on respondents' ages, with 40.4% falling into the 21–25 years age group, 30.4% falling under the 26–30 years age group, 19.7% falling into the 31–35 years age group, and the remaining 9.5% falls under the age group of 36–40 years old. Regarding education, 6.8% of respondents had undergraduate degrees, while 34.5% had graduate and 39.5% had post-graduate degrees, showing that the participants had a high level of education. The rest, 19.2%, had other diplomas and professional education. Demographic data shows that educated, young, middle-income consumers are more receptive to green products, indicating the need for targeted marketing emphasizing product quality, environmental impact, and transparency.

4. Results

4.1 Factor loadings, construct reliability and validity

This study ascertained interitem reliability by evaluating factor loadings and maintained a threshold of 0.70. The results from [Table 1](#) describe each factor's value for item loading. All the values are above the threshold value of 0.70. In the measurement model, this study applied convergent validity and reliability analysis. To verify the reliability of each item, confirmatory factor analysis has been used in SmartPLS v4. The recommended value is equal to or greater than 0.7, which is acceptable. All values of Cronbach's alpha configurations for the first-order constructs are between 0.817 and 0.921. For the second order constructs, the value of CB-Alpha is between the range of 0.793 and 0.807; for the third order construct, we only have one variable, which was measured on the third order named online service quality; the value for CB-Alpha for this variable is 0.864, which is greater than the threshold. In the convergent validity, the author examines the similarity between the operationalization and what is expected in theory. The composite reliability (CR) values for the first order range from 0.818 to 0.931, the values of CR for the second order range between 0.759 to 0.825, and for the third order construct, the value is 0.865. AVE for the first order ranges from 0.584 to 0.847, and for the second order, the value of AVE ranges from 0.581 to 0.832. The recommended value of CB alpha and CR should be greater than 0.7, and AVE greater than 0.5, indicating that the instrument has sufficient reliability and effectiveness. The steps were followed according to established guidelines from previous social science research ([Hair et al., 2019](#); [Shahzad et al., 2024](#)). The results in [Table 1](#) show no problem with the data's convergent validity and reliability, and can be utilized for structural analysis.

4.2 HTMT ratio

To identify the insensitivity of the criteria described above, the Heterotrait-Monotrait (HTMT) ratio criterion was created. The value of the HTMT ratio is closer to 1, indicating that the path analysis lacks discriminative validity. HTMT analyses the strength of the relationship between variables (to be more exact, the upper boundary). To differentiate between the two factors, the HTMT should be less than one. That is the reason researchers used this scale. The higher value described in [Table 2](#) is 0.827, which is lower than the above standard, indicating that the discriminative validity of this research has been fully met.

4.3 Path analysis

Subsequently, examining the research model's reliability, convergent, and discriminant validity, the hypothetical relationship among constructs was measured using SmartPLS v4 built on standardized paths. The values of path analysis show that online service quality is positively correlated with GPB with beta coefficients ($b = 0.395$). The beta coefficient of

Table 1. Factor loading, convergent reliability and validity

1st order items Variables	Items	Loadings	Alpha	CR A	AVE
Accessibility	ACC1	0.860	0.857	0.859	0.701
	ACC2	0.786			
	ACC3	0.836			
	ACC4	0.864			
Accuracy	ACU1	0.849	0.876	0.882	0.802
	ACU2	0.919			
	ACU3	0.917			
	CC1	0.870			
Consumer Complaint	CC2	0.825	0.894	0.931	0.757
	CC3	0.887			
	CC4	0.897			
	COMP1	0.938			
Completeness	COMP2	0.914	0.889	0.889	0.819
	COMP3	0.861			
	CUS1	0.869			
Consumer Social Responsibility	CUS2	0.866	0.888	0.889	0.749
	CUS3	0.865			
	CUS4	0.862			
	EI1	0.913			
Emotional Intensity	EI2	0.812	0.821	0.857	0.735
	EI3	0.844			
	EK1	0.916			
Environmental Knowledge	EK2	0.899	0.921	0.922	0.809
	EK3	0.884			
	EK4	0.898			
	EoU1	0.877			
Ease of Use	EoU2	0.849	0.817	0.818	0.732
	EoU3	0.841			
	GCL1	0.817			
Green Consumer Loyalty	GCL2	0.774	0.831	0.834	0.597
	GCL3	0.762			
	GCL4	0.740			
	GCL5	0.769			
	GCS1	0.933			
Green Consumer Satisfaction	GCS2	0.901	0.910	0.911	0.847
	GCS3	0.928			
	GPB1	0.785			
Green Purchase Behavior	GPB2	0.767	0.821	0.821	0.584
	GPB3	0.802			
	GPB4	0.757			
	GPB5	0.705			
	GRI1	0.851			
Green Recommendation Intention	GRI2	0.864	0.822	0.826	0.737
	GRI3	0.861			
	GRPI1	0.885			
Green Repurchase Intention	GRPI2	0.841	0.829	0.837	0.744
	GRPI3	0.862			
	INF1	0.843			
Informativeness	INF2	0.851	0.873	0.874	0.725
	INF3	0.878			
	INF4	0.832			
	INT1	0.887			
Interactivity	INT2	0.891	0.862	0.870	0.783
	INT3	0.876			

(continued)

Table 1. Continued

1st order items Variables	Items	Loadings	Alpha	CR A	AVE
Material Quality	MQ1	0.837	0.844	0.846	0.682
	MQ2	0.845			
	MQ3	0.813			
	MQ4	0.807			
Social Influence	SIF1	0.879	0.878	0.884	0.731
	SIF2	0.829			
	SIF3	0.825			
	SIF4	0.886			
Social Interaction	SIT1	0.742	0.845	0.849	0.619
	SIT2	0.797			
	SIT3	0.859			
	SIT4	0.769			
	SIT5	0.760			
Sustainability of Packaging	SP1	0.898	0.847	0.847	0.767
	SP2	0.900			
	SP3	0.828			
Social Value	SV1	0.881	0.858	0.864	0.702
	SV2	0.779			
	SV3	0.835			
	SV4	0.853			
Second Order Constructs					
Variables	Items	Path and <i>T</i> values	Alpha	CR A	AVE
Information Quality	ACU	0.820 (36.135)	0.793	0.825	0.702
	COMP	0.829 (38.022)			
	INF	0.864 (87.328)			
System Quality	ACC	0.873 (79.463)	0.807	0.819	0.722
	EoU	0.796 (33.491)			
	INT	0.877 (64.755)			
Product Quality	MQ	0.908 (74.177)	0.798	0.799	0.832
	SP	0.916 (87.770)			
Societal Factors	CUSR	0.746 (28.663)	0.759	0.759	0.581
	SIF	0.744 (26.225)			
	SIT	0.743 (27.722)			
	SV	0.814 (36.691)			
3rd Order Constructs					
Online service quality	IQ	0.936 (106.007)	0.864	0.865	0.880
	SQ	0.940 (161.051)			

Source(s): Authors' own work

product quality is positively associated with GPB ($b = 0.182$). Environmental knowledge shows a positive relationship with GPB, with the beta value ($b = 0.112$). The societal factor is positively associated with GPB, and the beta value is ($b = 0.200$). The GPB has a significant positive relationship with GCS with a coefficient value of beta ($b = 0.552$). Also, GCS positively associates GCL with the beta value ($b = 0.121$). The GCS negatively impacts CC with a value of (-0.135). The beta coefficient value for CC to GCL shows a negative relationship (-0.284). GCL is positively associated with GRPI with the value of beta coefficients ($b = 0.258$). At the same time, GCL is also positively correlated with the GRI with the value beta ($b = 0.187$), as shown in [Table 3](#).

Table 2. HTMT criterion

	ACC	ACU	CC	COMP	CUSR	EI	EK	EoU	GCL	GCS	GPB	GRI	GRPI	INF	INT	MQ	SIF	SIT	SP
ACU	0.675																		
CC	0.192	0.195																	
COMP	0.582	0.693	0.225																
CUSR	0.560	0.460	0.156	0.404															
EI	0.073	0.074	0.046	0.064	0.065														
EK	0.638	0.453	0.110	0.409	0.389	0.043													
EoU	0.621	0.587	0.243	0.634	0.498	0.065	0.391												
GCL	0.248	0.289	0.339	0.267	0.213	0.058	0.141	0.225											
GCS	0.688	0.628	0.136	0.596	0.472	0.055	0.462	0.613	0.180										
GPB	0.794	0.566	0.210	0.583	0.604	0.092	0.586	0.641	0.274	0.636									
GRI	0.116	0.144	0.095	0.175	0.187	0.150	0.116	0.127	0.253	0.130	0.166								
GRPI	0.236	0.272	0.093	0.210	0.222	0.268	0.187	0.278	0.334	0.200	0.258	0.600							
INF	0.676	0.603	0.275	0.606	0.502	0.053	0.455	0.636	0.253	0.602	0.827	0.261	0.354						
INT	0.757	0.641	0.196	0.590	0.502	0.047	0.492	0.676	0.252	0.623	0.712	0.197	0.293	0.626					
MQ	0.629	0.606	0.162	0.561	0.823	0.081	0.434	0.606	0.220	0.609	0.704	0.207	0.304	0.547	0.602				
SIF	0.782	0.461	0.148	0.428	0.403	0.069	0.451	0.440	0.099	0.499	0.609	0.083	0.082	0.498	0.574	0.431			
SIT	0.633	0.602	0.183	0.574	0.418	0.093	0.452	0.539	0.237	0.560	0.682	0.222	0.276	0.772	0.633	0.515	0.499		
SP	0.701	0.622	0.210	0.546	0.594	0.084	0.489	0.640	0.247	0.656	0.740	0.222	0.329	0.644	0.627	0.785	0.515	0.660	
SV	0.769	0.482	0.118	0.443	0.654	0.099	0.460	0.520	0.176	0.524	0.630	0.168	0.171	0.530	0.523	0.581	0.564	0.499	0.569

Source(s): Authors' own work

Table 3. SEM results

Hypothesis	Effects off	Effects on	Beta	SD	T-value	p-values	Remarks
H1a	Online service quality	GPB	0.395	0.065	6.064	0.000	Confirmed
H1b	Product Quality	GPB	0.182	0.049	3.674	0.000	Confirmed
H2	Environmental Knowledge	GPB	0.112	0.039	2.852	0.004	Confirmed
H3	Societal Factors	GPB	0.200	0.071	2.824	0.005	Confirmed
H4	GPB	GCS	0.552	0.037	15.010	0.000	Confirmed
H5a	GCS	GCL	0.121	0.044	2.740	0.006	Confirmed
H5b	GCS	CC	−0.135	0.044	3.076	0.002	Confirmed
H6a	CC	GCL	−0.284	0.045	6.266	0.000	Confirmed
H7a	GCL	GRPI	0.258	0.045	5.675	0.000	Confirmed
H7b	GCL	GRI	0.187	0.052	3.582	0.000	Confirmed

Mediation and Moderation						
Hypothesis	Path	Beta	SD	T value	p value	Remarks
H6b	GCS → CC → GCL	0.038	0.015	2.583	0.010	Confirmed
H8a	EI x GCL → GRPI	0.175	0.064	3.240	0.001	Confirmed
H8b	EI x GCL → GRI	0.225	0.064	3.539	0.000	Confirmed

Source(s): Authors' own work

4.4 Mediation and moderation

We conducted bootstrapping with 5,000 resamples to test the indirect effects of the mediating factor. Meanwhile, moderation is performed using interaction effects (two-stage approach) modeling in SmartPLS4. The results of this study show that CC mediates the relationship between GCS and GCL with the beta value ($b = 0.038$). Also, the beta values in Table 3 show that emotional intelligence not only moderates the relationship between GCL and GRI but also moderates the relationship of GCL with GRPI, as shown in Table 3.

4.5 Importance-performance map analysis (IPMA)

The application of IPMA can improve PLS-SEM outcomes by incorporating the performance of individual constructs, and clarifying the relative significance of each construct and their connections to managerial responsibilities (Bai *et al.*, 2023). The results of this extended path coefficient approximation are presented based on analysis dimensions. These dimensions can be employed to draw meaningful conclusions from the data (Zhou *et al.*, 2023a, b). When the IPMA is applied at the indicator level, the average performance of an indicator is reflected by its mean value. The IPMA rescales indicator scores on a scale from 0 to 100, enhancing the interpretation and assessment of performance levels. A score of “0” signifies the lowest performance level, while “100” represents the highest level of performance. The IPMA for market performance was conducted to analyze the total effect (depicted on the X-axis as important) and the index values of the latent variables (defined on the Y-axis as performance) for both the dependent variables GRPI and GRI. According to Figure 2, GCL has surfaced as the most crucial construct, attributed to its elevated importance score and outstanding performance. Meanwhile, the second important factor was EI, followed by GCS. Improving EI and satisfaction can significantly improve consumers' long-term loyalty and re-purchase intention.

This implies that in the context of this study, “GCL” holds significant influence and is currently demonstrating commendable performance. Moreover, management must devote time and money to improving GCL, leading to increased overall performance. The same is true for GRI. As shown in Figure 3, “GCL” was the most important factor to focus on, as this

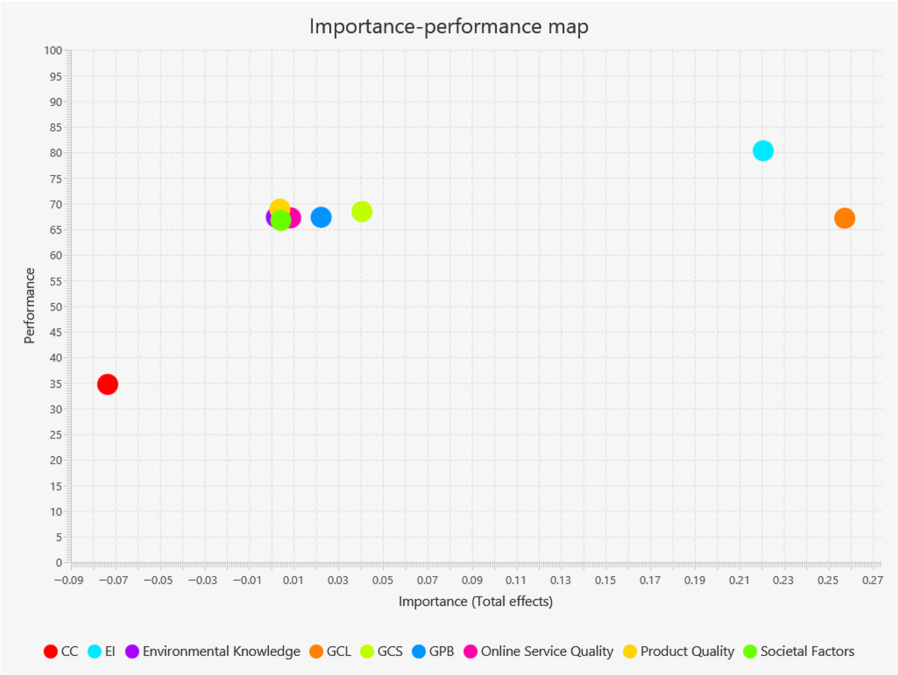


Figure 2. IPMA of GRPI. Source: Authors' own work

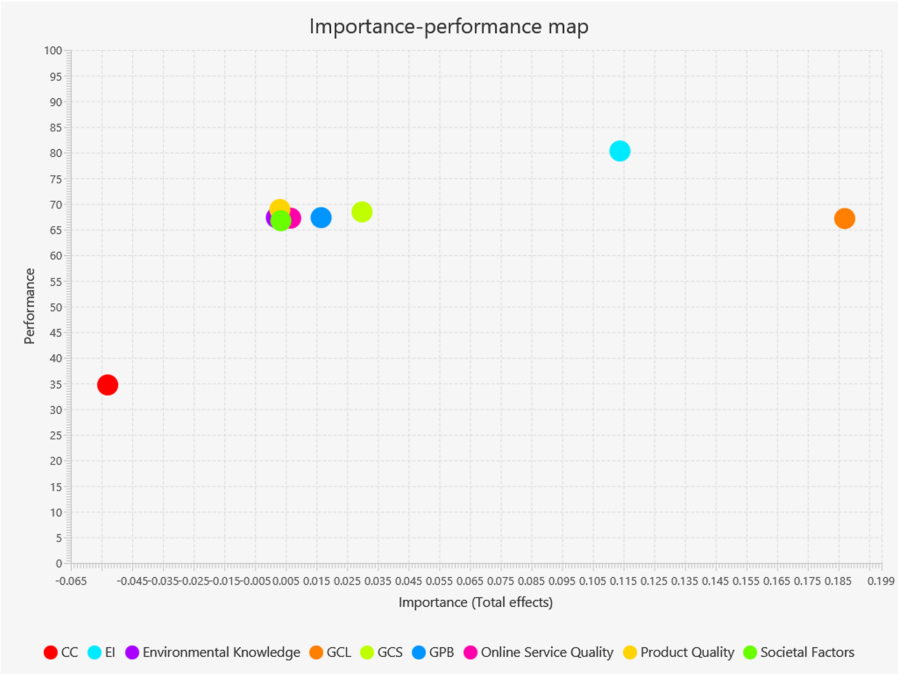


Figure 3. IPMA of GRI. Source: Authors' own work

variable demonstrates commendable performance compared to other study variables. Similarly, EI is also the second important factor to measure GRI.

5. Conclusions

5.1 Discussion of findings

This study provides a compelling narrative of success through a comprehensive understanding of GPB in online agricultural markets, examining pre-purchase, actual purchase, and post-purchase behaviors. The findings of this study confirm that all the factors in the pre-purchase behavior phase impact GPB, which leads towards satisfaction and loyalty through the mediating role of CC. This phase leads towards a post-purchase factor, including repurchase and recommendation intention through EI. High online service quality, characterized by information and system quality attributes, plays a pivotal role in influencing consumers to engage in environmentally conscious purchasing decisions aligned with the study (Ghosh *et al.*, 2023). Research confirms that OSQ and PRQ are key mechanisms for boosting consumer satisfaction and loyalty rates. This supports previous evidence that high-quality service with satisfactory products instigates repeat purchases while generating recommendations (Irshad *et al.*, 2024). Meanwhile, the understanding of EK together with social factors push consumers toward making environmentally friendly choices because they both critically evaluate sustainability declarations and take responsibility for sustainability choices.

Effective complaint management through CC is a vital linking factor because it enhances trust and satisfaction and leads to sustained consumer loyalty. The results are aligned with the prior studies, which identified effective handling of CC helping to maintain higher numbers of environmentally mindful consumers (Wattoo *et al.*, 2025; Wattoo and Iqbal, 2022). Meanwhile, social influence, value, consumer social responsibility, and interaction all enhance the overall consumer GPB. Research also supports the idea of consumer social responsibility, with consumers increasingly choosing GAPs because they feel they are responsible for contributing to creating a sustainable society.

Furthermore, when consumers have a positive experience with these products, they are more likely to choose them again because they feel trustworthy and reliable (Camilleri and Filieri, 2023). GCL can be enhanced when companies proactively address and resolve these issues in a way that is consistent with sustainability goals. By handling and resolving CCs effectively, more positive and lasting relationships can be built between those consumers who want to buy environmentally friendly products and businesses. This can help to improve GCS. Consumer complaints are addressed effectively, and they become more satisfied with the firm's offerings, which can benefit the business in many ways; consumers can be satisfied and wish to be loyal to the same seller because trust was built through a solution to their complaint.

The findings of this research identified the behavior of those consumers whose emotional intensity significantly impacts the relationship between GCL and GRI. Studies have found that people with high emotional intensity are likely to adopt and maintain eco-friendly behaviors. Furthermore, this emotional intensity will favorably impact the propensity to repurchase environmentally friendly items or services. A person's tendency to support environmentally friendly products or services is positively affected by the intensity of their emotions. Therefore, the intensity of emotions between consumers and sustainability directly impacts their green behavioral patterns because people who feel deeply committed to environmental issues tend to buy again and recommend products.

5.2 Theoretical implications

The theoretical implications of this study are multilayered. The findings of the relationship of quality factors with GPB enhance the understanding of the TPB, which is based on three primary factors: attitudes, subjective norms, and perceived behavioral control. When inclined

toward green products, online service quality and product quality enhance consumers' intentions to buy green products to contribute to a more sustainable environment. Within the framework of the TPB, this suggests that favorable attitudes towards green products and services increase the intention to buy green products. Also, when deciding to purchase green products, consumers feel more confident, and they identify their ability to make environmentally friendly purchasing decisions. This increases perceived behavior control strength and intention to engage in GPB within the theory of planned behavior framework.

Secondly, the relationship between EK and GPB also contributed to the TPB literature because when a consumer makes a more informed decision to buy products online, it shapes that consumer's attitude towards those specific green products. Within the framework of TPB theory, this suggests that EK enhances the perceived desirability and value of GPB, strengthening the intentions to engage. Within the concept of SET, SF in this study contributed towards enhancing green decisions regarding agricultural products. By engaging in such choices, consumers perceive that they will be accepted by society and receive social approval and recognition in their communities. Associated with GPB, SF shapes consumers' perceptions of the cost and benefit analysis associated with GPB; when these norms strongly support such sustainable decisions by consumers, the perceived benefits of their participation in green purchasing outweigh the perceived cost.

Finally, it contributes to the literature by highlighting how GPB leads to consumers' satisfaction with green products. It identifies how CC mediates the relationship between GCS and loyalty. Moreover, the introduction of EI provides a novel dimension to our comprehension of how emotions affect sustainable consumption patterns and how consumers suggest buying such products in the future. In conclusion, this study enriches the theoretical framework for understanding and promoting sustainable agricultural consumption while emphasizing the importance of emotional engagement in shaping consumer behavior.

5.3 Practical implications

The practical implications of this study are profound. Businesses operating in the green agricultural product sector should focus on improving products and OSQ to engage and make loyal consumers. Also, those businesses working and selling green products in the market should teach consumers through different ads about the benefits of purchasing these products. When consumers know how green products benefit the environment, they prefer to buy from that business. They will especially make more informed decisions; their purchasing decisions will be aligned with the company's mission of environmental safety. Practically, social value also plays an important role when buying green products online. SF can enhance the overall strategy to foster a green culture of consumption and its contribution to a green environment.

Furthermore, recognizing the vital role of CS in driving CL, companies should prioritize strategies that enhance consumer experiences with their eco-friendly offerings. Companies can initiate loyalty programs; they can use multiple strategies to engage their loyal consumer and offer them rewards so they can feel special; in this way, businesses can get a chance to market, which can benefit in many ways. Also, companies try to make the CC handling process faster to remove the complaints as soon as possible. When complaints are resolved automatically, consumers become satisfied with the business, and loyal consumers come repeatedly to buy the products and become recommenders. Importantly, businesses should also be tuned to the emotional aspects of sustainability, as EI can either amplify or dampen the impact of CL on repurchase and recommendation intentions.

This highlights the need for tailored marketing and communication strategies that evoke positive emotions and strengthen consumer commitment to green agricultural products, driving sustainability in the industry. Focusing on after-sales services also benefits businesses in many ways. Satisfied consumers can help the company by generating positive comments on social media platforms and in the public opinion process.

5.4 Limitations and future recommendations

This research has the following limitations and some recommendations. This study only identified one variable, EI, as a moderator; further research explores more variables by which an apparent change can be identified in post-purchase behavior. Businesses should focus on sustainability education, improving product and online service quality, and enhancing eco-friendly consumer experiences. This article only explores green agricultural products to measure consumers' informed level of decisions online; future researchers can identify another sector, like beauty products, to measure the purchasing behavior of consumers. The target population for this study is consumers who are used to buying these products. Future researchers can have the view of business owners who are selling green products in the market, and can measure the difference in sales between green and non-green brand products.

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